Multi-County Goods Movement Action Plan

Volume 1: Action Plan

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
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April 30, 2008

“The findings and recommendations of this document supersede all previous technical documents.”

Table of Contents

Volume 1

EXECUTIVE SUMMARY (Bound Separately) 1

CHAPTER 1 – PROJECT OVERVIEW 1-1
CHAPTER 2 – STAKEHOLDER OUTREACH 2-1
CHAPTER 3 – EXISTING CONDITIONS AND CONSTRAINTS 3-1
CHAPTER 4 – FUTURE FORECASTS 4-1
CHAPTER 5 – ECONOMIC AND ENVIRONMENTAL ISSUES AND CONSTRAINTS 5-1
CHAPTER 6 – PROJECTS AND STRATEGIES TO IMPROVE THE MOVEMENT OF GOODS 6-1
CHAPTER 7 – RECOMMENDED ACTION PLAN 7-1

REFERENCES Ref-1
LIST OF ABBREVIATIONS Abb-1
GLOSSARY OF TERMS Glo-1

COUNTY-SPECIFIC ACTION PLANS
Los Angeles County
Orange County
Riverside County
San Bernardino County
San Diego County
Ventura County

APPENDIX A: FINANCIAL FRAMEWORK A-1
APPENDIX B: SUPPORTING TABLES B-1
APPENDIX C: COMPENDIUM OF PUBLIC COMMENTS AND PROJECT PARTNER RESPONSES C-1
APPENDIX D: TRADE CORRIDORS IMPROVEMENT FUND SUMMARY FOR SOUTHERN CALIFORNIA AND SAN DIEGO BORDER REGIONS D-1

Volume 2

Project Management Plan
Tech Memo 2a – Stakeholder Opinion Survey of Goods Movement Issues
Tech Memo 2b – Public Outreach – Survey No. 2 Report
Tech Memo 3 – Existing Conditions and Constraints
Tech Memo 4a – Freight Demand
Tech Memo 4b – System Performance Report
Tech Memo 5a – Economic Benefits and Costs of Growth in Goods Movement
Tech Memo 5b – Environmental and Community Impacts
Tech Memo 6a – Evaluation of Initial Goods Movement Strategies
Tech Memo 6b – Evaluation of Detailed Goods Movement Strategies
Tech Memo 7 – Mitigation Strategies

MULTI-COUNTY GOODS MOVEMENT ACTION PLAN

EXECUTIVE SUMMARY
APRIL 2008

Metro Caltrans OCTA rctc Riverside County Transportation Commission Governments SANBAG Working Together Southern California Association of Governments VCTC SANDAG

Prepared for:

Los Angeles County Metropolitan Transportation Authority (Metro)

Orange County Transportation Authority (OCTA)

Riverside County Transportation Commission (RCTC)

San Bernardino Associated Governments (SANBAG)

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Introduction

Purpose

The Multi-County Goods Movement Action Plan (MCGMAP or Action Plan) represents an unprecedented partnership between county, regional, and state transportation agencies to address the goods movement challenge faced by the Southern California counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura, and Imperial (See Figure 1). Collectively, these counties comprise the United States' premiere international commerce gateway, handling 44 percent of the Nation's containerized imports. This preeminence reflects Southern California's competitive advantage derived from its unique combination of large deep-water ports, the California/Mexico border crossings, the West Coast's largest population concentrations, one of the Nation's largest densities of transloading, consolidation, and distribution warehouses, and intermodal facilities. The region also has unparalleled connectivity by all-weather Interstate freeways and transcontinental rail lines to all points within the United States.

However, the rising tide of goods moving through the region imposes multiple mobility, environmental, and community impacts that degrade the region's quality of life and threaten the continued growth of the Southern California freight movement industry on which most of the nation relies. The MCGMAP identifies actions to be undertaken by the partner agencies, together with state and federal agencies and the private sector, to maintain Southern California's role as a center for international trade, commerce and manufacturing by planning for freight growth while simultaneously and aggressively mitigating environmental and local community impacts. The Action Plan sets forth a way to structure and understand the issues and defines actions that should be taken to address infrastructure needs, environmental concerns, and community impacts within the context of that structure. It incorporates and builds on existing studies and initiatives already in progress, and from them develops an integrated, comprehensive, regional approach.

This Executive Summary provides an overview of the region's goods movement challenges, the MCGMAP vision, principles, plan approach, and recommended actions. Also included are the lists of goods movement projects needed to maintain mobility in the face of forecasted demand. Specific and detailed information is contained within the topical chapters of the Action Plan. Additional information is also provided within the contents of technical appendices and memoranda (Tech Memos) prepared throughout the course of this effort, which are available on the project website (http://www.metro.net/mcgmap).

Figure 1: Southern California County Boundary Map

MCGMAP - The Master Plan for Goods Movement in Southern California

The Action Plan is the master plan for goods movement in Southern California and is intended to be used as a guide in preparation of state, regional, and local transportation plans. The objectives of the MCGMAP are to develop strategies that: 1) address the goods movement infrastructure capacity needs of the region; 2) reduce goods movement emissions to help achieve air quality goals; and 3) improve the quality of life and community livability for Southern California residents. The Action Plan is regional in scope, so that the Plan's analyses of potential strategies and investments are at a corridor rather than a local or project-specific level. While detailed project-level analyses were not part of this effort, they are nevertheless critical and will be conducted as part of subsequent project development efforts. The MCGMAP is intended to be a living document that will be revised and updated when major changes occur and if resources are available.

MCGMAP Partner Agency Roles

Goods movement is a diverse industry with a broad and disparate group of public and private sector stakeholders, each with its own roles and responsibilities. The MCGMAP partners are the transportation and planning agencies that co-manage the development of the Action Plan: Los Angeles County Metropolitan Transportation Authority, Orange County Transportation Authority, Riverside County Transportation Commission, San Bernardino Associated Governments, San Diego Association of Governments, Southern California Association of Governments, Ventura County Transportation Commission, and Caltrans Districts 7, 8, 11, and 12. The MCGMAP partners plan, fund, maintain, operate, construct and implement multi-modal transportation projects and influence the goods movement system through the regional planning and programming of funds to transportation projects.

Other organizations, such as the Ports of Los Angeles and Long Beach, have authority to plan and construct transportation and facility improvements within the Ports' jurisdiction, while the South Coast Air Quality Management District (AQMD) develops and implements plans to improve the region's air quality. Decisions regarding land use, arterial improvements and the permitting of warehouses and transloading centers are made by local municipalities.

Regional, state, and federal agencies have varying regulatory authorities over the trucking and rail industries, but the MCGMAP partners have little ability to regulate the operations, business practices, or pollutant emissions of the private sector goods movement operators, and no authority to regulate shippers and ocean carriers. As a result, the MCGMAP partners have focused primarily on goods movement infrastructure while acknowledging the essential roles to be played by the regulatory agencies, the Ports Clean Air Action Plan (CAAP), and public or private technology initiatives.

Given their defined roles and responsibilities, the MCGMAP partners cannot fully implement many of the plan's recommended strategies on their own. Therefore, to fully realize the benefits of this plan, continued collaboration and consensus building among the MCGMAP partners and other public and private sector stakeholders will be critical.

"The Action Plan is the master plan for goods movement in Southern California and is intended to be used as a guide in preparartion of state, regional, and local transportation plans."

Simultaneous and Continuous Improvement – An Overarching Strategy

The vision of the Action Plan – a cleaner and healthier environment, alternative mobility strategies, and fair-share investment approaches - must be implemented through simultaneous and continuous improvement of the environment and infrastructure. Figure 2 depicts the concept and importance of a simultaneous and continuous approach. Environmental mitigation, including significant cleanup of emissions from ships, trains, and trucks, is critical to reduce the impact of existing and increased freight flows and to reach the region's air quality attainment targets. Expanded marine terminals, and inter-modal, rail, and highway infrastructure are needed to accommodate the growing freight volume. The freight growth that is accommodated through these actions provides the economic base for public and private investment in infrastructure and the environmental cleanup. The vision of the MCGMAP is to implement these elements in parallel – capacity, investment, and mitigation – each of which is necessary for the other to succeed.

Figure 2: MCGMAP Simultaneous and Continuous Approach

Core Mandates and Implementation Principles

The project partners developed four core mandates and six implementation principles to provide the guiding framework for the development of the MCGMAP.

CORE MANDATES

***ENVIRONMENT:* Avoid, Reduce, and Mitigate Environmental, Community, and Health Impacts**

Environmental and community impacts must receive equal attention in the implementation of solutions.

***MOBILITY:* Promote the Safe and Efficient Movement of All Transportation Modes and Reduce Congestion**

Existing and projected traffic growth will result in the significant deterioration of the region's highway and rail system's performance capabilities. The region's transportation system presents significant safety concerns for the public, particularly at-grade crossings and truck accidents, and increasing truck traffic in neighborhoods.

***ECONOMY:* Ensure the Economic Well-Being of the Region and the State**

Goods movement is an important segment of the MCGMAP region and the U.S. trade economy. Goods movement and the associated industries (e.g., logistics) provide direct and indirect benefits to the region's economy. Each new logistics job supports two new jobs in the economy.

***FUNDING:* Secure the Region's Fair Share of Public and Private Funds for Investment in the Freight Transportation System**

Although the region's goods movement system serves markets within and outside of California, these markets and associated system users are not paying their fair share to offset the costs of regional freight congestion and related health impacts. While still advocating for dedicated federal and state funding sources, user-based public-private funding arrangements must be a major component of the financing for critical projects.

Source: CALTRANS District 7

Core Mandates and Implementation Principles

IMPLEMENTATION PRINCIPLES

The MCGMAP builds upon the principles set forth in the Statewide Goods Movement Action Plan (January 2007). The following represent implementation principles specific to MCGMAP:

1. Guideline: The Action Plan is the master plan for goods movement in Southern California and is intended to be used as guidance in the preparation of state, regional, and local transportation plans. The Action Plan can also be a tool for local jurisdictions to make informed land use decisions.

2. Investment: Investments in goods movement infrastructure will be implemented on a simultaneous and continuous basis with investments in environmental/community mitigation.

3. Cost Distribution: A fair share of the cost of the impacts of goods movement on transportation infrastructure, environment, and communities must be borne by those benefiting from it.

4. Management: The need for institutional mechanisms for financing or implementing projects, will be defined as such needs are clearly identified.

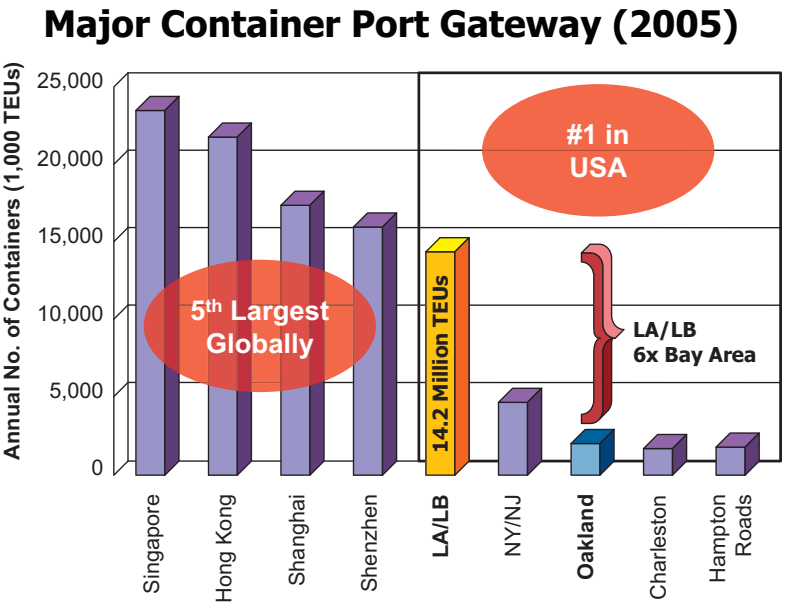
5. Public Benefit: Projects supported by public/private partnerships and private projects supported by public funding should demonstrate a clear public benefit.

6. Land Use Compatibility: Partner agencies shall encourage land use decisions that will result in buffers – both open and developed – that separate goods movement infrastructure and sensitive receptors such as residential areas, schools, and hospitals.

CHALLENGES FOR THE NATIONAL TRADE GATEWAY

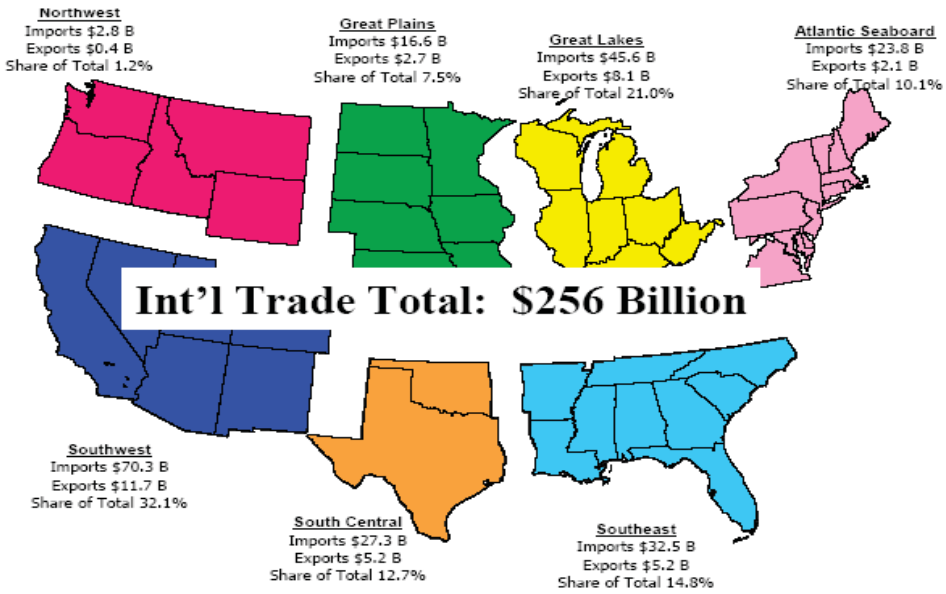
Currently, the Ports of Long Beach and Los Angeles (San Pedro Bay ports) accommodate more than 40 percent of all international containerized cargo into and out of the U.S. and were ranked 5th in the world in 2005 (see Figure 3). All indications point to a future demand in international freight flows that will exceed even the most aggressive efforts by the ports, railroads, and transportation agencies to accommodate it. Container volumes through the San Pedro Bay ports are projected to nearly triple from **15.7 million TEUs** (twenty-foot equivalent units) in 2006 to **42.5 million TEUs** by 2030. These forecasts are constrained by anticipated port capacity at a level significantly below the TEU demand projected for the ports in federally sponsored analyses. A large portion of this trade is simply "through-traffic," degrading air quality and impacting the region's quality of life, while providing limited economic benefit to the region. Approximately 77% of the container-based goods handled by the San Pedro Bay ports are consumed outside the Southern California region. Only 23% are consumed within the region. Freight flowing through the Ports of Los Angeles and Long Beach, which totaled $256 billion in 2005, reaches every state in the continental U.S. as shown in Figure 4.

Figure 3: Major Container Port Gateways



Trucks traversing the California/Mexico border crossing area utilize three primary ports of entry (POE) – Otay Mesa, Tecate, and Calexico East. Mexico is California's number one export market and the fastest expanding component of the San Diego regional economy. The Otay Mesa-Mesa de Otay Port of Entry is the busiest commercial border crossing between California and Mexico, handling more than 1.4 million trucks and $28.6 billion worth of goods in both directions in 2006. This trade represents the third highest dollar value of trade among all land border crossings between the United States and Mexico. Another $1.2 billion in merchandise and more than 140,000 trucks crossed at the Tecate-Tecate POE. For Imperial County, the Calexico East/Calexico II POE processed $11.3 billion in goods and 614,000 trucks in 2006. Nearly 80% of these truck trips stay within the state.

Figure 4: Total Value of Containerized Trade Moving through the Ports of Los Angeles and Long Beach, 2005



Source: Port of Los Angeles, Port of Long Beach, and Alameda Corridor Transportation Authority

The Crisis

The region is faced with multiple mobility, environmental, community impact, funding, and economic challenges:

Mobility Challenge - The study area's ports, airports, rail lines and inter-modal terminals have existing capacity constraints that undermine the efficiency and productivity of the system as a whole. Furthermore, the existing roadway and rail networks are reaching capacity. As a result, the system today is susceptible to disruptions to the movement of goods, causing delays that reduce the quality of services and increase costs to consumers. The mobility challenge is further exacerbated by the fact that the roadways, and rail networks that accommodate the movement of goods are often the same as those utilized by motorists and passengers for the movement of people.

Modeling for the SCAG region (defined as Los Angeles, Orange, San Bernardino, Ventura, Riverside, and Imperial Counties) forecasts that truck vehicle miles of travel (VMT) will increase by over 110% by 2030, growing from a level of 22.4 million VMT in 2000 to 48.4 million VMT by 2030. Some freeways in the region currently handle up to 40,000 trucks per day, and it is projected that these freeways may have to handle up to 80,000 trucks per day by 2025. As a result of the growth in passenger and truck traffic, the highway system's performance will deteriorate significantly. In fact, average speeds will drop from 35.9 mph in 2005 to 31.9 mph in 2030, resulting an average of 5.4 million hours of delay daily for all traffic. Furthermore, freight rail volume is projected to increase from 112 trains per day in 2000 to 250 trains per day in 2025 along the BNSF and Union Pacific mainline rail network. The current and future mobility challenges for the region are daunting and require immediate action as well as proactive steps to address future needs.

Environmental and Community Challenges - The goods movement system directly affects quality of life. This includes traffic congestion, truck intrusion into neighborhoods, safety, land use incompatibility, poor air quality and related health impacts, restricted mobility and delay at rail crossings, noise and vibration impacts, and visual impacts.

The dimensions of these impacts are staggering when viewed within the context of Southern California's designation as a non-attainment region for air quality. The use of bunker and diesel fuels, predominantly for the transport of freight by ocean going vessels, is a large contributor to the deterioration of the region's air quality. Furthermore, new health studies are drawing ever stronger conclusions about the association of air pollution with public health effects such as asthma, reduced lung function, and cancer risk that target the most vulnerable in the port communities and around other logistics centers - children. Implications of these findings are reflected in the estimated public health impacts summarized by California Air Resource Board (CARB) in Table 1.

Solving the challenge of moving freight is greatly complicated by the knowledge that failure to convert large proportions of the railroad engines and truck fleet to low-emitting or zero-emitting engines in the near future will result in missing the regional emission reduction targets needed by 2014 to meet the federal annual PM 2.5 standard, and by 2019 to meet the federal 24-hour PM 2.5 standard. Failure to meet the budget for the State Implementation Plan for air quality could result in a cessation of the flow of federal funds for highway projects. Thus, mobility and environmental challenges are heavily intertwined.

Source: CALTRANS District 7

Table 1: CARB Annual (2005) Health Effects of PM and Ozone Pollution

Annual (2005) Health Effects of PM and Ozone Pollution from Freight Transport in California

Health Outcome [A]	Cases per Year	2005 Valuation ($ Millions)
Premature Death [B]	2,400	19,000
Hospital Admissions (respiratory causes)	2,000	67
Hospital Admissions (cardiovascular causes)	830	34
Asthma and Other Lower Respiratory Symptoms	62,000	1.1
Acute Bronchitis	5,100	2.2
Work Loss Days	360,000	65
Minor Restricted Activity days	3,900,000	230
School Absence	1,100,000	100
Total	**NA**	**19,499**

Source: California Air Resources Board, March 2006

A Does not include the contributions from particle sulfate reformed from SOx emissions, which is being addressed with several ongoing emissions, measurement, and modeling studies.

B Includes cardiopulmonary- and lung cancer-related deaths.

Funding Challenges- The goods movement system is significantly underfunded. Projects and programs identified in this Action Plan show funding needs on the order of $50 billion over the next 25 years. Despite accommodating most of the nation's international trade volumes, Southern California has received a disproportionately low share of federal and state funding for goods movement. Moreover, the private sector's role in funding regional and nationally significant goods movement projects to date has been limited.

Economic Challenges - Despite its impacts, international trade provides significant benefits to the region. The logistics industry provides both direct and indirect benefits to the region's economy. Economic studies show that logistics activity is responsible for $90.7 billion, or 6.6%, of the nearly $1.4 trillion in economic activity annually in Southern California. The indirect or induced impact represents another $170 billion or 12.4%. Each logistics job supports 2.2 new jobs in the economy. This contribution to the economy is significant and is important to achieving the MCGMAP vision.

Conversely, the economic benefits of goods movement can be negatively impacted by delays and congestion. At the Otay Mesa and Tecate international border crossings, inadequate and aging infrastructure and more stringent security requirements caused the U.S. and Mexico binational economy to lose $3.9 billion and about 21,900 jobs during 2007. The border delays in freight movement result in increased transportation costs and interruptions in manufacturing and delivery cycles.

In order to maintain the economic vitality of the region, the economic benefits of goods movement must be leveraged and expanded. One of the challenges for the region is to translate a portion of these economic benefits into a stream of funding that addresses the infrastructure improvements made necessary by the increased movement of goods within and through Southern California. In addition, the economic growth attainable through increased logistics activity is needed to finance the cleanup of environmental problems that have been allowed to accumulate.

Source: CALTRANS District 7

HYUNDAI
AMERICAN
Yellow

Source: CALTRANS District 7

Currently, goods passing through the Southern California seaports and land ports of entry with Mexico belong to one of three modal "market segments": 1) On-dock and off-dock/near-dock; 2) distribution/delivery; and 3) transload. By identifying the modes of travel for goods, a market segmented approach can be developed that will allow for the region to better target improvements and funding sources for goods movement projects and associated environmental and community impact mitigation measures.

Understanding the Market Segments

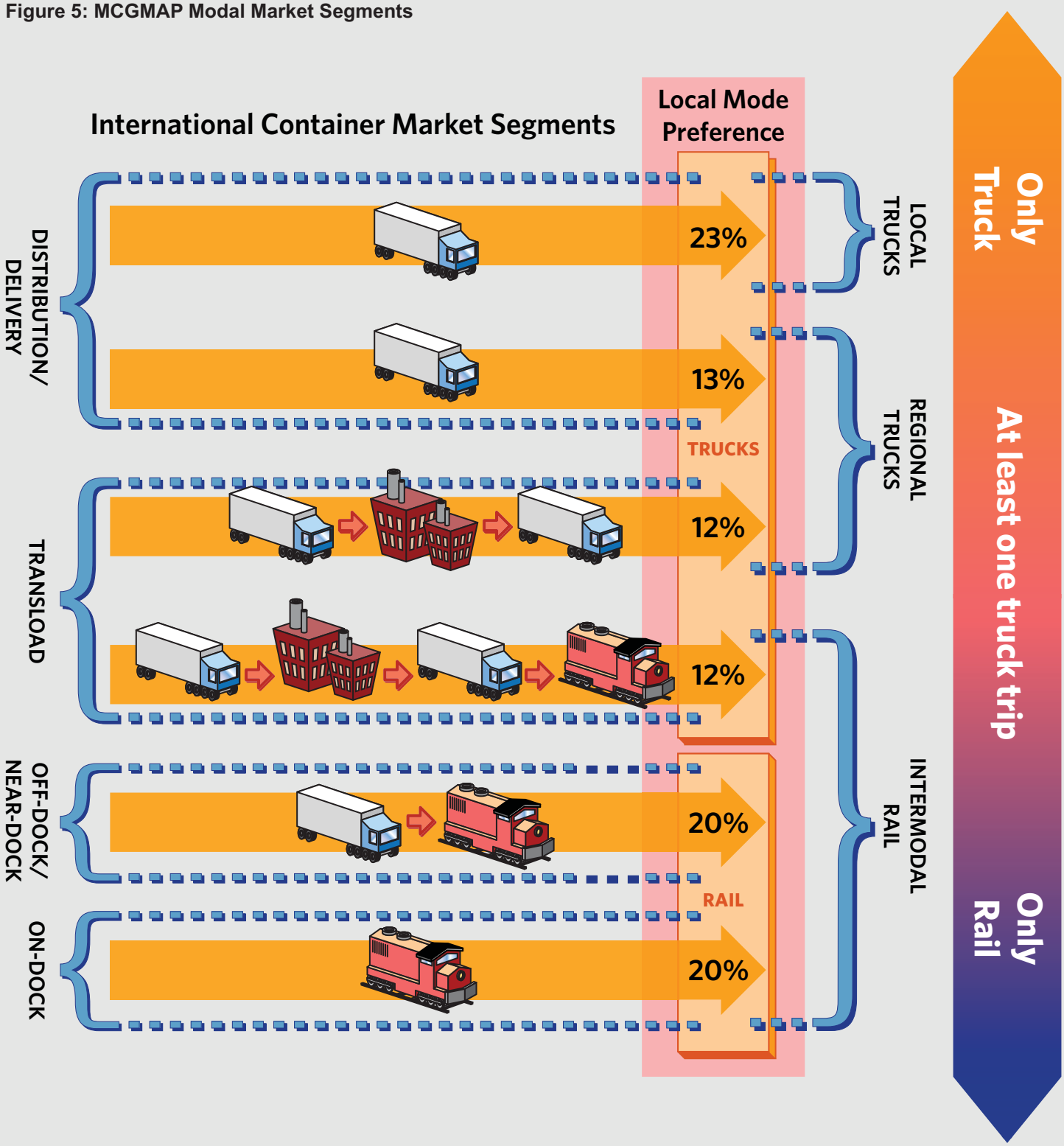
Figure 5 depicts the three primary market segments. Note that the specific percentages listed may vary on a daily basis and do not account for domestic goods movement, which represents a significant share of truck VMT in Southern California.

- Direct Shipment from on-dock and off-dock/near-dock - Approximately 40% of containers passing through the Ports of Los Angeles/Long Beach leave the region by rail utilizing either on-dock rail at the marine terminals or off-dock/near-dock rail inter-modal facilities. These goods are destined for areas outside the MCGMAP region, including the central and eastern United States. As a result, funding sources for goods movement can be better targeted since the direct benefits to shippers and the nation can be clearly shown. This includes additional state and federal goods movement funding, as well as container fees levied on shippers who receive direct benefits from improved efficiency of the goods movement system.

- Transload - Approximately 37% of containers passing through the Ports of Los Angeles/Long Beach are either trucked directly out of the region or leave the region after an intermediate stop at a warehouse or distribution center. These goods may arrive at the ports as a single container, be transported to an inland distribution center by truck, be broken down into smaller units while at a warehouse or distribution center, then loaded onto either truck or rail to be moved to their final destinations. Such goods use more specific routes through the MCGMAP region and provide better opportunities for targeting of specific routes, users, or impacts relative to local distribution/delivery. This includes truck replacement/retrofit programs, the development of separated corridors that move between clustered warehouse and distribution centers, and concepts such as inland ports and virtual container yards (yard operations to reduce the number of unproductive container truck trips).

- Distribution/Delivery – Approximately 23% of containers passing through the Ports of Los Angeles/Long Beach stay within the Southern California region, with the associated benefits and impacts. Because the origins and destinations for these goods are as dispersed as the people and communities that rely on them, the trucks transporting these goods use various roadways and routes for travel and blend into all other vehicular traffic within the region. Domestic goods movement, such as local delivery, construction, manufacturing, and service/utility trucking exhibit similar travel patterns. Because the users and shippers of this modal market are so widely varied, it is difficult to target individual users for funding without ignoring other users. Traditional funding sources for roadway improvements and alternative funding approaches for roadway tolling or congestion pricing will be needed to address this market segment.

Figure 5: MCGMAP Modal Market Segments



RAIL ROAD
CROSSING
2
TRACKS

Action Plan Framework

The MCGMAP is structured around four sets of actions, each of which is related to a component or segment of the goods movement market. Pages 10 and 11 discuss the concept of market segmentation of the goods movement flows within and through Southern California. It is a concept for structuring the problem in a way that lends itself to more targeted and cost-effective solutions. The three basic market segments of freight flows are:

- Direct intermodal rail shipment from on-dock and off-dock/near-dock to locations outside the region
- Transload (regional trips with an intermediate stopping point)
- Local distribution/delivery by trucks

The MCGMAP strategy distributes four "action sets" across the three basic market segments. This represents the basic structure upon which MCGMAP is built. The four action sets include:

1. Accelerate regional environmental mitigation
2. Relieve congestion and improve mobility
3. Improve operational efficiency
4. Develop equitable public/private funding strategy

Table 2 illustrates the core elements of the MCGMAP strategy by identifying the types of actions appropriate to address the needs of each market segment. In some cases, such as the environmental strategies, similar actions cut across all the market segments, but the appropriate source of funding from which to draw resources may vary.

Table 2: Example Actions Targeted by Market Segment

FREIGHT MODAL MARKET SEGMENTS	*ACTION 1 -Accelerate Regional Environmental Mitigation*
Freight moves destined outside of Southern California (~52%) - No Stops within Region –" Intermodal Rail"	
Freight loaded onto trains at the dock (~20%) Freight transported to near dock facility then onto a train (~20%) Freight transported directly out of the region by truck (~12%)	• Accelerate emission reduction measures in CAAP, AQMD, and state plans • Use clean technology shuttle to intermodal facilities • Use low emission train engines or electrification • Construct grade separations in ACE corridor
Freight moves destined outside of Southern California (~25%) – With at Least One Stop within Region – "Regional Trucks"	
Freight trucked to a warehouse, an intermodal facility and then loaded onto a train (12%) Freight trucked to warehouse, then trucked to a final destination outside of the region (13%)	• Accelerate emission reduction measures in CAAP, AQMD, and state plans • Use clean technology shuttle to inland ports • Use low emission train engines or electrification • Coordinate community impact mitigation and land use planning • Adopt incentive programs for turnover of truck fleet to clean technology
Local freight moves within Southern California (~23%) – Multiple Stops within Region – "Local Trucks"	
Freight trucked to numerous locations within the region	• Accelerate emission reduction measures in CAAP, AQMD, and state plans • Continue project-specific impact analysis and mitigation measures

Action Plan Framework

ACTION 2 - Relieve Congestion and Increase Mobility	ACTION 3 - Improve Operational Efficiency	ACTION 4 – Develop Equitable Public/ Private Funding Strategy
• Construct rail mainline capacity improvements • Construct Colton Crossing • Use clean technology shuttle to intermodal facilities	• Increase on-dock loading • Expand hours of port operation (PIERPASS) and intermodal terminals operation	• Railroad (private) funding and public funding proportional to benefit • User fees (e.g., container fees) • Increase federal participation
• Construct highway capacity improvements • Study feasibility of dedicated freight guideway(s) • Use clean technology shuttle to inland ports	• Adopt flexible hours of operation (warehouse/ distribution centers) • Study feasibility of virtual container yards • Expand use and integration of Intelligent Transportation Systems for highways and vehicles	• Railroad funding and public funding proportional to benefit • Traditional highway funding • Possible truck tolling on dedicated failities • Container fees • Increase federal and state participation • Conditions of approval and development fees for community mitigation
• Construct highway capacity improvements • Study dedicated freight guideway(s) on freeways and roadways	• Adopt flexible hours of operation (delivery) • Expand use and integration of Intelligent Transportation Systems for highways and vehicles • Alleviate physical factors and conditions that may constrain operations of trucks(ie. lane widths, vertical and horizontal constraints and curvature, shoulders, pavement)	• Traditional highway funding • Possible truck tolling on dedicated facilities • Conditions of approval and development fees for community mitigation

Accelerate Environmental Mitigation | ACTION SET 1

Goods movement imposes significant costs on community livability and the environment. Therefore, the MCGMAP partners consider air quality improvements and regional environmental mitigation an intrinsic part of a regional goods movement system.

The Action Plan recognizes that a regional approach is necessary, with the focus on cleaning up emissions at the source (i.e. the powertrains of ships, locomotives, trucks, and harbor equipment) not one based simply on project-by-project mitigation. The simultaneous and continuous implementation of environmental mitigation strategies is a leading imperative for this Action Plan and will require action at two levels: 1) Region-wide approaches; and 2) project-specific mitigation measures.

Region-wide Approaches

A systems approach is required to reduce the air quality, community and environmental impacts of goods movement flowing into and through the region. This approach has three components – acceleration of the funding and implementation of air quality plans already prepared, strengthening of fuel and engine standards, and institutional policies.

- ***Acceleration of funding and implementation of air quality plans -*** Some of the nation's most aggressive clean air improvement plans are now in place in Southern California: the San Pedro Bay Ports Clean Air Action Plan (CAAP), the 2007 South Coast Air Quality Management Plan (AQMP), and the California Air Resources Board (CARB) Emission Reduction Plan. The MCGMAP supports these plans and proposes to accelerate the implementation of the strategies in those plans. Accelerating the environmental cleanup from goods movement sources is one of the principle themes of the environmental actions in the MCGMAP.
- ***Strengthening of fuel and engine standards -*** Regulations that promote the use of clean fuels and engine standards/technologies should be strengthened beyond those currently proposed. This will need to be supported by accelerated research and development of cleaner technologies by private industry, and by implementation assistance from state and federal regulatory agencies. These actions by private industry and regulatory agencies will allow regional and local strategies and incentive programs in the CAAP and AQMD to have greater effect.
- ***Institutional policies –*** Cooperative and coordinated institutional and development policies enacted by local jurisdictions and the development industry could result in environmental and community benefits. Such policies could include: 1) Designating quiet zones for rail corridors; 2) amending zoning and land use regulations to better avoid non-compatible land uses (separating goods movement activities from residential areas; buffering); and 3) establishing mitigation banking and/or development of pooled funds for mitigation (e.g., land use changes, purchasing green space along freight corridors, diesel truck retrofits, funds for health clinics, etc.). The partner agencies have embarked on a collaborative effort with community stakeholders and the private sector to develop such guidelines (see first bullet under specific actions).

Project Specific Mitigation Measures.

While the proposed broader regional strategies will result in significant reductions in emissions for the study area as a whole, project specific mitigation measures are often most effective at the local level, resulting in more tangible benefits for local neighborhoods and communities. Therefore, the Action Plan supports the use of project-specific revenue mechanisms to help fund mitigation efforts. Examples include:

- Use of best available technology and best practices for project construction and operational impacts.
- Compliance with natural resource statutes (e.g., federal and state Endangered Species Acts and Clean Water Acts, Migratory Bird Treaty Act)
- Inclusion of "smart" design and good planning principles, such as landscaped buffering, noise barriers, exterior light shielding and positioning, separation of incompatible land uses, and wetlands protection.

SPECIFIC ACTIONS

- Develop guidelines for local jurisdictions to use in siting and designing goods movement related land uses and transportation facilities. (Consultant activity is underway)
- Encourage federal participation in developing guidelines and international agreements that regulate vessels (and other stationary sources of diesel emissions) used for transporting goods to and through U.S. ports.
- Support clean lease arrangements made by the ports for reducing ship emissions.
- Initiate a follow-on effort to identify more aggressive goods movement initiatives to achieve regional air quality attainment, including the identification of sources of funding to accelerate the environmental cleanup.

ACTION SET 2 | Relieve Congestion and Improve Mobility

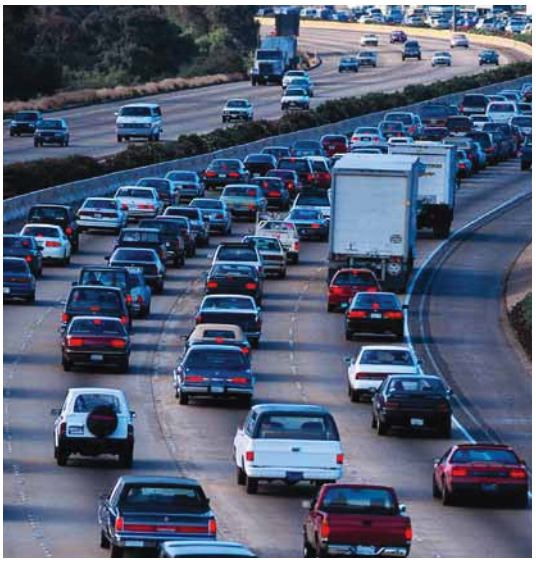
Region-wide congestion relief and increased mobility cannot be achieved without significant investment in infrastructure, coupled with improvements in efficiency and productivity. Utilizing the market segmentation approach, various crucial capital improvements were identified for each of the modes involved in the movement of goods.

Increased Intermodal and Mainline Rail Capacity

Increases in mainline rail capacity and on-dock rail improvements at the ports are critical to the efficient transport of intermodal freight bound for destinations outside the region. The Action Plan recommends implementation of rail improvements in accordance with the San Pedro Bay Ports Master Plans as well as triple tracking the BNSF mainline from Los Angeles to San Bernardino and double tracking the two Union Pacific corridors. These improvements must be done in concert with the grade separations and safety improvements outlined in the multi-county Alameda Corridor East (ACE) Trade Corridor program. Implementing the mainline rail capacity enhancements together with the grade separation of railroad crossings can maximize efficiency and cost-effectiveness while also providing an opportunity to maximize funding from federal and state sources and accelerate the delivery of the needed improvements. Grade separation of the rail-to-rail Colton crossing as well as other rail-roadway grade separations near the the Ports of Los Angeles, Long Beach, Hueneme, and San Diego, and at other key Los Angeles County locations are also critical.

Improved Highways/Roadways

The Plan recommends three tiers of highway actions. The **Tier one** includes major improvements on roadways and bridges in proximity to the ports/border crossings and other major freight activity centers (examples include the Gerald Desmond Bridge replacement project, the SR-47 Expressway, I-110 connectors, High Desert Corridor, SR-78 Brawley Bypass, and the San Diego Border Corridors). **Tier two** is comprised of corridor-level investigation of alternative technologies, separated mass flow applications (e.g., the I-710 Corridor Improvements) as well as dedicated freight guideways/truck lanes with the use of clean engine trucks and/or clean Long Combination Vehicles (LCVs), if such vehicles could be authorized to operate on dedicated facilities in California safely with minimal impacts on surrounding communities. Further consideration of LCVs will require a detailed analysis of potential capital and operational impacts. This tier focuses on new technologies as well as new application of methods not widely used in California. Consequently, these projects will require additional detailed analysis before they can proceed. **Tier three** projects encompass capital and operational improvements that in addition to assisting with the efficient movement of goods, are also beneficial to mixed flow traffic. Such improvements include modification of key freeway-to-freeway interchanges to alleviate operational and geometric bottlenecks, addition of auxiliary lanes, shoulder improvements and other safety and operational improvements on roadways heavily used by trucks.



SPECIFIC ACTIONS

- Complete the ACE Trade Corridor railroad grade crossing improvement program in Los Angeles, Orange, Riverside, and San Bernardino Counties.
- Continue with analysis and planning of I-710 dedicated freight guideway facility.
- Further investigate the feasibility of inland port / concentrate inland warehouse and distribution locations.
- Increase border trade capacity and efficiency.
- Implement key projects listed in the regional and county-specific Tables 5 and 6.
- Participate with the railroads in eliminating key bottlenecks and increasing capacity along the mainline rail system as outlined in the Los Angeles-Inland Empire Railroad Mainline Advanced Planning Study.
- Develop the appropriate institutional arrangements and negotiating framework to provide simultaneous and continuous improvement to mainline track improvements, the Colton Crossing grade separation, highway-rail grade separations, locomotive emission reductions, and other rail corridor related mitigations.
- Initiate a Regionally Significant Transportation Investment Study (RSTIS) to evaluate the feasibility of implementing a Dedicated Freight Guideway System/Regional Truck Lanes (I-710 From Port of Long Beach to SR-60; East-West Corridor between the I-710 and to I-15; and I-15 to Victorville) inclusive of potential non-freeway implementation.

Any comprehensive strategy to address mobility, improve predictability and enhance safety needs to address system and corridor capacity. This includes improvements to the operational efficiency of the region's goods movement system. The operational efficiency of various segments of the goods movement system can be improved based on specific modal market segments.

Improve Marine Terminal Productivity, Truck Turn Times, and Intermodal Operations

In order to meet the future demand, the Ports of Los Angeles and Long Beach will increase their operational productivity from the existing level of 4,700 TEUs per acre per year to almost 11,000 TEUs per acre per year. The current focus is on increasing on-dock rail use and extending hours of operation to off-peak time periods (PIERPASS). Additional strategies include the transport of unsorted containers from the ports to inland railyards separated from residential areas for the creation of destination trains, as well as introducing new technologies such as optical character recognition (OCR) and radio frequency identification tags (RFID), and the evaluation of the feasibility of a virtual container yard to reduce the number of unproductive empty container truck trips.

Improve Highway Operations

Increased implementation of Intelligent Transportation Systems (ITS), weigh-in-motion (WIM) systems, highway pricing such as Open Road Tolling (ORT) collection systems, improved incident management, and enforcement of driver and operating restrictions can improve highway operations. ITS solutions allow for truck routing, traffic control during construction or maintenance, as well as the shifting of truck movement to off-peak times. WIM bypass systems are an effective means of traffic management in the proximity of weigh stations. The system helps maintain normal traffic flow and prevents traffic backup onto the mainline freeway resulting from commercial vehicles entering and exiting weigh stations. Open Road Tolling allows users to travel at highway speeds on the mainline while their tolls are collected electronically overhead, reducing congestion and travel times for passenger and commercial vehicles. California has established a statewide standard for use at all toll roads and bridges utilizing the "FasTrak" device.

SPECIFIC ACTIONS:

- Implement efficiency improvements contained in the San Pedro Bay Ports Master Plans that reduce impacts from trucks and containers on the transportation system and community.
- Improve terminal productivity, truck turn times, and inter-modal operations.
- Implement the highway operational improvements listed in Table 6.
- Develop partnerships between public and private entities to research and develop advances in goods movement transportation technologies.

ACTION SET 4 | Develop Equitable Public/ Private Funding Strategy

Funding and implementation of the recommended actions, projects, and programs and their associated mitigations will require a coordinated effort by the private sector and public sector at all levels of government. It is critical that all beneficiaries of goods movement participate in funding infrastructure improvements as well as environmental mitigation. Beyond its value to the regional economy, the existing border crossings and commercial trade with Mexico are also critical to the regional and bi-national economies. Cross-border goods have origins and destinations to California/regional retail markets and manufacturers to shipping beyond California through the San Pedro Bay Ports and the Inland Empire Rail/Intermodal distribution centers.

To illustrate the shortfall in public funding, the Alameda Corridor-East Trade Corridor, which would provide much needed grade-separation projects to reduce congestion and emissions throughout the region, has an 83% funding shortfall - $3.8 billion out of the $4.4 billion total.

Maximize the Study Area's Fair Share of State and Federal Funds

Federal assistance is essential to compensate for the disproportionate local and regional costs for the goods movement infrastructure (and associated regional environmental and community impacts and necessary mitigations) provided to the rest of the nation. The next national transportation funding reauthorization legislation must recognize the importance of funding a national goods movement system, establish appropriate levels of federal funding support, and provide further opportunity for flexibility in the use of federal funds. The four freight-related programs of key relevance are 1) Projects of National and Regional Significance, 2) National Corridor Infrastructure Improvement Program, 3) Freight Intermodal Distribution Pilot Program, and 4) Truck Parking Facilities Program. Though state and federal funds are needed, any funding for private infrastructure to increase capacity and facilitate the throughput of goods must ensure that public dollars are used in return for public benefits, not merely for benefits to the private logistics system. The development of public-private benefit assessments among the private beneficiaries and public agencies is one method to address this issue.

Private Sector Contribution

Recognizing funding shortfalls for infrastructure projects and the fact that private industry benefits from an improved goods movement system, the MCGMAP recommends efforts to secure private revenue sources including user fees. This could be done through pending legislative efforts or by other means such as ongoing efforts by the San Pedro Bay ports to negotiate cargo fees for infrastructure and environmental mitigation projects. The types of user fees that should be considered include congestion pricing, port-assessed cargo or container fees, industry-supported programs similar to PIERPASS, and VMT-based taxes or gas taxes for trucks. The Action Plan addresses the need to convert the value of improvements to the study area's goods movement system into revenue for improving infrastructure and mitigating impacts. Federal and state funds require local/private matching funds, thus private sector contributions will add strength to applications for leveraging federal and state funds.

Stakeholders in San Diego and Baja California, Mexico are investigating the potential for use of public funds together with private financing and toll fees for a new border crossing, highways, and federal inspection staffing at Otay Mesa East, California / Mesa de Otay II, Baja California. Similar pursuits for new border crossings or expansions are also projected along the Imperial County, California / Mexicali, Baja California border.

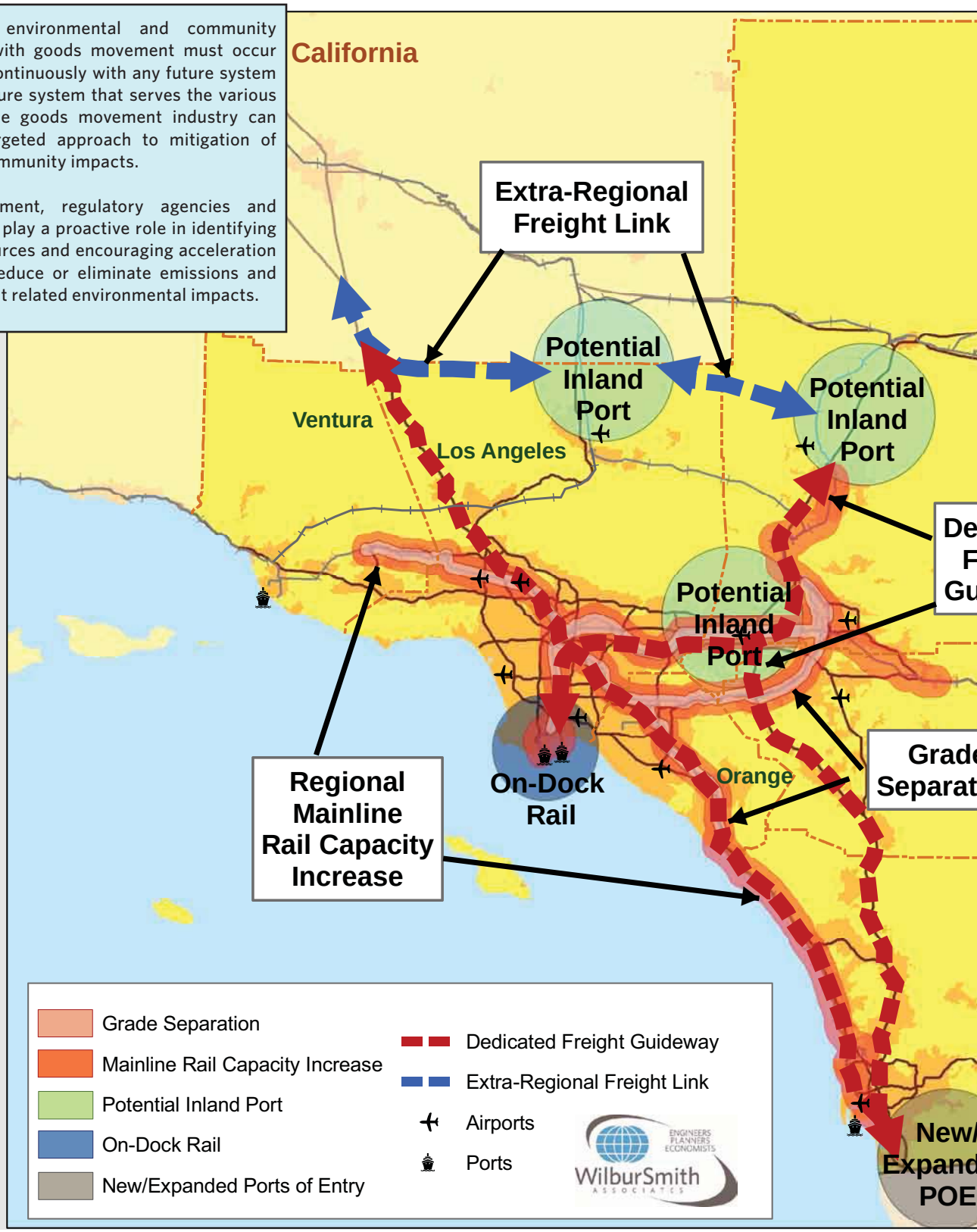
SPECIFIC ACTIONS

- Maximize Southern California's fair share of state and federal funds through ongoing and coordinated legislative efforts.
- Provide input to legislation focused on user fees and to any ongoing efforts to negotiate user fees with industry that can be included in a specific plan of finance for goods movement and air quality improvements.
- Pursue public-private funding arrangements for specific facilities, where appropriate .
- Implement the Cooperation Agreement among regional, state, and federal agencies to facilitate the actions contained in the MCGMAP.
- Develop structure for managing user fees and revenues for goods movement infrastructure and community/environmental mitigation projects.

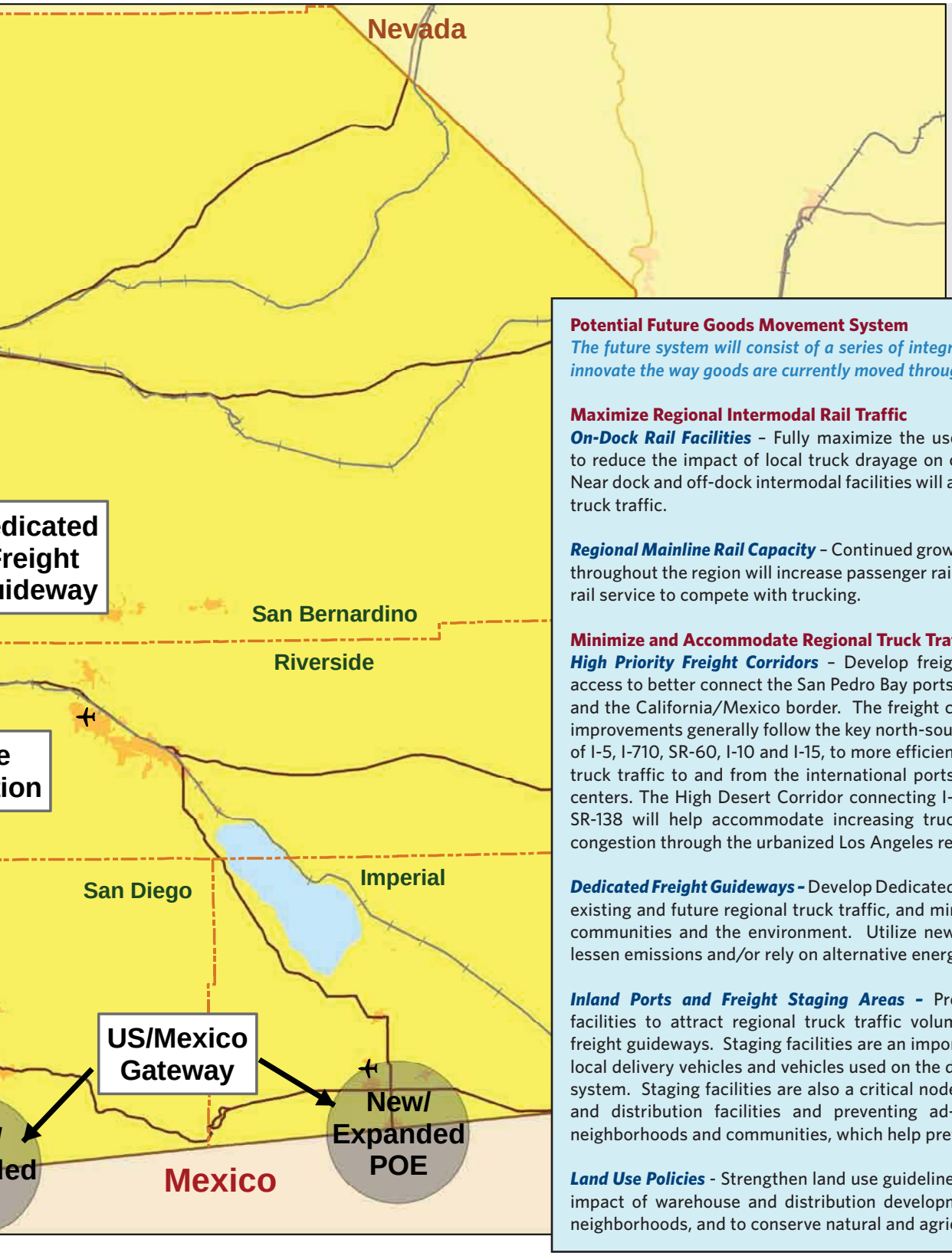
Figure 6: Map of Potential Future System

The mitigation of environmental and community impacts associated with goods movement must occur simultaneously and continuously with any future system improvements. A future system that serves the various modal markets of the goods movement industry can provide a more targeted approach to mitigation of environmental and community impacts.

The federal government, regulatory agencies and private industry must play a proactive role in identifying dedicated funding sources and encouraging acceleration of innovations that reduce or eliminate emissions and other goods movement related environmental impacts.



Potential Future System



Potential Future Goods Movement System

The future system will consist of a series of integral components designed to innovate the way goods are currently moved through the region.

Maximize Regional Intermodal Rail Traffic

On-Dock Rail Facilities – Fully maximize the use of on-dock rail facilities to reduce the impact of local truck drayage on congestion and emissions. Near dock and off-dock intermodal facilities will also be expanded to reduce truck traffic.

Regional Mainline Rail Capacity – Continued growth in mainline rail capacity throughout the region will increase passenger rail services as well as freight rail service to compete with trucking.

Minimize and Accommodate Regional Truck Traffic

High Priority Freight Corridors – Develop freight corridors and improve access to better connect the San Pedro Bay ports, the Inland Empire region, and the California/Mexico border. The freight corridor and border access improvements generally follow the key north-south and east-west corridors of I-5, I-710, SR-60, I-10 and I-15, to more efficiently accommodate regional truck traffic to and from the international ports of entry and distribution centers. The High Desert Corridor connecting I-5 and I-15 generally along SR-138 will help accommodate increasing truck traffic by avoiding the congestion through the urbanized Los Angeles region.

Dedicated Freight Guideways – Develop Dedicated facilities to accommodate existing and future regional truck traffic, and minimize the impact on local communities and the environment. Utilize new modes that eliminate or lessen emissions and/or rely on alternative energy sources.

Inland Ports and Freight Staging Areas – Promote dedicated staging facilities to attract regional truck traffic volumes to use the dedicated freight guideways. Staging facilities are an important interchange between local delivery vehicles and vehicles used on the dedicated freight guideway system. Staging facilities are also a critical node for attracting warehouse and distribution facilities and preventing ad-hoc location throughout neighborhoods and communities, which help prevent land use conflicts.

Land Use Policies - Strengthen land use guidelines and policies to minimize impact of warehouse and distribution development on communities and neighborhoods, and to conserve natural and agricultural lands.

Stakeholder Outreach

This section summarizes the stakeholder outreach efforts of the MCGMAP project, which occurred throughout the development of the Action Plan. The purpose of these outreach activities was to gather comments and input on the Draft Action Plan. Written and oral comments/questions about the Draft Action Plan along with topical responses are included in Appendix C of the Final Action Plan.

Stakeholder participation was an essential component throughout the development of the MCGMAP. In doing so, the project partners attempted to reach as broad a cross-section of stakeholders as possible through the following outreach mediums:

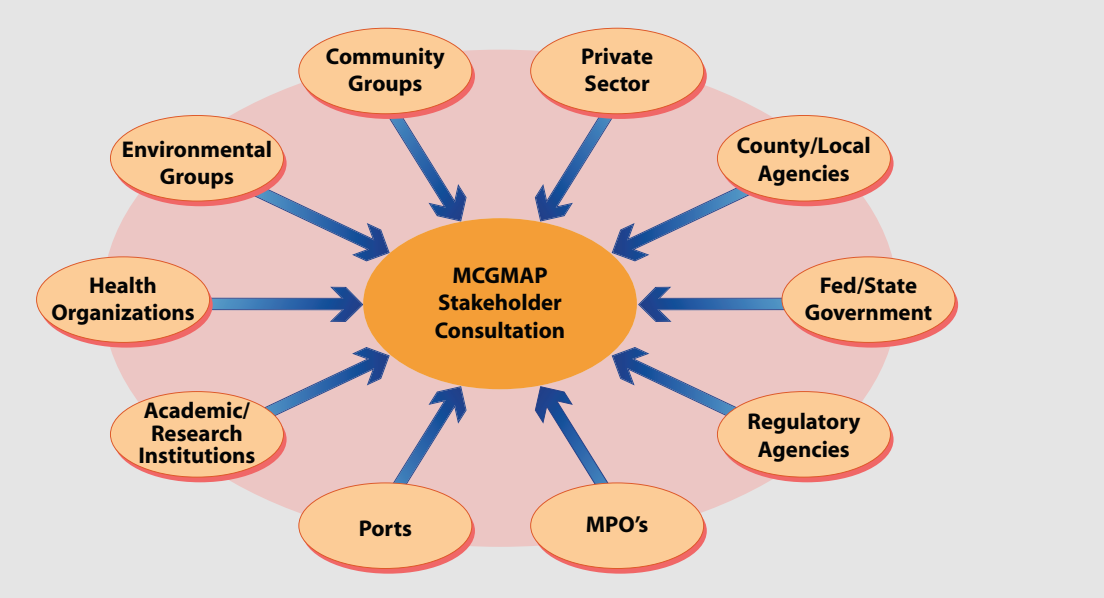
- Project Website;
- Seven (7) Stakeholder Advisory Group (SAG) Meetings;
- Two (2) Public Surveys;
- Presentations to boards, committees and organizations; and
- Twelve (12) Public workshops.

Two survey instruments were utilized and a project website (http://www.metro.net/mcgmap) was established to inform and engage stakeholders. Meetings and workshops were convened to gather input and share findings. The Stakeholder Advisory Group meetings were an important mechanism through which key stakeholders across region were informed and had an opportunity to vocalize concerns to the MCGMAP planners. Representatives from community advocacy and health organizations, air quality regulatory agencies, the ports, the trucking and railroad industries and other transportation agencies at all levels of government were invited to participate in the Stakeholder Advisory Group (SAG) meetings. Additionally, smaller one-on-one meetings were held with many of these groups to confirm data and obtain their individual perspectives on issues related to goods movement. Stakeholder Advisory Group meetings and county workshops provided a forum for stakeholders to comment on the content of the action plan and to express concerns about the impact on local communities, air quality, the environment and the transportation system.

In general, the stakeholders support a coordinated effort among the agencies and stakeholders to solve goods movement challenges facing the region. Stakeholders expressed the following specific concerns:

- Having more aggressive environmental mitigation strategies to reduce current levels of goods movement impacts before any new infrastructure projects are built;
- Dedicating new private/public funding sources to reduce health and environmental impacts of goods movement in the region;
- Providing for more aggressive use of alternative fuels and alternative technologies to address goods movement impacts;
- Questioning whether we need to meet unlimited goods movement demand - all costs and benefits should be studied first; and
- Considering placement of limits on trade growth and diverting it to other ports and instead investing in clean industries as a more cost-effective approach.

Some stakeholders indicated that regional environmental and community impacts must be addressed and mitigated to a level beyond existing air quality attainment goals. However, the authority to increase air quality attainment goals rests with regulatory agencies such as the SCAQMD and CARB, not the MCGMAP partner agencies. For more information, please see Chapter 2 – Stakeholder Outreach in the Action Plan.



Analysis Approach

This section briefly describes the approach to evaluating goods movement projects and strategies. This approach included an analysis of three Port of Los Angeles/Long Beach container volume growth and two levels of infrastructure investment scenarios, a qualitative evaluation of goods movement projects/strategies, and a detailed analysis of twelve bundles of projects, including regional truck lanes.

Analysis of growth scenarios

Four scenarios encompassing three levels of Port of Los Angeles/Long Beach container volume growth and two levels of infrastructure investment were analyzed to determine their economic impact. Table 3 provides a summary of the employment impacts of each scenario. In addition, an attempt was made to estimate the regional mobility impacts of the four scenarios; however, due to data limitations, the regional transportation demand model does not adequately project the linkage between regional truck trips and port container volumes. Consequently, the model could only be used for scenarios 1 and 4.

Table 3: MCGMAP Freight Growth Scenarios

Scenario	*Assumptions*	*2030 Employment impact (number of jobs)*	*Change relative to Scenario 1*
1	San Pedro Bay port growth of 42.5 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation	1,601,476	-
2	San Pedro Bay port growth of 24 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation	1,013,101	-36.7%
3	San Pedro Bay port growth of 33 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation	1,303,490	-18.6%
4	San Pedro Bay port growth of 42.5 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation supplemented by additional projects and private investment sources and fees	1,601,476	0.0%

Evaluation of goods movement strategies

A qualitative evaluation of goods movement projects/strategies was also conducted. This analysis grouped a comprehensive list of 249 projects/strategies (the complete list is included in the Action Plan) into 15 categories of projects ranging from increased highway and rail capacity to changes in operational and institutional practices. The 15 categories of projects were then qualitatively evaluated using 26 evaluation criteria. For more detailed information on this analysis, please refer to Technical Memorandum 6A. In addition, 12 bundles of potential freight improvements including nine dedicated truck lane bundles (bundles 2 through 9) and one dedicated freight guideway were modeled using the SCAG Travel Demand Forecasting model. The model was used to quantify truck volumes using the region's highway network and estimate the number of daily hours of delay reduced for both autos and trucks. Furthermore, for each bundle the potential cost (which was kept at a constant per mile basis), the number of warehouse acres in proximity to each corridor, the number of schools within 1/3 mile of each bundle, and the number of residential acres within 1/2 mile of each bundle was calculated. Results from this analysis are summarized in Table 4.

When interpreting the analysis in Table 4, please note the following:

- Due to the limitations of the analytical tools available, all bundles were modeled using a container forecast volume of 42.5 million TEUs by 2030.
- All analyses were completed from a regional perspective. Analyses were completed with the understanding that further future detailed corridor-specific analyses would be required prior to project implementation. Future detailed analysis should quantify factors not included as part of this effort, such as design, right-of-way considerations including number of displaced properties, impact on commercial properties adjacent to corridors, etc.
- The macro-level analysis of dedicated truck lane systems, advanced technology and other bundles rendered preliminary information that also warrants further investigation and outreach to affected communities to be conclusive.

Further information about the scenarios, project bundles and other model criteria and findings can be found in Chapter 6 of the Action Plan and the technical appendices.

Table 4: MCGMAP Bundle Analysis Results

Bundle	*Description*	*Distance (mi)*	*Reduction of Daily Hours of Delay (vs. 2030 Baseline)*		*Schools**	*Residential* (Acres)*	*Warehouse* (Acres)*
			Autos	*Trucks*			
1	Operational and safety improvements	N/A	-42,000	-1,000	N/A	N/A	N/A
2	I-710 to SR-60 to I-15	101.5	203,000	78,000	35	9,933	6,290
3	I-710 to I-10 to I-15	98.7	289,000	83,000	60	11,329	3,135
4	I-710 to SR-91 to I-15	87.5	192,000	87,000	48	8,684	4,716
5	I-710 to I-10 (WB) / SR-60 (EB) to I-15	100.1	252,000	81,000	77	16,702	6,767
6	I-710 to SR-91 to SR-57 to SR-60 to I-15	110	207,000	76,000	41	10,533	5,057
7	I-710 to SR-91 to I-605 to I-10 to I-15	96.1	273,000	83,000	57	11,177	2,691
8	I-5 (I-710 to Kern County)	74.6	347,000	89,000	31	4,979	579
9	I-5 (U.S./Mexico Border to Kern County)	204.6	112,000	122,000	78	12,806	3,054
10	Mixed-flow toll express-ways: I-710 > SR-60 > I-15	101.5	225,000	32,000	35	9,933	6,290
11	Alternative technologies (e.g. Shuttle Trains, Mag-lev) between POLA/POLB and inland destinations	N/A	98,000	23,000	N/A	N/A	N/A
12	I-15 (U.S./Mexico Border to Victorville)	161.7	185,000	76,000	23	5,500	3,151

Note: *Data does not include San Diego County information.

Project Descriptions and Lists

Project Identification Process

In support of the actions and vision, and market segmentation approach, the partner agencies identified a regional and county specific list of projects or strategies, presented in **Tables 5 and 6**. Many of these projects can be implemented in the short-term while others require additional planning and project development. The projects on these lists are considered essential; neither list should be viewed as taking precedence over the other but rather as complementary efforts to address the effects of goods movement in the region. Given the multi-county nature of this study, the majority of the regional and county Goods Movement Projects/Strategies will require coordination among the multi-county partners and stakeholders.

Table 5, the "Regional Goods Movement Projects/Strategies" represents a short-term to long-term vision for improving the system with primary focus on region-wide projects that provide environmental mitigation or ground access (rail, highway, and intermodal) improvements to and from the international gateways and the multi-county goods movement distribution centers and corridors (existing and proposed) within the Southern California region, (i.e., the San Pedro Bay Ports, the Port of Hueneme, Inland Empire Rail/Intermodal Facilities, the Alameda Corridor and the California/Mexico Ports of Entry). This system is also graphically depicted and further described in Pages 18 and 19.

Table 6, the "County-Specific Goods Movement System Projects/Strategies" includes improvements that are located within a single county and connect with the regional goods movement system of corridors and distribution centers and the statewide goods movement system as identified by Caltrans. Table 6 comprises a list of efforts that: 1) Support the regional projects in Table 5; 2) mitigate environmental and/or community impacts in a shorter horizon; 3) correct short-term system deficiencies; and 4) are recommended in advance or in conjunction with the regional projects based on local needs and project readiness. The County-Specific list, in essence, fills critical gaps in the goods movement network.

As can be seen in the two project lists, an investment of over $50 Billion over the next 25 years is necessary to accommodate the projected growth of freight within the region and to mitigate related impacts. This will require funding commitments from all levels of government as well as the private sector. In addition to this list, a series of actions focused on reducing congestion and environmental impacts are identified in the Action Plan. Each of the County chapters also contains additional projects, strategies and vision for localized improvements identified for future implementation.

Table 5: MCGMAP Preliminary Regional Goods Movement Projects/Strategies

(REGIONAL AND COUNTY-SPECIFIC LISTS ARE BOTH CONSIDERED TO BE OF EQUAL PRIORITY IN MCGMAP. MODES AND PROJECTS ARE NOT LISTED IN PRIORITY ORDER. ALL PROJECTS WILL REQUIRE FURTHER STUDY PRIOR TO IMPLEMENTATION UNLESS ALREADY COMPLETED.)

Environmental mitigation or Mode/System	*Description*	*2007 Cost[1]* (in millions)	*Committed Funds* (in millions)	*Time-frame[2]*
Regional and project specific mitigation and emissions reduction	• Implementation of Goods Movement Infrastructure Projects Could Require Mitigation of Project Specific Impacts	TBD	TBD	S, M, L
	• San Pedro Bay Ports Clean Air Action Plan	$2,067	$464	S
	• Other Goods Movement Emission Reduction Plans and Identified Needs	TBD	TBD	S, M
RAIL				
Grade Separations	• Alameda Corridor East (ACE) Grade Separations and Grade Crossings Improvements	$4,510	$961	S, M
	ACE County subtotals:			
	• Los Angeles County – San Gabriel Valley	*$1,891*	*$343*	*S, M*
	• Orange County	*$731*	*$115*	*S, M*
	• Riverside County	*$1,048*	*$257*	*S, M*
	• San Bernardino County	*$840*	*$168*	*S, M*
	• Gateway Cities BNSF Mainline Grade Separations (on ACE list)	$196	$78	S, M
Mainline capacity enhancements	• Rail Capacity Improvements (e.g., double and triple tracking; Colton Crossing)[3]	$2,200	$0	S, M
Regional Freight Links	• Reconnect Santa Paula Branch Rail Line	$450	$0	M
INTERMODAL GROUND ACCESS				
On Dock Rail	• San Pedro Bay Ports Rail Systems	$631	TBD	S, M
Intermodal Yards/Facilities	• Ports of Los Angeles/Long Beach Union Pacific Intermodal Container Transfer Facility Modernization[4]	$300	$0	S
	• BNSF Port of Los Angeles/Long Beach Near Dock Facility (Southern California International Gateway – SCIG) [4]	$300	$0	S
Inland port	• Further investigation of Inland Port Strategy	TBD	$0	M
ALTERNATIVE TECHNOLOGY				
Truck Lanes/Dedicated Freight Guideway System	• Dedicated Freight Guideway System/Regional Truck Lanes (I-710 From Port of Long Beach to SR-60; East-West Corridor between the I-710 and I-15; and I-15 to Victorville) inclusive of non-freeway corridors	$18,268	$35	M, L
FREEWAY/HIGHWAY				
Freight Corridor Capacity Enhancement and Operational Improvements	• High Desert Corridor[5] (SR-14 to I-15)	$5,600	$0	M, L
	• Alameda Corridor SR-47 Expressway	$662	$265	S
	• SR-60/I-10 Truck Climbing Lane	$55.3	$0	S
	• Replace/Reconstruct Gerald Desmond Bridge	$800	$337	S
	• I-710 Early Action Projects - City of Long Beach (3 Projects)	$500	$12	S
	• I-5 Truck Lanes Projects – North Los Angeles County (2 Projects)	$392	$12	S, M
	• SR-86 NAFTA Corridor Interchange Construction	$150	$0	M
	• SR-58 Corridor Widening Projects (2 Projects)	$301	$0	M, M
Border Crossing Improvements	• Access Improvements to the California/Mexico Ports of Entry at Otay Mesa, Otay Mesa East, and Calexico East Projects (3 Projects)	$1,699	$524	S
	Total	***$39,081.3***	***$2,610***	

Notes: 1. All figures include environmental mitigation costs.
2. S=Short-term (2007-2015); M=Mid-term (2015-2025); L=Long-term (post 2025).
3. Project must demonstrate regional public benefit to qualify for public funds.
4. Private sector fund sources.
5. Require further analysis west of US-395, private sector primary fund source, with possible exception of short-term project to construct section between Phantom East and I-15 ($350 million)

Project Descriptions and Lists

Table 6: MCGMAP Preliminary County Goods Movement System Improvements

(REGIONAL AND COUNTY-SPECIFIC LISTS ARE BOTH CONSIDERED TO BE OF EQUAL PRIORITY IN MCGMAP. MODES AND PROJECTS ARE NOT LISTED IN PRIORITY ORDER. ALL PROJECTS WILL REQUIRE FURTHER STUDY PRIOR TO IMPLEMENTATION UNLESS ALREADY COMPLETED.)

Mode/System	*County*	*Description*	*2007 Cost[1] (in millions)*	*Time-frame[2]*
RAIL				
Grade Separations	VEN	• Construct Rice Avenue/UP Grade Separation	$45	TBD
	VEN	• Construct Rose Avenue/UP Grade Separation	$45	TBD
	VEN	• SR-118/Coast Line – Construct Grade Separation	TBD	TBD
	LA	• Nogales Street (LA Subdivision) grade separation project	$29	S
	OR	• LOSSAN Corridor Grade Seperations	$655	L
Mainline Capacity Enhancement	LA	• Relief siding (2 projects) and upgrade sidings (1 project) on the Antelope Valley Line	$15	S
	SD	• Construct Coastal Rail Corridor	$1,350	S,M
	SD	• Construct South Line Rail/Trolley	$328	S,M
INTERMODAL GROUND ACCESS				
Intermodal Yards/ Facilities	SBD	• Build New BNSF Intermodal Yard in Victorville	TBD	TBD
Maritime	LA	• Shuttle Train Intermodal Service to Inland Empire; Inland Terminal	$60	TBD
	SD	• San Diego Port District Marine Terminal Ground Access	$822	S, M
ALTERNATIVE TECHNOLOGY				
ITS Applications	LA	• San Pedro ATSAC System in City of Los Angeles	$6	TBD
	LA	• Wilmington ATSAC System in City of Los Angeles	$7	TBD
	LA	• Transportation Management, Information and Security System	$10	TBD
FREEWAY/HIGHWAY				
Freight Corridor Capacity Enhancement and Operational Improvements	VEN	• Reconstruct US 101/Rice Avenue IC	$75	M
	LA	• Key Goods Movement Arterial Improvements	TBD	TBD
	LA	• Reconstruct SR-91/I-605 interchange	$240	S
	LA	• Reconstruct I-605/SR-60 interchange	$1,000	S
	LA	• Reconstruct I-605/I-10 interchange	$1,000	S
	LA	• Reconstruct SR-60/SR-57 interchange	$550	S
	LA	• I-110 8th/9th Street Interchange – Add Auxiliary Lanes and Modify/Reconstruct Ramps (Two Projects)	$39	TBD
	LA	• Washington Blvd. Widening and Reconstruction project	$14	S
	LA	• Alameda Street Widening and Reconstruction in Los Angeles (101 Freeway to 7th Street; I-10 to 7th Street)	$29	TBD
	LA	• Seaside Avenue/Ocean Blvd (SR-47) and Navy Way Interchange	$43	TBD
	LA	• I-110 Connector Improvement Program (4 Projects)	$134	TBD
	OR	• I-5 From the I-5/SR-22/SR-57 Interchange to SR-91 add a general purpose lane in each direction	$430	M
	OR	• I-5 Reconstruct El Toro Road Interchange	$120	S
	OR	• I-5 between SR-55 and the SR-133 (near El Toro "Y") add one general purpose lane in each direction and improve interchanges in the vicinity	$319.2	M
	OR	• I-5 between the vicinity of El Toro "Y" to near SR-73 add new lanes in each direction	$315	M

Notes: 1. All figures include environmental mitigation costs.
2. S=Short-term (2007-2015); M=Mid-term (2015-2025); L=Long-term (post 2025).

Table 6: MCGMAP Preliminary County Goods Movement System Improvements (Continued)

(REGIONAL AND COUNTY-SPECIFIC LISTS ARE BOTH CONSIDERED TO BE OF EQUAL PRIORITY IN MCGMAP. MODES AND PROJECTS ARE NOT LISTED IN PRIORITY ORDER. ALL PROJECTS WILL REQUIRE FURTHER STUDY PRIOR TO IMPLEMENTATION UNLESS ALREADY COMPLETED.)

Mode/System	*County*	*Description*	*2007 Cost[1] (in millions)*	*Time-frame[2]*
FREEWAY/HIGHWAY (Continued)				
Freight Corridor Capacity Enhancement and Operational Improvements (cont.)	OR	• I-5 Northbound Extend Existing Truck Bypass Lane From Crown Valley to El Toro Road. Add Auxiliary lane where needed.	$240	L
	OR	• I-5 Southbound From Alicia Parkway to the Crown Valley Interchange add a Lane	$411	M
	OR	• I-5 Construct new interchange at Crown Valley (Saddleback) and reconstruct interchange at Avery Parkway with collector distributor road between Crown Valley and Avery	$260	L
	OR	• SR-57 Northbound From Lambert Road to Tonner Canyon (LA County Line) interchange add truck climbing lane	$157	M
	OR	• SR-57 Northbound From Orangethorpe to Lambert Road, Add Auxiliary Lane & 5th through lane	$140	S
	OR	• SR-57 in the Northbound Direction Extend General Purpose Lane #5 Between Orangewood and SR-91 and Add Auxiliary Lane	$190.8	S
	OR	• SR-91 Westbound From SR-57 to I-5 – Add General Purpose Lane & Auxiliary Lane	$152	S
	OR	• SR-91 Westbound – Provide a General Purpose Lane from SR-55 to SR-57 and add auxiliary lane	$120	M
	OR	• SR-91 Eastbound Add a Lane Between SR-55 (Lakeview and SR-241 and Westbound From SR-241 to Imperial Highway).	$96	S
	OR	• I-405 from the I-5 to SR-55 add 1 general purpose lane in each direction	$328.9	L
	RIV	• SR-60 Construct Truck Climbing Lane through Badlands to I-10	$114	L
	RIV	• March Inland Cargo Port Airport I-215/Van Buren Blvd. Ground Access Improvement Project	$97.6	S
	RIV	• I-10/SR-60 New Interchange Construction	$100	L
	RIV	• I-215 Widening to SBD County Line	$1,400	S,M
	SBD	• I-15 Widening and Devore Interchange (at I-215) Reconstruction	$200	S
	SBD	• Interstate 10 Widening and Interchange Improvements (LA Co. Line to I-215)	$700	S
	SD	• I-5 Widen/Managed Lanes (From La Jolla Village Dr. to Vandergrift)	$962	S
	SD	• I-15 Widen/Managed Lanes & Operational Improvements (From SR-163 to SR-78)	$608	S
	SD	• I-805 Widen/Managed Lanes (From SR-905 to I-5)	$1,801	S
	SD	• San Diego International Airport Truck Access to I-5 (Truck route/ Interchange improvements)	$32	M
	SD	• Pipeline Truck Access (Petroleum Terminal) to I-15 (Truck route/ Interchange improvements)	$32	M
		Total	***$15,822.5***	

Notes: 1. All figures include environmental mitigation costs.
2. S=Short-term (2007-2015); M=Mid-term (2015-2025); L=Long-term (post 2025).

Next Steps

The MCGMAP is not an end point. Rather, it is the beginning of a more comprehensive regional approach to keep freight moving within and through the region and to reduce the environmental and community impacts caused by the movement of that freight. Going forward, stakeholders will play an integral role in the next steps in the areas of partnership and advocacy, environmental and community impacts, mobility and funding. Based on feedback from stakeholders and Action Plan recommendations, the MCGMAP project partners are committed to taking the following next steps:

Partnership and Advocacy

- Implement the Southern California National Freight Gateway (SCNFG) Cooperation Agreement among federal, state, regional, and other implementing agencies to maintain dialogue to address the challenges outlined in MCGMAP.
- Request the incorporation of MCGMAP strategies and actions into other state, regional and local plans.
- Continue to convene multi-county meetings to monitor the progress on the Action Plan and provide annual reports to the CEOs and to the boards of the partner agencies.
- Support and propose legislation that: 1) Provides funding mechanisms for goods movement projects/strategies; and 2) improves mobility and facilitates regional multi-county goods movement goals without undermining local community priorities and quality of life.
- Support groups such as Mobility 21 and the Coalition for America's Gateways and Trade Corridors in developing dedicated federal and state goods movement funding sources.
- Continue to work closely with all stakeholders including the Councils of Governments, community groups, environmental regulatory agencies and academia.
- Seek goods movement and logistics industry involvement throughout planning and project development phases.

Environmental and Community Impacts

- Through the SCNFG Cooperation Agreement and other related activities, develop a specific set of feasible actions to accelerate implementation of the strategies contained in the various air quality and emission reduction plans that are within the scope of responsibility of the project partners.
- In partnership with CARB, air districts, the logistics industry, and local governments, initiate an activity to generate public and/or private funds to accelerate implementation of air quality improvement strategies being undertaken by these and other entities. Examples may include: Container fees that provide a revenue stream to fund emissions reduction projects, impact fees paid by entities contributing to the goods-related air quality problem, supplemental transportation infrastructure project mitigation (to add to an air quality funding pool), mitigation banking, market-based strategies, and other vehicle-based fees commensurate with the impacts attributed to those vehicles.
- Continue and Complete the Environmental Justice Analysis and Outreach for the MCGMAP in Fall 2007. This effort will develop a guidebook for local jurisdictions and the private sector to use in avoiding, minimizing, and mitigating the effects of goods movement infrastructure and to assist local jurisdictions make informed land use decisions.

Mobility

- Initiate a study to investigate the linkage between industry supply chain trends and port and trade related transportation patterns and movements.
- Continue project development efforts, including planning, design, funding, and implementation, of the regional and county-specific projects listed in the Action Plan, including the mitigation of the impacts of those projects.
- Initiate a Regionally Significant Transportation Investment Study (RSTIS) to evaluate the feasibility of implementing a Dedicated Freight Guideway System/Regional Truck Lanes (I-710 From Port of Long Beach to SR-60; East-West Corridor between I-710 and I-15; and I-15 to Victorville) inclusive of potential non-freeway implementation.
- Initiate localized studies, as appropriate.

Funding

- Pursue new avenues of goods movement funding for projects, including the region's fair share of state appropriations, federal funds, and private sector contributions consistent with the impacts of the benefits they derive from the use of the transportation system.
- Continue fair share and user fee discussions with private sector stakeholders to seek their support in addressing goods movement impacts and filling funding gaps. Develop a clear and concise message on this subject and communicate this to the public, policy and funding decision makers at all levels of government.
- Establish structures to manage user fees and revenue that are acceptable to both public and private sector stakeholders.

Chapter 1 – Project Overview

Purpose and Objectives

This Multi-County Goods Movement Action Plan (herein referred to as "the MCGMAP" or "the Action Plan") represents an unprecedented partnership between county, regional and state transportation agencies in Southern California to address the challenges associated with the movement of goods, which is projected to increase dramatically over the next 25 years. The MCGMAP is intended to serve as a master plan for goods movement in the region and a guide in the preparation of state, regional, and local transportation plans. The objectives of the MCGMAP are to develop strategies that: 1) address the goods movement infrastructure capacity needs of the region; 2) identify environmental mitigation strategies; and 3) improve the quality of life and community livability for Southern California residents. The Action Plan is regional in scope, such that the Plan's analyses of potential strategies and investments are at a macro or corridor level rather than a local or project specific-level. While detailed project-level analyses were not part of this effort, it is nevertheless critical and will be conducted as part of subsequent project development effort.

The MCGMAP project study area includes the counties of Los Angeles, Orange, Riverside, San Bernardino, Ventura, San Diego and beyond. With its extensive system of ports, airports, border crossings, highways and rail facilities, the study area is a major gateway for international commerce (see Figure 1). All projections point to continued robust growth in goods movement volumes, both international and domestic freight moving through the study region. Freight logistics play a vital role in the national, state, and regional economies. One out of every seven jobs in Southern California depends on the trade/logistics sectors. Environmental and public health impacts, however, have led communities and policy makers to demand mitigation and challenge proposals for infrastructure capacity enhancement. Research has clearly shown that there are serious health impacts from diesel pollution. Communities surrounding major goods movement centers (e.g., ports, rail yards, warehousing) are impacted by 24-hour operations to accommodate the high volumes of trade. Drivers on the region's roadways are impacted by high volumes of truck traffic moving goods to both local and national destinations.

The goods movement system is rapidly reaching capacity. Increasing congestion adversely affects the efficiency of cargo movement and aggravates environmental impacts such as diesel emissions. By voicing their opposition to various key infrastructure improvement projects, communities are calling for slower growth and mitigation of existing impacts. For a more detailed discussion of the existing and forecast future conditions of the region's goods movement system, see Chapters 3, 4, and 6 of this document. A more detailed discussion of the existing and forecast future conditions of the region's economy and environment can be found in Chapters 5 and 7.

Substantial progress in addressing the impacts of goods movement has already taken place with some notable successes that include the completion of the Alameda Corridor, Alameda Corridor-East grade separation projects, the adopted I-710 Major Corridor Study, the San Pedro Bay Ports Clean Air Action plan, the state Goods Movement Action Plan, the California Marine and Intermodal Transportation System Advisory Council (CALMITSAC) effort, the PierPass program, and the passage of Proposition 1B (Trade Corridor Improvement Fund). To meet future challenges, however, a coordinated regional framework is required. Such a framework is needed to meet the rapidly growing demand for freight movement and to ensure prudent investment of public and private resources, continued economic vitality, and implementation of environmental mitigation measures that improve the health and quality of life of Southern California residents.

Figure 1 shows the study area and illustrates the existing regional goods movement system.

A31418

Wilbur Smith Associates

Figure 1
Study Area

The MCGMAP identifies actions to be undertaken by the partner agencies, the state and federal agencies, and the private sector to maintain Southern California's role as a center for international trade, commerce, and manufacturing by planning for freight growth while simultaneously and aggressively mitigating environmental and local community impacts. The Action Plan sets forth a framework to structure and understand the issues and defines actions that should be taken to address infrastructure needs, environmental concerns, and community impacts within the context of that structure. Also, it incorporates and builds on existing studies and initiatives already in progress, and focuses on developing an integrated and comprehensive regional approach.

Project Partners/Funding Agencies

The agencies participating in the development of the MCGMAP are:

- Los Angeles County Metropolitan Transportation Authority (Metro)
- Orange County Transportation Authority (OCTA)
- Riverside County Transportation Commission (RCTC)
- San Bernardino Associated Governments (SANBAG)
- Ventura County Transportation Commission (VCTC)
- California Department of Transportation (Caltrans) Districts 7, 8, 11, and 12
- San Diego Association of Governments (SANDAG)
- Southern California Association of Governments (SCAG)

Metro served as the administrative lead for the project. The participating agencies (or "project partners") and consultant team comprised the Technical Advisory Committee (TAC), which met bi-weekly (or as needed) to monitor the progress of the Action Plan, provide reviews of all technical products being developed, ensure a complete analysis was performed, and achieve consensus on recommended courses of actions. The TAC members also met as needed with the Executive Officers (TAC Execs) of the participating agencies. In addition, the TAC formed smaller working groups to provide input on specific technical and policy issues, such as modeling, outreach, and environmental concerns. These working groups also met when needed as specific issues arose.

A proactive outreach plan was undertaken to provide opportunity for the public and interested stakeholders to participate in the development of the Action Plan. The project partners and consultant team met with the MCGMAP Stakeholder Advisory Group (SAG) during major milestones of the project to integrate their feedback into the Action Plan. Also, existing forums such as the SCAG Goods Movement Task Force and others groups were given regular updates on the progress of the Action Plan to obtain input from a broad cross-section of public and private sector stakeholders.

MCGMAP Partner Agency Roles

The Action Plan recognizes that goods movement is a diverse industry with a broad and disparate group of public and private sector stakeholders, each with its own roles and responsibilities. The MCGMAP partners are the transportation and planning agencies that co-manage the development of the Action Plan.: Los Angeles County Metro, Orange County Transportation Authority, Riverside County Transportation Commission, San Bernardino Associated Governments, San Diego Association of Governments, Southern California Association of Governments, Ventura County Transportation Commission, and Caltrans Districts 7, 8, 11, and 12. The MCGMAP partners plan, fund, maintain, operate, construct, and implement multi-modal transportation projects

and influence the goods movement system through the regional planning and programming of funds to transportation projects.

Other organizations, such as the Ports of Los Angeles and Long Beach, have authority to plan and construct transportation and facility improvements within the Ports' jurisdiction, while the South Coast Air Quality Management District develops and implements plans to improve the region's air quality. Decisions regarding land use, arterial improvements and the permitting of warehouses and transloading centers are made by local municipalities.

Regional, state, and federal agencies have varying regulatory authorities over the trucking and rail industries, but the MCGMAP partners have little ability to regulate the operations, business practices, or pollutant emissions of the private sector goods movement operators, and no authority to regulate shippers and ocean carriers. As a result, the MCGMAP partners have focused primarily on goods movement infrastructure while acknowledging the essential roles to be played by the regulatory agencies, the Ports Clean Air Action Plan, and public or private technology initiatives.

Given their defined roles and responsibilities, the MCGMAP partners cannot fully implement many of the plan's recommended strategies on their own. Therefore, to fully realize the benefits of this plan, continued collaboration and consensus building among the MCGMAP partners and other public and private sector stakeholders will be critical.

The project partners identified the following core mandates and implementation principles to guide in the development of the Action Plan:

CORE MANDATES

Environment: Avoid, Reduce, and Mitigate Environmental, Community, and Health Impacts
Environmental and community impacts must receive equal attention in the implementation of solutions.

Mobility: Promote the Safe and Efficient Movement of All Modes and Reduce Congestion
Traffic growth will result in the significant deterioration of the region's highway and rail system's performance capabilities and present potential safety concerns for the public, particularly in terms of truck accidents, rail crossings, and truck encroachment into neighborhoods.

Economy: Ensure Vitality of Regional Economy
Goods movement is an important segment of the MCGMAP region and the U.S. trade economy, and the associated industries (e.g., logistics) provide direct and indirect benefits to the region's economy.

Funding: Secure the Region's Fair Share of Public and Private Funds
Although the region's goods movement system serves markets within and outside of California, these markets and associated system users are not paying their fair share to the region. While still advocating for dedicated federal and state funding sources, user-based public-private funding arrangements must be a major component of the financing for critical projects.

IMPLEMENTATION PRINCIPLES

The MCGMAP builds upon the principles set forth in the Statewide Goods Movement Action Plan that was adopted in January 2007. The following represent implementation principles specific to MCGMAP:

1. **Guideline:** The Action Plan is the master plan for goods movement in Southern California and is intended to be used as guidance in the preparation of state, regional, and local transportation plans. The Action Plan can also be a tool for local jurisdictions to make informed land use decisions.

2. **Investment:** Investments in goods movement infrastructure will be implemented on a simultaneous and continuous† basis with investments in environmental/community mitigation.

3. **Cost Distribution:** A fair share of the cost of the impacts of goods movement on transportation infrastructure, environment, and communities must be borne by those benefiting from it.

4. **Management:** The need for institutional mechanisms, such as joint powers authorities, for financing or implementing projects, will be defined as such needs are clearly identified.

5. **Public Benefit:** Projects supported by public/private partnerships and private projects supported by public funding should demonstrate a clear public benefit.

6. **Land Use Compatibility:** Partner agencies shall encourage land use decisions that will result in buffers (both open and developed) that separate goods movement infrastructure and sensitive receptors such as residential areas, schools, and hospitals.

Building the MCGMAP Action Plan

The Action Plan is organized around tasks performed by the consultant team that are shown in Figure 2 and described below. Each task served as building blocks that led to the completion of the Action Plan that is documented in technical memoranda (Tech Memos) and summarized in the chapters herein. With the exception of Chapters 5 and 7 of this Action Plan, each chapter corresponds to the tasks described below. The Action Plan consists of two volumes. The Action Plan contains an executive summary, topical chapters, and county Action Plan chapters. The Action Plan Technical Appendices contains Technical Memos 2 through 7, the financial framework (Appendix A), supporting tables, charts and project lists (Appendix B), and public comments and responses (Appendix C).

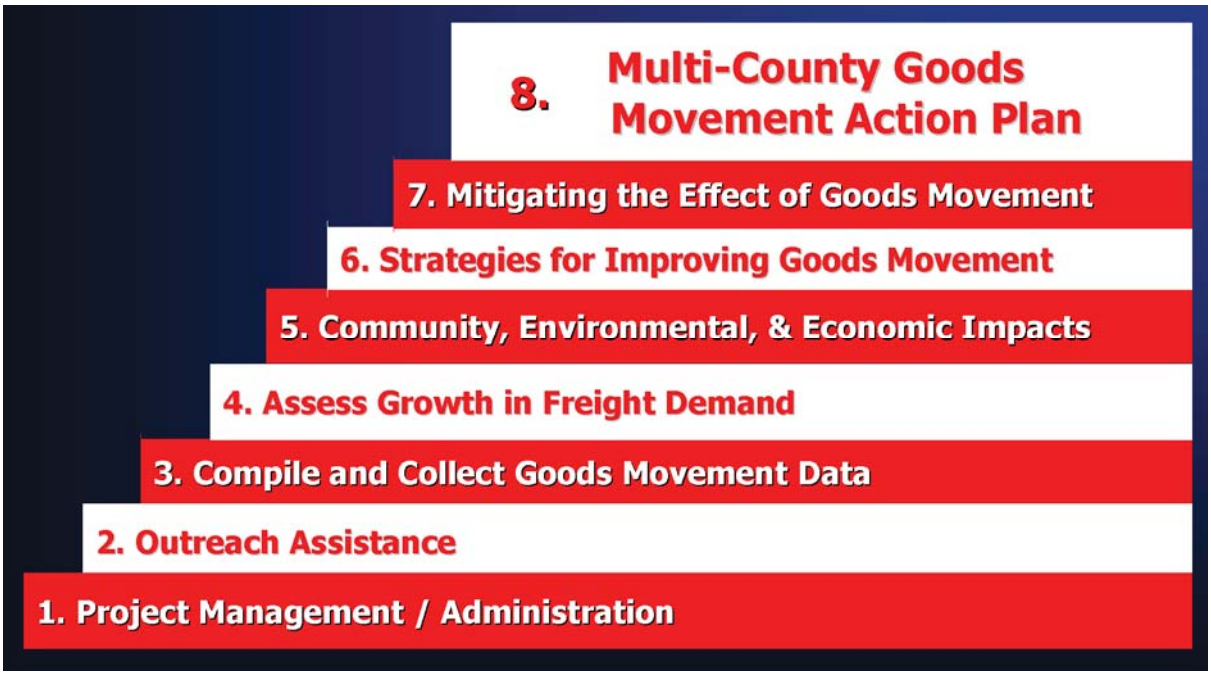
Task 1.0 Project Management and Administration - This task consists of the ongoing project management, control and administration of all tasks including agency coordination, monthly TAC meetings, and weekly correspondence between the consultant project team and Metro project manager (Chapter 1 and summarized in the Project Management Plan).

Task 2.0 Outreach Assistance - This task comprises the stakeholder and private sector outreach elements of the project, including periodic SAG meetings, planned workshops within the study area counties, and stakeholder

† Note that the use of the term "simultaneous and continuous" in this document is similar, but not identical, to the use applied by the State of California. A definition of "simultaneous and continuous" is provided in the glossary.

surveys. This task also includes meetings with individual stakeholders throughout the course of the project (Summarized in Chapter 2 and described in more detail in Tech Memos 2a and 2b).

Figure 2
Building the MCGMAP



Task 3.0 Compile and Collect Goods Movement Data – This task provides a summary of the existing conditions and constraints of the goods movement system, with a focus on the ports (sea and air), rail, highway, and warehousing/distribution components of the regional goods movement system. It also includes an identification of the location and magnitude of existing deficiencies on the freeways and railways within the region and within the logistics network in general (Summarized in Chapter 3 and described in more detail in Tech Memo 3).

Task 4.0 Assess Growth in Freight Demand, Trends in the Logistics Industry and Baseline (2030) System Performance – Task 4 focuses on the assessment of future freight growth within and outside of the study area. The goal of Task 4 is to identify the baseline conditions for the study area, as well as identify potential freight growth scenarios that could occur depending on local or global changes to the goods movement industry (Summarized in Chapter 4 and described in more detail in Tech Memos 4a and 4b).

Task 5.0 Evaluate Economic, Environmental and Community Impact of Freight Movement Generators and Facilities – The purpose of Task 5 is to document the economic, environmental, and community impacts within the region of the existing goods movement system described in Task 3. For the economic component, this task identifies logistics-related jobs by job type and by wage scale, and documents the relationship between jobs, wages, business activity/expansion, tax revenue, and growth in freight. For the environmental component, this task identifies locations around the region that are currently or will potentially be impacted by freight movement affecting neighborhoods and quality of life. The result of this task will be a documentation of the type, general

location, and magnitude of the environmental and community impacts of goods movement (Summarized in Chapter 5 and described in more detail in Tech Memos 5a and 5b).

Task 6.0 Identify and Evaluate Strategies for Improving the Movement of Goods – This task includes the critical element of the MCGMAP project: the evaluation of strategies and projects identified to improve the future movement of goods. These strategies and projects have been developed through coordination with the TAC and evaluated against the freight growth scenarios identified in Task 4. This task includes a two-part screening evaluation process to initially evaluate a broad set of goods movement projects and strategies and a more detailed evaluation of specific projects and strategies (Summarized in Chapter 6 and described in more detail in Tech Memos 6a and 6b).

Task 7.0 Identify Strategies for Mitigating the Effect of Goods Movement on Local Communities and the Environment – This task consists of the identification of a set of good practices to mitigate the environmental and community impacts of the goods movement strategies within the region, including those projects and strategies identified in Task 6 (Summarized in Chapter 7 and described in more detail in Tech Memo 7).

Task 8.0 Develop Multi-County Goods Movement Action Plan Report and Identify Institutional/Funding Arrangements Needed to Implement the Plan – Task 8 represents the culmination of the project and includes the recommended actions for simultaneously and continuously improving the goods movement system and the environment. Also included is a discussion of the financing mechanisms required to implement the recommended actions and associated goods movement projects and strategies. Lastly, this task provides a summary of the high-priority goods movement projects for the region, as identified by this effort (Chapter 7 of the Action Plan).

Chapter 2 – Stakeholder Outreach

This chapter summarizes the work conducted under Task 2 to build the Action Plan. The stakeholder outreach process included conducting MCGMAP Stakeholder Advisory Group meetings, administering surveys, compiling survey results, convening meetings and making presentations to local stakeholders, convening workshops, and documenting stakeholder opinions, concerns and recommendations throughout the development of the Action Plan. Furthermore, all study related documents were posted onto the MCGMAP web site, which is: http://www.metro.net/mcgmap/.

Stakeholder Outreach

Stakeholder Advisory Group Meetings

In the fall of 2005, the partner agencies established Stakeholder Advisory Group (SAG) meetings to solicit input from stakeholders, share project information, and to identify the issues and concerns of greatest importance to stakeholders regarding goods movement. The SAG consisted of a broad cross section of stakeholders that included representatives from air quality and environmental organizations, freight, shipping, trucking, and railroad industries, local ports (sea and air), chambers of commerce, business organizations, local, state and federal officials, council of governments, regulatory agencies, academia, and community groups.

The project team held the following SAG meetings to date:

No.	Date	Location
1.	October 26, 2005	Los Angeles County Metropolitan Transportation Authority Office
2.	March 22, 2006	San Bernardino Associated Governments Office
3.	May 24, 2006	City of Long Beach Council Chambers
4.	July 26, 2006	City of Buena Park Council Chambers
5.	October 25, 2006	Southern California Association of Governments Office
6.	July 25, 2007	Southern California Association of Governments Office
7.	November 8, 2007	Southern California Association of Governments Office.
8.	March 6, 2008	Los Angeles County Metropolitan Transportation Authority Office

The SAG meetings were attended by a broad cross section of stakeholders. Below is a partial listing of the various groups and organizations that participated in the SAG meetings.

- Alameda Corridor East (ACE) Construction Authority
- Alameda Corridor Transportation Authority (ACTA)
- Automobile Club of Southern California
- BREATHE California of Los Angeles County
- Burlington Northern Santa Fe Railway
- California Air Resources Board (CARB)
- California Trucking Association
- Center for Community Action and Environmental Justice
- Coalition for a Safe Environment
- East Yard Communities for Environmental Justice
- Gateway Cities Council of Governments
- Los Angeles World Airports

- Majestic Realty Company
- National Association of Industrial and Office Properties
- Natural Resources Defense Council
- Orange County Business Council
- Port of Long Beach
- Port of Los Angeles
- Rail America
- San Gabriel Valley Council of Governments
- South Bay Council of Governments
- South Coast Air Quality Management District
- Union Pacific Railroad
- University of Southern California Keck School of Medicine
- University of Southern California, Southern California Particle Center
- Watson Land Company

Stakeholder Surveys

Two anecdotal opinion surveys were conducted to determine the key goods movement issues and to obtain feedback on potential solutions. In early 2006, the first survey was developed and administered to key stakeholders in the MCGMAP six-county study area and beyond in order to gather perceptions and opinions of goods movement issues. Details of the survey results are included in Tech Memos 2a and 2b. From the results of the survey, the MCGMAP project team was able to validate and/or re-consider existing assumptions about key issues, problems, and potential solutions as they relate to goods movement and stakeholders in the Southern California region. Survey respondents included goods movement stakeholders representing government agencies, academia, community and environmental groups, industry and non-profit associations, and private industry.

Survey No. 1 – Goods Movement Issues

The MCGMAP Survey No. 1 included questions about highways, trucks, freight trains, ports, industrial areas, aviation areas, and goods movement benefits. Each respondent was asked to self-identify for documentation and future notification purposes. All individual data results are kept confidential. Surveys were distributed and received between March and June, 2006. The survey was comprised of 53 questions across five pages and took about 15 minutes to complete.

Each County Transportation Commission (CTC) utilized either direct mail or electronic mail to distribute the surveys. Using in-house databases, the CTCs disseminated the survey to local jurisdictions (staff and elected officials), business and community organizations, and environmental and community groups.

The survey was also made available via Zoomerang, an internet survey based application that was linked to the project website. All those who received the survey had the option to complete a hard copy of the survey or to complete the survey online.

A total of 166 surveys were completed. In general, the survey results validated what the MCGMAP technical team anticipated about goods movement concerns. When asked to freely identify from their own perception and experiences which goods movement issues were the most important, the following were the top three:

1. Traffic congestion and truck issues

2. Infrastructure and traffic congestion issues
3. Infrastructure/construction and environmental issues

When asked to choose from a list of previously identified issues and the same general issues, with an additional level of specificity, the following was reported:

1. Traffic delays on freeway due to congestion (41 out of 143 responses)
2. Air/water pollution from cargo ships, including health impacts (33 out of 164 responses)
3. Traffic delays on local streets due to congestion (13 out of 129 responses)

Survey No. 2 – Goods Movement Projects/Strategies

Survey No. 2 was completed in early 2007. The objective of the second survey was to solicit reaction from stakeholders on a specific listing of goods movement projects and strategies. Respondents were asked to also offer any other innovative idea or solution for addressing the goods movement challenge in Southern California. As with Survey No. 1, the partner agencies distributed the survey in hard copy and electronic formats to their stakeholders in each county. The survey was also accessible online through Zoomerang. A total of 138 surveys were completed.

Respondents indicated their support for a wide range of goods movement projects and strategies. A high level of support was received for projects and strategies that improved operations and capacity at the ports and local rail facilities, including grade separations. Respondents also demonstrated support for a dedicated truck lane between the ports and the Inland Empire. No specific east-west corridor was identified as the most preferred corridor for a truck lane facility, but the majority of respondents felt that an east-west corridor should be the focus of goods movement infrastructure improvements.

Organization Presentations

This unprecedented multi-county goods movement planning process generated interest from various stakeholders. The project team provided updates to local agency boards, committees and other organizations about the development of the Action Plan. These presentations included, but are not limited to, the following organizations:

- Gateway Cities Council of Governments
- Los Angeles Chamber of Commerce
- Metro
  - Board of Directors
  - Goods Movement Workshop
  - Planning and Programming Committee
- North County Transportation Coalition
- Orange County Transportation Authority (OCTA)
  - Board of Directors
  - Regional Planning & Highways Committee
- Office of Senator Dianne Feinstein
- Port of Long Beach/Port of Los Angeles
- Riverside County Transportation Commission (RCTC)
  - Plans & Programs Committee
  - Regional Technical Advisory Committee

- San Gabriel Valley Council of Governments
- San Bernardino Associated Governments (SANBAG)
  - Board of Directors
  - Plans & Programs Committee
- San Diego Association of Governments (SANDAG)
  - Regional Freight Working Group
  - Transportation Committee
- Southern California Association of Governments (SCAG)
  - Goods Movement Task Force
  - Plans & Program Technical Advisory Committee
  - Regional Council
  - Transportation and Communications Committee
- South Bay Cities Council of Governments
- Ventura County Transportation Commission (VCTC)

Additional, briefings and presentations to the Councils of Governments and other various groups were held prior to finalizing the Action Plan.

Public Workshop Process

Public Workshop Series (December, 2007 - February, 2008)

Twelve public workshops were held throughout the six-county study region to present a summary of the Draft Action Plan- recommended actions and goods movement strategies/projects, and proposed mitigation measures. The workshops were conducted to give the public an opportunity to comment on the material presented and give feedback to the Technical Advisory Committee (TAC). All public comments were recorded and considered prior to finalizing the Action Plan. Also, topical summaries of public comments will be provided to each of the project partner's executive boards for review and consideration.

Workshop Locations

The workshops were held throughout the six participating counties. Each workshop was held at a location that was easily accessible to the community. Upon completion of each public workshop, all public comments were recorded and processed. The project team compiled the comments by topic and provided topical responses that are presented in Appendix C of the Final Action Plan. The workshop schedule is listed on the following page.

Agency	County	Proposed Locations	Dates	No. of Meetings
Metro	Los Angeles	• South Coast Air Quality Management District • Boys and Girls Club of East Los Angeles • Wilmington Senior Center • Larry Chimbole Cultural Center - City of Palmdale • Bannings Landing Community Center	December 3,4, 6 and 13, 2007 February 20, 2008	5
OCTA	Orange	• City of Anaheim – Gordon Hoyt • Laguna Hills Community Center	January 14 and 17, 2008	2
RCTC	Riverside	• Jurupa Community Center • Coachella Council Chamber	December 10 and 17, 2007	2
SANDAG	San Diego	• SANDAG offices	February 21, 2008	1
VCTC	Ventura	• Camarillo City Hall • City of Camarillo Library	December 11, 2007	1
SANBAG	San Bernardino	• SANBAG offices	January 9, 2008	1

Initial Stakeholder Comments

In general, there is support of a coordinated effort among the partner agencies and stakeholders to solve the goods movement challenges facing the region. During the SAG meetings, presentations, and workshops that were conducted, stakeholders expressed the following key concerns/suggestions:

- More aggressive environmental mitigation strategies is needed to reduce current levels of goods movement impacts before any new infrastructure project is built;
- Dedicated new private/public funding sources is needed to reduce health and environmental impacts of goods movement throughout the region;
- All costs and benefits should be studied before decision-makers agree to meet unlimited goods movement demand;
- Equal analysis of environmental and community impacts, planned improvements and mitigation measures should be completed as a part of the evaluation of a new (or expanded) goods movement system;
- Placing limits on trade growth, diversion to other ports, and investing in clean industries is a more cost-effective approach to solve the goods movement challenges in the region; and
- Explore the use of clean alternate technologies to transport goods and to support goods movement activities, operations, and equipment.

Chapter 3 – Existing Conditions and Constraints

Chapter 3 summarizes the work done under Task 3 to build the Action Plan, that is further described in Tech Memo 3. This chapter identifies the key factors that influence goods movement decisions, describes how freight is moved, provides an inventory of the components of the regional goods movement system, and identifies issues, constraints and other deficiencies in the system and supply chain. This chapter also identifies community and environmental impacts that are further described in Chapter 5.

Key Goods Movement Factors

- Projections- Freight cargo volumes that are expected to triple by 2030, will place an additional heavy burden on the environment, local communities and the region's aging transportation infrastructure.
- Quality of Life- According to the California Air Resources Board (CARB) and others emissions from goods movement sources, particularly ozone and diesel particulate matter, has a direct and negative impact on public health and the environment.
- Trade Relations- A national policy that promotes reduced barriers to trade, combined with the export of U.S. industrial jobs, particularly to Asia, has increased the nation's reliance on imports thereby increasing the flow of goods through the region's system.
- Demand- Due to its strategic location, Southern California has become an important trade gateway for the rest of the nation, carrying a disproportionate share of international trade. Moreover, much of the goods moved within the region support one of the largest metropolitan populations in the country and the third largest manufacturing center in the nation.[1]
- Economics- The goods movement system is vital to the local economy and provides many jobs within the study area, particularly in the logistics sector. Southern California's burgeoning population requires a logistics sector that matches its size and growth.
- Funding- Nonconformance of regional air quality goals may result in a cessation of federal transportation improvement funds for the region. Moreover, transportation funding for goods movement has not kept pace with needed improvements and mitigation measures; traditional fund sources are steadily shrinking.

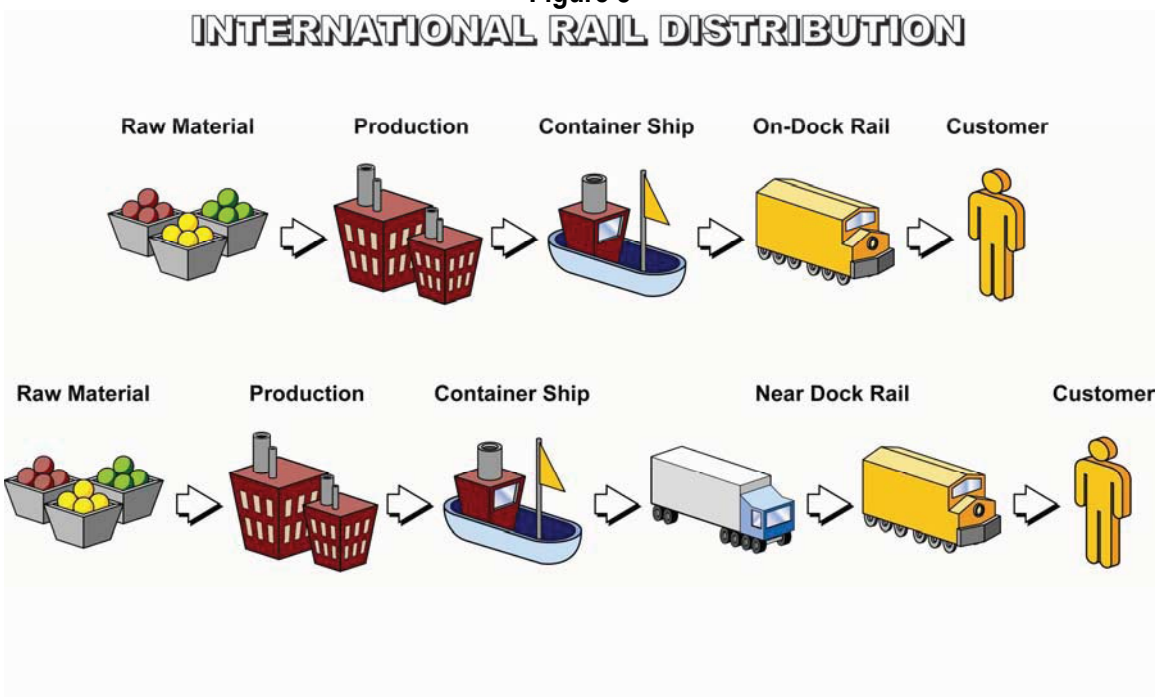
Understanding Freight Flows

Freight moves through ports in one of three ways:

- **Inland-point Intermodal Service -** The ocean carrier arranges transfer of marine container from vessel to rail and rail line haul movement,
- **Transportation to the Port Gate with a Container Mounted on a Chassis -** The customer arranges for a marine container to be transported from port gate to a destination (or distribution center) via long-haul truck or dray.
- **Transportation to Inland Warehouses -** Dray from port gate to warehouse may be arranged by the shipping line or by customer. The customer contracts with a Third Party Logistics (3PL) firm, sometimes a subsidiary of the ocean carrier or Non-Vessel Owning Common Carriers, to provide deconsolidation and transloading into domestic trailers or containers.

Figures 3 through 8 graphically depict the various ways goods are moved in the region through the supply chain to the ultimate destination- the consumer.

Figure 3



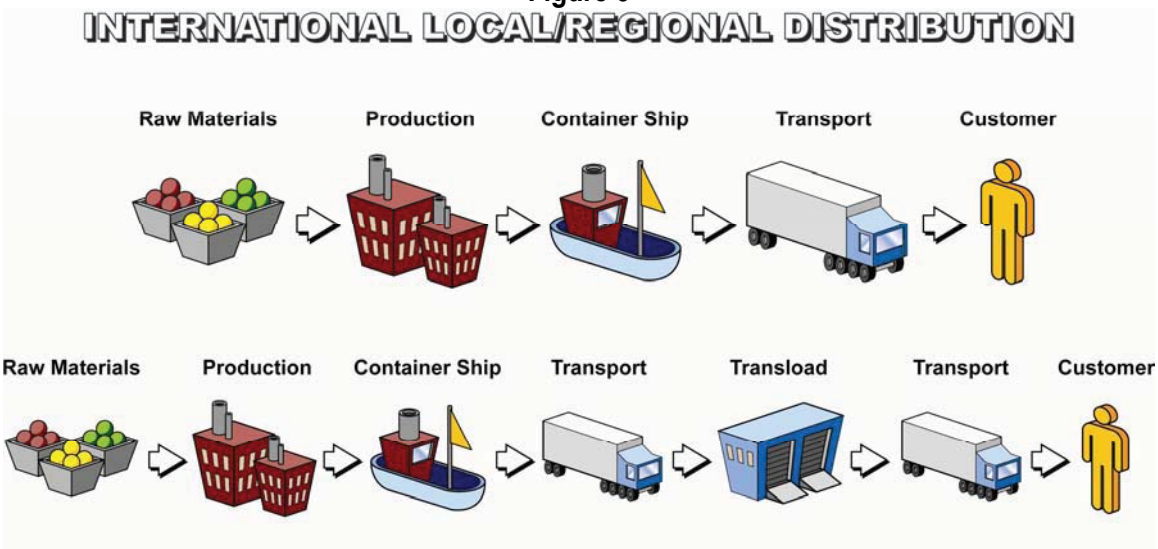
As shown in Figure 3, international goods arrive at the Ports via oceangoing vessels and then leave the region via rail. Sometimes the cargo is first loaded onto trucks for transport to inland (near-dock, off-dock, or inland distribution centers) for transloading to rail. These goods move to points east of the MCGMAP region (typically distances of 500 miles or more) and are shipped as whole containers.

Figure 4 depicts another aspect of the supply chain that represents transload rail intermodal distribution. These goods move in a manner similar to the international rail distribution shown in Figure 3. Figure 5 shows how international cargo moves into and through the region via aircraft.

Figure 4

Figure 5

Figure 6



As shown in Figure 6, international goods that arrive at the Ports (via ocean going vessels) can also leave the region by truck. This includes goods that are transloaded at inland distribution centers. These containers are broken down for distribution to various markets east of the study region, to locations such as Phoenix, Salt Lake City, or Las Vegas, and north to northern California, Oregon, and Washington.

Figure 7

As depicted in Figure 7, domestic goods produced within or outside of the MCGMAP region are primarily moved by trucks. These local goods typically leave the place of production and are transported by truck to a transload or distribution facility to be distributed to the customer.

Figure 8

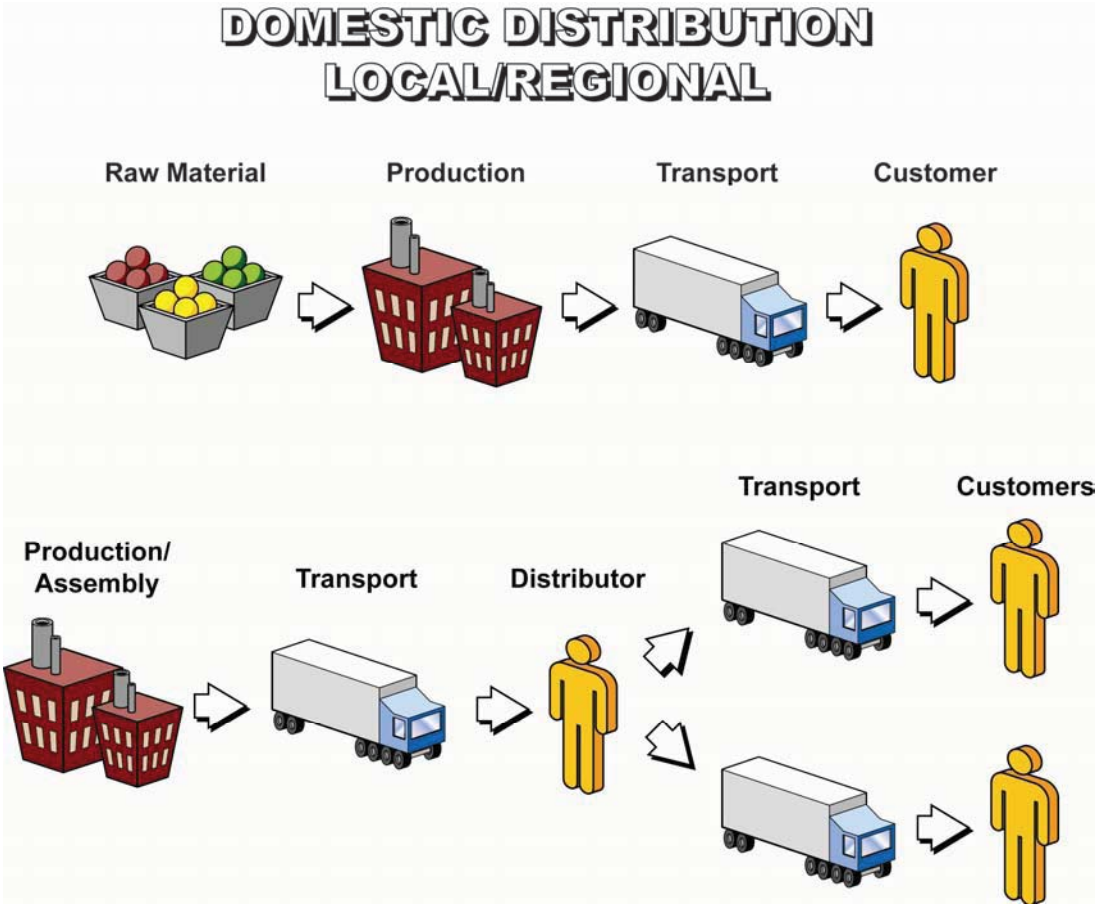


Figure 8 illustrates the local and regional distribution system wherein goods are shipped directly from the point of production to the customer. In some cases, one customer acts as a distributor, resulting in multiple "secondary" trips to other customers.

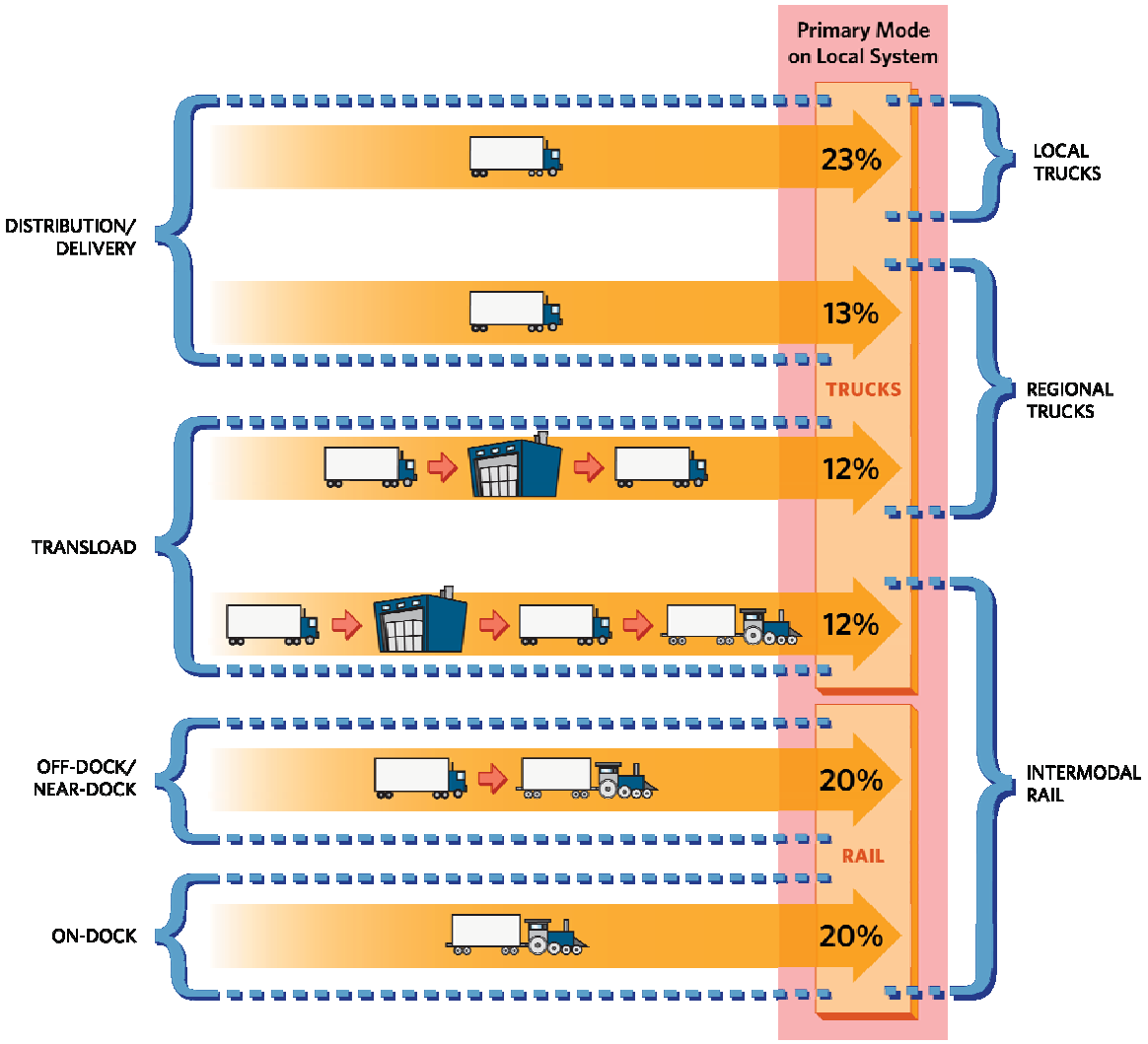
Market Segmentation

The study area has the largest goods movement system in North America. However, each mode operates largely as an independent entity. As a result, the modes are not organized at a level that easily permits integration across the entire supply chain. While the goods themselves move from mode to mode, the carriers and service providers typically do not have the ability to influence the reliability and quality of service of the entire supply chain. Carriers do not typically venture into total logistics services and, if they do, it is generally to gain pricing control and competitive advantage rather than to make door-to-door supply chain improvements.[2]

Within the study region, goods movement consists of six broad modal segments, as illustrated in Figure 9. Each of these modal market segments presents strategic opportunities for applying goods movement specific actions. Intermodal rail shipments, depicted at the top of Figure 9 are loaded directly on-dock at the

ports, and involve no truck movements on the local and regional highways. This mode of transport is indicative of how international container cargo shipments are handled. In contrast, local and regional distribution and delivery shipments, shown at the bottom of Figure 9, are transported exclusively by truck moves on the local and regional highway system. This mode is indicative of how domestic cargo and some local and regional international cargo shipments are handled. The segments in between on Figure 9, represent cargo that is moved using multiple modes that require staging activities and multiple trips on the regional highways before reaching its final destination. Also, the following conclusions can be drawn from Figure 9:

Figure 9
Modal Market Segments



* All percentages estimated; based on 2005 figures

Regional Intermodal Rail Market Segment – Approximately half of the entire international container market utilizes the region's intermodal rail system. Between 50 and 55% of all containers moving through the region's ports are either loaded/unloaded (1) directly on/off an intermodal train on the docks (e.g., on-dock intermodal rail), (2) directly on/off an intermodal train at an intermodal rail yard near or distant from the docks (e.g., near- or off-dock intermodal rail), or (3) indirectly after the contents of an international container are transloaded into larger domestic containers at off-dock warehouses before being trucked to an off-dock intermodal yard (e.g., transloaded intermodal rail). While the on-dock market segment (approximately 20%) requires no truck movements on the local and regional roadway system, the remaining intermodal market movements require at least one truck-trip to an off-dock intermodal facility plus an additional return trip (often with an empty container). Also, the Union Pacific (UP) and Burlington Northern Santa Fe (BNSF) move an estimated 40 percent of all international containers through the study area (many of these are empty westbound containers) as part of their intermodal service.[3] The Alameda Corridor Transportation Authority (ACTA) conducted a study in 2004 that estimated the railroads also transport another 12 percent of what had been international containerized cargo in domestic containers.[4] This is cargo that had been warehoused or transloaded in the study area before being transported eastbound in domestic containers..

Regional Truck Market Segment – Trucks serve another significant segment of the international container market that includes Phoenix, Salt Lake City, San Francisco, Seattle, and other regional urban markets. These regional trucks haul either directly loaded containers or larger domestically configured tractor-trailer combinations with international shipments transloaded from ocean containers. These trucks rely on the region's local transportation roadway system and a concentrated set of regional freeways for the line-haul portion of their trips. These trips are typically up to 500 miles in length; however, some trips exceed that distance.

Local Truck Market Segment –Local goods movement (e.g. domestic cargo, local distribution) represents the least opportunity for strategically directing specific solutions and funding options, but it cannot be overlooked. Local trucks traverse a broad system of local roadways to serve a large number of consumers that are spread throughout the region.

While the region is a major gateway for international container movements, the local and domestic component is more dominant because the study area represents the third largest manufacturing center in the United States and is home to almost 20 million residents. These factors alone generate a significant demand for local goods within the study area.

Components of the Region's Goods Movement System

SEA PORTS

The San Pedro Bay Ports of Long Beach and Los Angeles are the largest container ports nationally, and the fifth largest in the world (Table 1). These ports handled 15.7 million Twenty-Foot Equivalent Units (TEUs) of containers in 2006. Three quarters of the trade through the San Pedro Bay Ports of Long Beach and Los Angeles is produced or consumed elsewhere.[5] Only one quarter is for local consumption. In 2005, the value of containerized trade moving through the San Pedro Bay Ports of Long Beach and Los Angeles totaled $256 billion, which is a 246% increase over the 1994 level of $74 billion and a 31% increase over the 2000 level of $196 billion.[6] In terms of tonnage, the Port of Los Angeles handled cargo 169 million metric

revenue tons (MRT) in CY 2005, while the Port of Long Beach handled over 159 million metric revenue tons in CY 2005. The MCGMAP study area is also home to two other ports: the Port of Hueneme and the Port of San Diego. The Port of Hueneme is 60 miles north of the City of Los Angeles in Ventura County. Port Hueneme handled one million MRT of cargo in 2003. The port's principal commodities include automobiles, bananas, wood pulp, fresh fruit, general cargo, offshore oil support, and fish. The Port of San Diego handled close to three million MRT of cargo in CY 2005.

Table 1
2005 Top Ports in North America and the World (millions of TEUs Annually)

Top North American Ports		Top World Ports	
Port	**TEUs**	**Port**	**TEUs**
1. **Los Angeles**	7.48	1. Singapore	23.19
2. **Long Beach**	6.71	2. Hong Kong	22.60
3. NY/NJ	4.79	3. Shanghai	18.00
4. Oakland	2.27	4. Shenzhen	16.20
5. Seattle	2.09	**5. Los Angeles/Long Beach Combined**	14.19
6. Tacoma	2.07	6. Busan	11.84
7. Charleston	1.99	7. Kaohsiung	9.47
8. Hampton Roads	1.98	8. Rotterdam	9.30
9. Savannah	1.90	9. Hamburg	8.08
10. Vancouver	1.77	10. Dubai	7.62
11. San Juan	1.73	11. **Los Angeles**	7.48
12. Houston	1.58	12. **Long Beach**	6.71
13. Montreal	1.26	13. Antwerp	6.49

Source: Containerization International and North American Port Container Traffic, American Association of Port Authorities, 2005

In addition to environmental and community-related constraints, there are also physical and operational constraints affecting existing capacity and throughput at the ports in the study area. The potential throughput at the port terminals is constrained by existing operational and management practices. While the estimated maximum throughput capacity at the San Pedro Bay ports is over 10,000 TEUs of containerized cargo per acre per year,[7] current average throughput at both ports combined is about 4,700 TEUs per acre per year.[8] Terminal capacity is affected by the availability of berths, backland acreage, and the number of cranes. It is also affected by operational and management practices such as container stacking and storage, container dwell times, hours of service and labor productivity. Capacity has been recently enhanced by the use of information technology such as optical character recognition systems and radio frequency identification.

PierPass was introduced in July 2005 to help shift traffic from the traditional work day hours to off peak travel times. These off peak travel times are defined as 6:00 pm – 3:00 am Monday through Thursday, and 8:00 am – 6:00 pm on Saturdays. This program provides an incentive for importers to move containers during off peak times. In 2006**,** the PierPass official website estimates that on average 60,000 truck trips per week have been shifted to off peak hours, or roughly 30-35% of the port cargo now moves off peak. The PierPass official website estimates that next year as many as 2.8-3 million truck trips may be shifted to off peak travel times.

While container traffic has received most of the attention in recent years, the terminal capacity for commodities such as petroleum liquid bulk has become a growing concern at the ports. California is now an important net importer of refined fuels, while demand is outstripping petroleum storage capacity. The need to accommodate containerized cargo is crowding out the petroleum facilities, adding to the overall complexity surrounding the expansion of the terminals.

While delay on the roadway system impacts goods movement, the most significant delays are at the goods movement facilities such as ports, intermodal facilities, and warehouse and distribution centers. The issue is most evident at the port container terminals, where almost half (44 percent) of the total roundtrip time is spent waiting for the container to be loaded and unloaded.[9] The delay is not associated with the actual turnaround of the load, which on average takes about 35 minutes, but with the queuing time to be loaded.[10] Regulatory measures, such as AB 2650, a state law passed to impose a fine on terminal operators if trucks idle outside the gate for a period longer than 30 minutes, have been effective in reducing queuing outside terminal gates. [11] However, some truckers complain that the queuing has simply moved inside the terminal gates. Terminals that maintain appointment systems or extend gate hours are able to avoid AB 2650-related fines. With PierPass in effect, all terminals have extended hours and are therefore exempt from these fines.

AIR CARGO

In recent years, air cargo has become the fastest growing segment of the goods movement industry in the United States, placing increasing demands on airports and ground transportation to and from airports.
The air freight industry is classified into five major types of carriers:

1-Integrated Air Cargo Carriers – Companies such as Federal Express (FedEx), UPS, DHL, Airborne, Emery, and BAX are known as integrated carriers because they provide door-to-door service by any combination of modes (air, truck, and rail intermodal). Integrated air cargo carriers control the reliability of service by owning some of the ground transport operations as well as the air lift capacity. These carriers also use information technology to exercise control.

2-Non-integrated (Cargo-only) Carriers – This sector does not provide an integrated door-to-door service, only line-haul service for the airport to airport portion, typically international. Shippers, freight forwarders, cargo handling companies, and other carriers buy lift capacity from non-integrated carriers.

3-Freight Forwarders - Freight forwarders do not operate as carriers. Freight forwarders handle and manage the shipment of air cargo on behalf of shippers, particularly international shipments, and buy air lift capacity from passenger belly space and cargo-only carriers.

4-Passenger Belly - Most international flights between major cities use wide-body aircraft which have enough space in the "belly" below the passenger level to store passenger baggage as well as commercial cargo. The bulk of air cargo carried by passenger belly service has reduced in the recent years. More than 70 percent of all air cargo is shipped on dedicated freight aircrafts. This shift has enhanced the ability of these airports to serve cargo.

5-Postal Services – While most of the mail is shipped in the U.S. by ground transport, there is some air mail.

There are six airports in the study area that have significant air cargo activity. Those airports include Los Angeles International (LAX), Ontario International (ONT), John Wayne (SNA), Long Beach (LGB), Bob Hope (BUR), and San Diego (SAN).

Table 2 below summarizes air cargo activity within the study area region between 2003 and 2005. As shown, Los Angeles International Airport (LAX) clearly handles the majority of the air cargo activity at more than 2.1 million tons of air cargo in 2005. It is the second largest air cargo hub in the nation and it handled approximately 75% of the study area's 2.7 million tons of air cargo in 2003.[12] LAX has 170 acres of cargo ramp and a total of two million square feet of building space for three cargo complexes. Approximately, 50 trucking firms operate terminals within two miles of the airport perimeter. As shown in Table 2, Ontario International Airport handled more than 575,000 tons of air cargo in 2005. Ontario Airport has 96,000 square feet of cargo building and office space to support all-cargo, airline belly cargo, and air mail. Twelve major air freight carriers serve this airport - Air Transport International, Airborne Express, Ameriflight, DHL, Empire Airways, Evergreen, Express Net, Federal Express, Kalitta Air, West Air, Union Flights, and UPS. Long Beach Airport is also served by air freight carriers that include FedEx, Airborne Express, and UPS. In 2005, Long Beach airport handled 54,300 tons of air cargo. Also in 2005, Bob Hope Airport, John Wayne Airport, and San Diego International Airport handled 52,900, 24,103, 168,101 tons of cargo, respectively.

Table 2
Air Cargo Activity 2003-2005 MCGMAP Study Area Airports
Tons of Air Cargo

Airport	2003	2004	2005	2005 Market Share
Los Angeles (LAX)	2,022,076	2,115,314	2,137,188	71.0%
Ontario (ONT)	571,992	605,211	575,369	19.1%
Long Beach (LGB)	56,081	57,050	54,298	1.8%
Bob Hope (BUR)	47,634	49,633	52,867	1.8%
John Wayne (SNA)	15,816	20,796	24,103	0.8%
San Diego (SAN)	146,328	152,257	168,101	5.5%
Total	**2,859,927**	**3,000,261**	**3,011,926**	**100.0%**

Source: SCAG Region Aviation Activity Report, 2003-2005, Caltrans Office of Aviation Planning Primary Annual Air Cargo Tonnage Report, San Diego Airport Economic Analysis Draft Summary Report 2005-2035, May 2006

In addition to environmental and community-related constraints, there are also physical and operational constraints affecting existing capacity and throughput at the airports in the study area. Delays during peak periods continue to mount at airports, mainly because of on-airport warehouse space and peak-period lift capacity. Also, competition for space impacts the airports in the study area, particularly Los Angeles International Airport (LAX), where high demand exists for both passenger and cargo services. Runways, taxiways, aprons to park aircraft, maintenance facilities, and cargo-handling facilities are needed for air cargo services. One proposal to alleviate this competition at LAX is to attract cargo to outlying airports such as San Bernardino International, Ontario International, Palmdale, Victorville and March, where capacity exists. Some of these have been proposed as all-cargo airports. However, the potential for all-cargo airports is limited because a significant portion of air cargo moves in the bellies of large international passenger aircraft, due to the pricing advantage offered by the extra belly space, most of which fly out of LAX. In addition, since most air cargo is destined for use within the region, the location of LAX makes it the most convenient with respect to the cargo's final destination.

RAIL

The study area is home to the nation's busiest rail intermodal operations. It is a key mode of transport for goods through the MCGMAP region and it is preferred when there is a need to move large volumes of goods over long distances. Freight is often transferred to eastern carriers who deliver shipments to dense eastern markets such as Columbus, Detroit, Boston, New York/New Jersey, Philadelphia, Baltimore, Norfolk, Atlanta and Jacksonville. The total domestic and intermodal volume moving through the eight terminals operated by Burlington Northern Santa Fe Railway (BNSF) and the Union Pacific Railroad (UP) in the study area approaches five million containers annually, of which 64 percent are international and 36 percent are domestic containers[13]. BNSF and UP are linked to the Mexican and Canadian rail systems. On an average weekday, 80 freight trains run through the study area, hauling 52 percent[14] of the ports' international containerized goods to and from other parts of the country.

There are two immediate issues facing the railroads serving Southern California which are (1) terminal capacity to load and stage freight and (2) mainline capacity east of Los Angeles over the mountains. As a result of historical growth in the intermodal container market, mostly due to growth in Asian imports, mainlines are reaching their capacity. Terminals are being stretched to their limits, recent reduction in free time at the terminals has provided some relief but the growing volumes are exceeding the capacity of the existing terminals. Some carriers have actively tried to relocate business segments to other terminals east of Los Angeles, with some success. The impact of mainline capacity constraints is a reduction in system velocity, which results in delay and increased backlog along the mainlines as well as at the rail yards. The average train trip is delayed by over 30 minutes east of Los Angeles.[15] A backup in the system is far reaching, resulting in the delay in the delivery of time-sensitive shipments to customers nationwide.

The following sections describe more about the existing freight rail system, rail intermodal facilities and commuter rail service within the study area.

Freight Rail System- The freight rail system within the study area consists of mainline freight lines, short lines, and the Alameda Corridor. Three mainline freight lines within the LA basin transport more than 98 percent of all Los Angeles and Long Beach port intermodal traffic. These lines are (1) the BNSF Transcon west of San Bernardino, (2) the UP Los Angeles Subdivision, and (3) the UP Alhambra Line. The BNSF Transcon in the Basin runs from San Bernardino to downtown Los Angeles, then connects to the triple track

Alameda Corridor and thus to the Ports of Los Angeles and Long Beach. In addition, Amtrak operates long distance Southwest Chief and the Amtrak Pacific Surfliners while Metrolink operates its 91 Line service, its Inland Empire Orange County Line service, and its Orange County Line service on the BNSF Transcon. UP's Los Angeles Subdivision runs from West Riverside to downtown Los Angeles. The Alhambra Line runs from Colton to downtown Los Angeles. Both lines connect to the Alameda Corridor. These lines also connect to the north-south rail routes for UP, the Coast, and the Santa Clarita Lines as shown in Figure 10. Current freight and passenger train volumes for these lines are listed in Tables 3 and 4.

There are four primary short line operators in the study area. All of the short lines are essentially switching carriers and performing work of high labor-intensity. They provide a specialty service to the large railroads by concentrating their resources on intra-city (and to a lesser degree intra-region) operating issues. None of the short lines have operating scopes beyond defined boundaries. The short lines have no regional influence on goods movement issues and should be viewed as outsourcing entities of UP and BNSF.

The Alameda Corridor is a publicly owned, grade separated track running from near downtown Los Angeles to the San Pedro Bay Port area. In 2005, this line handled approximately 54 trains per day.

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS

Figure 10
BNSF TRANSCON WEST OF SAN BERNARDINO, UP LOS ANGELES SUBDIVISION, AND UP ALHAMBRA LINES

524930/BASE - 3/1/06

Table 3
Total Through Passenger Train Movements
per Peak Day by Line Segment and/or Carrier and Route, Year 2000

BNSF/UP Line Segment	Train Movements
BNSF Hobart – Fullerton Jct.	46
BNSF Fullerton Jct. – Atwood	5
BNSF Atwood – West Riverside	16
BNSF/UP West Riverside – Colton	11
BNSF/UP Colton – San Bernardino	11
Lines over Cajon Pass (including BNSF/UP Cajon Line and UP Palmdale Line)	2
UP Mira Loma – W. Riverside plus UP West Colton - Colton	14
UP Yuma Line	2
Metrolink	
Covina - Los Angeles	30(20)
San Bernardino – Covina	30(20)
San Bernardino – Riverside	9(4)
Riverside – Atwood	15(10)
Atwood – Fullerton	3(0)
Fullerton – Los Angeles	22(14)
Riverside – Pomona – Los Angeles	12(10)
Amtrak	
Fullerton – Los Angeles	22
El Monte – Indio	2
Los Angeles – Fullerton – Barstow	2
Los Angeles – Pomona – Barstow	0

Source: Inland Empire Railroad Main Line Study, Final Report, June 30, 2005.
Note: Figures in parentheses for Metrolink trains are train counts during peak hours. Figures for Year 2000 are actual movements.

Table 4
Total Through Freight Train Movements
per Peak Day by Line Segment, Year 2000

Line Segment	Train Movements
BNSF Hobart – Fullerton Jct.	50
BNSF Fullerton Jct. – Atwood	50
BNSF Atwood – West Riverside	57
BNSF/UP West Riverside – Colton	92
BNSF/UP Colton Crossing	121
BNSF/UP Colton – San Bernardino	79
Lines over Cajon Pass (including BNSF/UP Cajon Line and UP Palmdale Line)	93
UP Mira Loma – W. Riverside plus UP West Colton - Colton	64
UP Yuma Line	42

Source: Inland Empire Railroad Main Line Study, Final Report, June 30, 2005.

The two primary segments of the railroad business are intermodal and carload. The intermodal segment includes the movement of international and domestic containers and trailers and is the main market emphasis for the railroads in the study area, which includes container traffic through the ports. In terms of the intermodal segment of the railroad business, the following is noted:

- The railroads wholesale intermodal train capacity directly to the marine lines rely on third party intermodal marketers for the domestic and transload business segments.
- The drayage part of the business (pick-up and delivery of containers to and from the terminal) is typically arranged by the intermodal marketing companies. An intermodal shipment consists of several trip segments (or legs).
- The line-haul is the long haul rail portion of the trip between the originating and terminating intermodal yards. On either end of the line-haul is the local dray to and from the actual shipper or receiver of the goods.
- Approximately 50 percent of all international container traffic moves via intermodal service to inland U.S. points, another 12 percent of these international containers are transloaded to 53' domestic containers, and move inland for final delivery[16].
- The UP and BNSF move an estimated 40 percent of all international containers through the study area (many of these are empty westbound containers) as part of their intermodal service.[17]
- In addition to port-related traffic, UP and BNSF transport a large number of domestic containers, adding billions of dollars to the total value of intermodal cargo in the study area. Domestic intermodal cargo includes customers such as UPS, U.S. manufactured food products, and high value merchandise (e.g., cigarettes and alcohol).

Carload typically carries commodities such as grain and fertilizers, lumber, paper, scrap metal, coal, aggregates, chemicals, steel, machinery, automobiles, oil and petroleum products, and consumer products. Carload traffic represents about a third of the rail goods movement in the study area. Also, it is estimated that carload volumes represent less than a third of the overall rail market volume in the study area.

Intermodal Facilities- Rail intermodal facilities allow for the transfer of containers from one mode to another, specifically the transfer of containers between rail and truck. The location of an intermodal yard, relative to the ports, has an impact on the amount of truck travel through the study area. There are two general types of intermodal terminals. On-dock rail terminals are typically single user facilities which are fed directly by an ocean vessel. While the inbound containers are significant, often time-sensitive cargo or containers destined to secondary markets will move to the common user intermodal facilities, off-dock. Off-dock terminals as noted earlier, create blocks of traffic, and the terminal operators build these blocks to match the markets the train will be serving. So all the Chicago freight is grouped together and separated from the Dallas or the Kansas City blocks of traffic. These two types of terminal facilities have some important safety and velocity differences. On-dock terminals have been very successful in reducing truck traffic in the study area. A truck carrying a port-generated container to an intermodal yard in or near a port (i.e., an on-dock or near-dock intermodal yard) will travel a shorter distance than one going to an inland facility (i.e., an off-dock intermodal yard).

The efficiency of an intermodal yard has an impact on the overall productivity and velocity of the goods movement system. On-dock facilities typically are single-user facilities, and near-dock and off-dock facilities are typically common user facilities. Marine terminal on-dock rail yards have a different set of safety concerns than off-dock rail facilities. These safety issues are driven, in part, by the marine terminal workers. Even with this, the on-dock rail yards have made an enormous contribution to reduction of truck traffic on the highways. In 2005, over 1.6 million lifts (21% of the San Pedro Bay ports' volume) were handled at the on-dock rail yards.

Intermodal throughput capacity is also affected by the types of operations and practices utilized by the railroads operating the intermodal yards. For example, the UP uses a "wheeled operation" at its Intermodal Container Transfer Facility (ICTF), where almost every container is stored on a trailer chassis. While this lowers the cost of operations, it also limits the container throughput per acre. In comparison, the BNSF uses management techniques to increase throughput per acre at its Hobart facility, including stacking containers vertically, allocating containers (per carrier), and imposing fees on containers that stay longer than a day. The result is that throughput per acre per year is twice as high at Hobart[18] as it is at ICTF.[19]

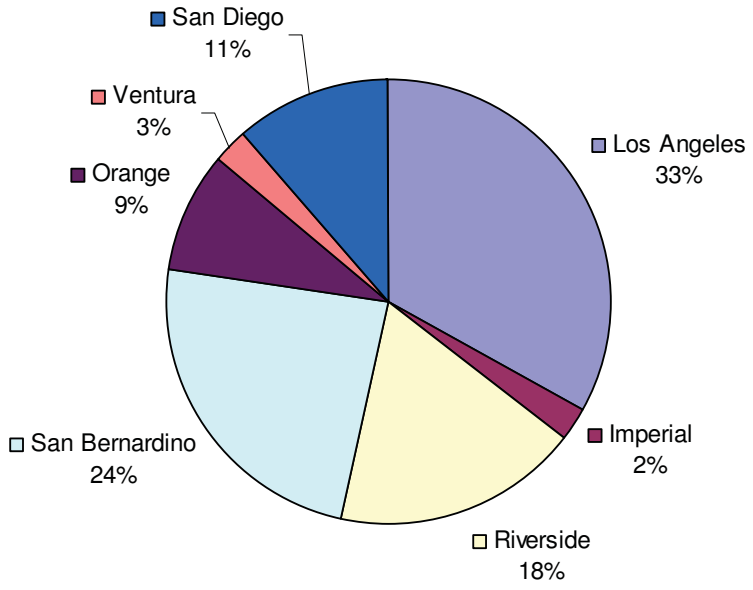
Commuter Rail Service - In addition to the freight trains, the network carriers 145 commuter trains (Metrolink) on an average weekday. In addition, Metrolink commuter passenger rail services operate on the existing freight rail system. Metrolink is planning major increases in passenger trains using BNSF and UP mainlines in the study area; these increases will further strain capacity in the absence of any improvements. Metrolink trains are most frequent during the morning and afternoon weekday commute periods, and are oriented inbound to Los Angeles in the morning and outbound in the afternoon. About a third of Metrolink trains operate on BNSF and UP mainlines today. Amtrak long distance and Pacific Surfliner corridor trains also use BNSF and UP mainlines in the study area. Capacity is also a concern on publicly owned tracks. As noted, Metrolink dispatches about 100 freight rains on publicly owned tracks, and these trains share the track with the majority of Metrolink trains. As freight and passenger trains increase, capacity will increasingly become a concern for all users of these publicly owned tracks.

TRUCK FLOWS and CONGESTION

Highways within the study area carry some of the highest truck volumes in the U.S.[20] One third of the region's 9,000 lane miles of highways carry more than 10,000 trucks per day. I-710, which links trucks directly to and from the ports and to I-605 and SR-91, carry up to 40,000 trucks on an average weekday.[21] The truck mode plays a significant role in moving goods door-to-door between shippers and receivers, as well as transferring goods from one mode to another (for example, between a port and an intermodal yard). Also, from a national standpoint, most heavy truck mileage is generated in the carriage of freight. Truck traffic is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity.[22]

Freight moves on highways through International ports of entry along the U.S./Mexico border and to destinations north and east of the study area. Trucks carry almost two-thirds of goods from Mexico and Canada to the United States. According to the Federal Highway Administration (FHWA), in 1998 trucks moved 71 percent of total (international and domestic) tonnage and 80 percent of the total (international and domestic) value of U.S. shipments. The distribution of truck vehicle miles traveled (VMT) throughout the study area by county is shown in Figure 11.

Figure 11
2003 Percentage of Truck VMT in the MCGMAP Study Area by County



Source: Caltrans 2004

Table 5 shows the distribution of port-related (POLA and POLB) truck trips over the existing freeway system. As shown, I-710 is the primary and dominant corridor for port-specific traffic. There also appears to be an inverse relationship that exists between distance to the ports and port-related traffic. For example, the further north from the ports, the lower the amount of port-related traffic. While total truck traffic shows no significant trend in volumes or as a share of total vehicle traffic, the share of port-specific truck traffic declines sharply in terms of its share of total truck traffic further away from the ports. Chapter 6 contains a more detailed discussion of the role of secondary truck trips, including those truck trips not directly to or from the ports but also due to goods moving to or from the ports to inland warehouse and distribution centers. Lastly, data is not available to quantify secondary trips or to identify a relationship between number of port trips and number of secondary trips generated.

Table 5
Comparison of Port Truck Volumes to Total Daily Truck Volumes on Study Area Roadways, Year 2003

Highways	Segments	Total Daily Vehicle Volume	Total Daily Truck Volume	Daily Port Truck Volume	Total Trucks as % of Total Vehicle Volume	Port Trucks as % of Total Truck Volume
I-110	PCH to Sepulveda	148,000	9,900	7,810	6.7%	78.9%
	Sepulveda to I-405	226,000	11,900	7,335	5.3%	61.6%
I-110	I-405 to SR-91	266,000	23,900	6,015	9.0%	25.2%
	SR-91 to I-105	247,000	17,800	4,680	7.2%	26.3%
	I-105 to I-10	324,000	15,900	2,485	4.9%	15.6%
I-710	PCH to Willow	146,000	25,400	23,900	17.4%	94.1%
	Willow to I-405	161,000	27,100	23,235	16.8%	85.7%
	I-405 to SR-91	186,000	31,400	20,045	16.9%	63.8%
	SR-91 to I-105	227,000	38,300	15,315	16.9%	40.0%
	I-105 to I-5	237,000	34,600	11,685	14.6%	33.8%
	I-5 to SR-60	199,000	24,200	1,025	12.2%	4.2%
	SR-60 to I-10	132,000	11,300	845	8.6%	7.5%
I-405	I-605 to I-710	289,000	15,700	1,875	5.4%	11.9%
	I-710 to I-110	283,000	15,400	2,965	5.4%	19.3%
	I-110 to SR-91	270,000	14,600	1,960	5.4%	13.4%
	SR-91 to I-105	294,000	12,100	1,810	4.1%	15.0%
	I-105 to I-10	310,000	12,800	1,590	4.1%	12.4%
SR-91	SR-57 to I-5	250,000	21,800	1,135	8.7%	5.2%
	I-5 to I-605	283,000	39,900	1,470	14.1%	3.7%
	I-605 to I-710	263,000	37,100	2,870	14.1%	7.7%
	I-710 to I-110	212,000	13,700	1,385	6.5%	10.1%
	I-110 to I-405	67,000	1,500	195	2.2%	13.0%
I-105	I-605 to I-710	212,000	18,800	2,800	8.9%	14.9%
	I-710 to I-110	231,000	14,700	1,605	6.4%	10.9%
	I-110 to I-405	243,000	13,800	390	5.7%	2.8%
I-5	SR-57 to SR-91	223,000	21,400	225	9.6%	1.1%
	SR-91 to I-605	199,000	18,600	160	9.3%	0.9%
	I-605 to I-710	249,000	23,200	195	9.3%	0.8%
	I-710 to SR-60	267,000	20,600	1,800	7.7%	8.7%
	SR-60 to I-10	247,000	20,400	710	8.3%	3.5%
SR-60	SR-57 to I-605	265,000	23,200	1,560	8.8%	6.7%
I-10	SR-57 to I-605	259,000	18,100	1,775	7.0%	9.8%
	I-605 to I-710	234,000	14,200	585	6.1%	4.1%
	I-710 to I-5	254,000	9,000	190	3.5%	2.1%
	SR-60 to I-110	284,000	21,600	300	7.6%	1.4%

Table 5
Comparison of Port Truck Volumes to Total Daily Truck Volumes on Study Area Roadways, Year 2003

Highways	Segments	Total Daily Vehicle Volume	Total Daily Truck Volume	Daily Port Truck Volume	Total Trucks as % of Total Vehicle Volume	Port Trucks as % of Total Truck Volume
I-605	I-405 to SR-91	245,000	11,300	20	4.6%	0.2%
	I-105 to I-5	297,000	41,900	4,100	14.1%	9.8%
	I-5 to SR-60	265,000	37,400	3,825	14.1%	10.2%
I-605	SR-60 to I-10	224,000	26,800	1,815	12.0%	6.8%
SR-57	I-5 to SR-91	276,000	18,800	10	6.8%	0.1%
	SR-91 to SR-60	296,000	23,400	135	7.9%	0.6%
	SR-60 to I-10	139,000	8,100	40	5.8%	0.5%

Source: Port of Los Angeles, "Baseline Transportation Study," pg. 39, 2004.
Caltrans Truck Volumes 2004 (Year 2003 Data).

Also, approximately 65 percent of inbound truck trips to the MCGMAP region's warehouse/distribution centers originate from port and/or airport terminals. The remaining approximately 35 percent of inbound truck trips to warehouse/distribution centers originate from local industries and railyards where domestic intermodal shipments arrive from elsewhere in North America. Further, the SCAG 2004 RTP reported that in the Year 2000 total daily delay due to congestion in the study area was estimated at 2.2 million person-hours. The impact of delay on the freight industry is significant, since it can increase the hourly cost of carrying goods by 50 to 250 percent, from a base value of $25 to $200 per hour, depending on the commodity.[23]

Table 6 presents a summary of Year 2003 daily and peak period volumes on segments within the SCAG region identified as experiencing high levels of congestion during peak periods.

Table 6
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of High Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
I-5	ORG	30.0	SR-55 to SR-57	S	12833	656	31.1	5%	N	10703	283	31.5	3%	344000	22016	6.4
I-5	ORG	33.1	SR-57 to LA County Line	S	11427	252	27.9	2%						260000	18200	7
I-10	LA	6.7	I-405 to I-110	W	8732	282	33.9	3%						264000	10639	4.03
I-10	LA	24.3	I-710 to I-605	W	7462	282	32	4%						22500	13658	6.07
I-110	LA	20.7	I-105 to I-10	N	8166	372	28.3	5%						292000	15388	5.27
I-215	RIV	38.3	I-10 to I-259						N	5206	393	33.3	8%	185000	20165	10.9
I-405	ORG	28.3	I-5 to SR-133	N	10958	288	21.6	3%						225000	9608	4.27
I-405	ORG	19.2	Beach Blvd to LA County Line	S	9294	363	30.2	4%						287000	9586	3.34
I-405	LA	14.9	I-110 to I-91	N	9178	309	26.2	3%						250000	11575	4.63
I-405	LA	44.3	US-101 to End	S	9503	309	26.2	3%	N	9311	209	30.2	2%	227000	8694	3.83
I-605	LA	11.0	SR-91 to I-105						N	7114	450	34.2	6%	247000	11436	4.63
I-605	LA	11.0	I-105 to I-5						N	7114	569	27.1	8%	267000	37700	14.12
I-605	LA	11.0	I-5 to SR-60	S	8377	889	33.1	11%	N	7114	814	33.6	11%	254000	35865	14.12
I-710	LA	25.2	I-5 to SR-60						S	4896	478	28.4	10%	133000	11385	8.56
SR-55	ORG	8.5	I-405 to I-5						N	3903	172	32.9	4%	257000	15163	5.9
SR-55	ORG	8.5	I-5 to SR-22	S	15037	565	24	4%						257000	15163	5.9
SR-57	ORG	15.6	I-5 / SR-22 to SR-91	S	9213	633	26.9	7%	N	12220	252	34.3	2%	300000	20400	6.8
SR-57	ORG	15.6	SR-91 to LA County Line	S	9213	466	28	5%	N	12220	280	31.5	2%	300000	20400	6.8
SR-60	LA	2.2	End to I-710	W	9013	247	28.5	3%						210000	10164	4.84

Table 6
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of High Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
SR-60	LA	23.6	I-605 to SR-71						E	10955	424	32.6	4%	345000	27980	8.11
SR-91	LA	17.6	I-710 to I-605	W	9255	341	31.9	4%						273000	25280	9.26
SR-91	ORG	10.1	SR-241 to Riverside County Line						E	10261	241	23.5	2%	284000	13206	4.65
SR-91	RIV	6.4	Riverside County Line to I-15	W	7954	364	30.5	5%	E	8091	403	34.3	5%	250000	17000	6.8
US-101	LA	12.4	I-110 to SR-170	S	9581	263	32.1	3%	N	9766	172	23.6	2%	292000	7738	2.65
US-101	LA	19.9	SR-170 to I-405	S	10487	274	33.7	3%						216000	8510	3.94
SR-134	LA	12.1	SR-170 to I-5						E	8751	142	33.9	2%	213000	5708	2.68

Sources: (a) Caltrans, Traffic and Vehicle Data Systems Unit, 2004 Truck; (b) Caltrans, 2005 Peak Hour Volume Data; (c) Southern California Association of Governments (SCAG), 2005 PeMS Database v. 6.

Table 6 summarizes the following conditions during periods of high congestion:

- Both I-710 and I-605 between I-5 and SR-60 in Los Angeles County carry more than 35,000 trucks, representing 14 percent of total daily traffic on these segments.
- I-605 between I-5 and SR-60 in Los Angeles County, with 11 percent truck traffic, represents the highest truck percentage in both the AM and PM peak hour.
- I-710 southbound between I-5 and SR-60 in Los Angeles County, with 10 percent truck traffic, represents the second highest truck percentage in the PM peak hour.

While congestion and delay affect the everyday lives of commuters in the study area, they also have a significant impact on goods movement. Eighteen percent of all truck volumes on the freeways within the study area experience delay due to congestion, which results in an increase in the cost of transporting goods by 50 to 250 percent.[24] Goods rely substantially on trucking to connect warehouses, distribution facilities, intermodal facilities, and other businesses. For the most part, these facilities and businesses operate during daytime hours, although some operate during the night. Daytime operations cause conflicts between everyday commuter traffic and truck traffic. This conflict also creates a perception that goods movement is the sole contributor to congestion and delays, given that the bulk of truck traffic does not occur during the morning and early evening peak commute hours and that approximately two thirds of trucks traffic occurs during off-peak hours. Congestion and delays on the highway system cannot be fully addressed without including strategies to reduce commuter traffic congestion as well as truck traffic.

Automobile drivers and passengers are often concerned about being involved in a traffic accident with a truck. These concerns may affect the implementation of goods movement and trade initiatives in the study area. Truck accidents result in a higher probability of damage to the other vehicle and injury to its occupants. Of all accidents involving large trucks, 84 percent of fatalities are passengers in vehicles other than the truck.[25] In the same study of all large truck collision incidents, 50.7% of these events were caused by the driver of the passenger vehicle. Between 2000 and 2003, the number of fatalities in accidents involving a truck increased by 17 percent in the study area.[26] Moreover, an accident involving a truck impacts system traffic flow more than an accident involving passenger vehicles.

Also, the lack of truck inspection and enforcement facilities within the study area presents a further constraint to addressing truck safety. Caltrans operates 37 truck inspection facilities in California.[27] Six of these facilities operate within the study area - Los Angeles County, Castaic (I-5); San Bernardino County, Cajon (I-15); Riverside County, Blythe (I-10); Riverside County, Desert Hills (I-10); Orange County, Peralta (SR-91); and Ventura County, Conejo (US-101). These facilities are located near the borders of the study area and inspect trucks entering or exiting the region. There are no inspection facilities within the study area that inspect the intra-regional truck travel.

In addition, trucks contribute to pavement deterioration. While an 80,000 pound truck weighs as much as 20 automobiles, it has the same impact on pavement condition as 9,600 automobiles.[28] Currently trucks pay truck weight fees that contribute toward a portion of growing road maintenance costs, these revenues do not contribute to congestion relief.

BORDER CROSSINGS

The number of trucks passing through the U.S./Mexico border crossings in San Diego and Imperial Counties are projected to grow from approximately 7,000 per day in 2005 (representing a total value of approximately $36 billion in annual value) to more than 12,000 per day in 2020; some forecasts project more than 17,500 trucks per day by 2030 (Figure 12). Additional capacity is needed at the border crossings and highways that serve them to meet current and future truck traffic projections.

Tables 7 and 8 summarize vehicle and truck volumes along freeway segments in San Diego County. Existing cross-border truck movements are shown in Table 9.

Table 7
San Diego Region Daily Vehicle and Truck Volumes
Year 2006

Route	Location	Postmile	Total Vehicle Volume	Total Truck Volume	Truck Percentage
I-5	JCT. RTE. 8/ROSECRANS	20.06	211000	8651	4.10%
I-5	BASILONE ROAD	71.38	150000	10500	7.00%
I-8	SAN DIEGO, JCT. RTE. 163	2.41	229000	6412	2.80%
I-8	SAN DIEGO, JCT. RTE. 805	4.38	217000	6944	3.20%
I-8	GREENFIELD DRIVE	18.73	88000	6072	6.90%
SR-15	JCT. RTE. 163	12.12	294000	10966	3.73%
SR-15	SAN DIEGO, MIRAMAR/ POMERADO ROADS	15.00	291000	10942	3.76%
SR-15	SAN DIEGO, POWAY ROAD	18.76	255000	18105	7.10%
SR-15	SAN DIEGO/RIVERSIDE COUNTY LINE	0.00	127000	8573	6.75%
SR-52	SAN DIEGO, GENESEE AVENUE	2.90	92000	3036	3.30%
SR-52	JCT. RTE. 805	3.76	97000	3007	3.10%
SR-52	SANTO ROAD	8.71	76000	1976	2.60%
SR-54	JCT. RTE. 94	10.99	60000	2340	3.90%
SR-67	POWAY ROAD	15.20	22000	2024	9.20%
SR-75	CORONADO, POMONA AVENUE	17.46	25500	485	1.90%
SR-76	JCT. RTE. 5	0.00	52000	2288	4.40%
SR-78	OCEANSIDE, EL CAMINO REAL	1.50	153000	5294	3.46%
SR-94	SAN DIEGO, JCT. RTE. 805	5.70	187000	7293	3.90%
SR-94	JCT. RTE. 125	8.98	144000	5328	3.70%
SR-163	JCT. RTE. 5	0.89	110000	3300	3.00%
I-805	JCT. RTE. 54	8.85	245000	14700	6.00%
SR-905	JCT. RTE. 805	5.16	53000	4293	8.10%

Source: Caltrans District 11, 2006; SANDAG, 2006.

Table 8
San Diego Region Peak Vehicle and Truck Volumes
Year 2006

	AM Peak Hour			PM Peak Hour		
Route	Total Vehicle Volume	Heavy Duty Truck volume	Truck percentage	Total Vehicle Volume	Heavy Duty Truck volume	Truck percentage
SR-94 JCT. RTE. 125	19189	514	2.68%	21565	290	1.34%
I-15 POWAY ROAD	17484	1695	9.69%	20565	1268	6.17%
I-15 West of SR-76	8403	1422	16.92%	10091	1995	19.77%
SR-76 (I-15 & I-5)	3777	195	5.16%	3839	106	2.76%
SR-52 (SR-125 & 805)	13151	745	5.66%	12372	506	4.09%
SR-56 (I-15& I-5)	10129	730	7.21%	16055	1314	8.18%
I-805 (SR-905 & SR-54)	9575	1213	12.67%	19916	1947	9.78%
SR-905 (East of I-805)	4312	827	19.18%	9607	1918	19.96%
I-5 west of SR-76	6872	1490	21.68%	15785	1732	10.97%
I-5 (SR-905 & SR-54)	15216	2003	13.16%	21989	1190	5.41%
I-8 (East of SR-125)	2514	684	27.21%	5029	454	9.03%

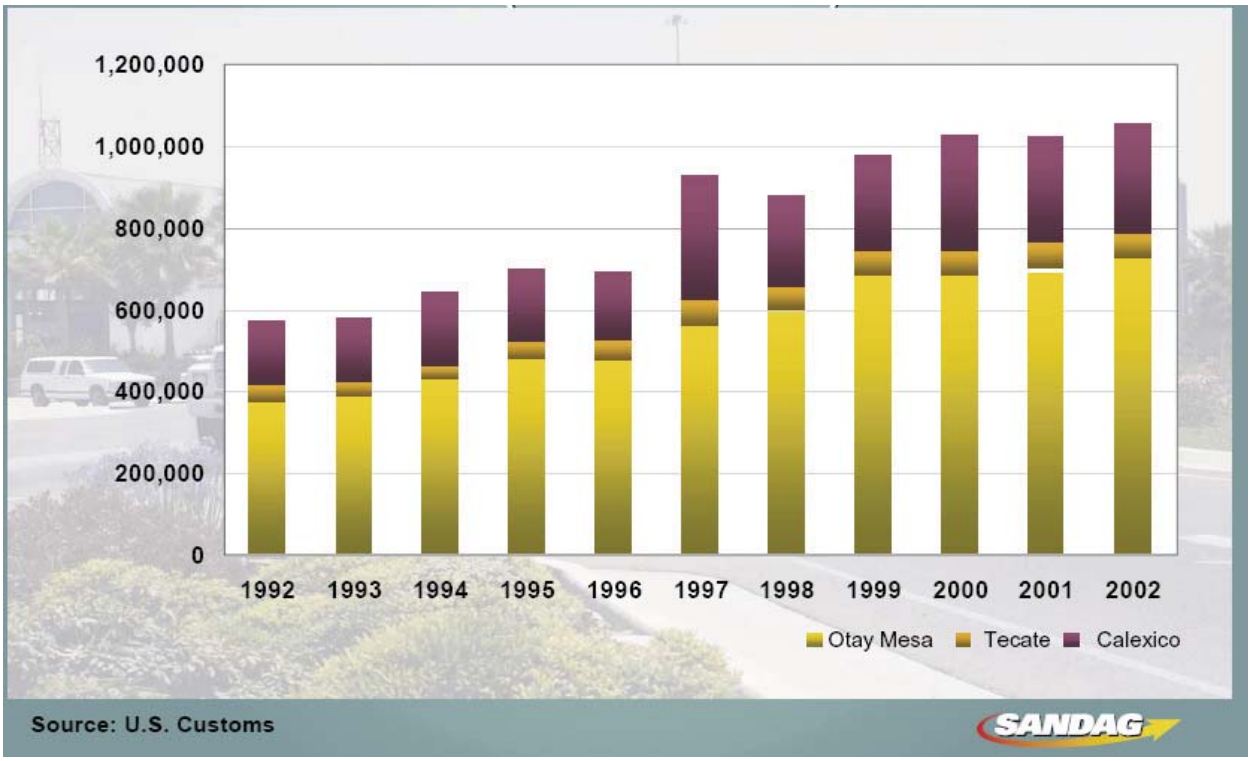
Source: Caltrans District 11, 2006; SANDAG, 2006.

Table 9
Border Crossings, 2005

U.S. Port of Entry	Annual Trade Value (million $)	Truck Crossings Entries per Day
Truck		
Otay Mesa Station, CA	24,417	5,175
Calexico, CA	10,750	2,303
Tecate, CA	1,157	479

Source: Trade value data are from U.S. Department of Transportation, Transborder Surface Freight Data (2005). Truck crossings data are from U.S. Customs and Border Protection, Border Crossing Statistics (2005).
Note: The border crossings are truck entries (imports) into California only, and do not include truck exits (exports) to Mexico.

Figure 12
Annual Cross-Border Truck Volumes



WAREHOUSING AND DISTRIBUTION

Warehouse, distribution, transload, and cross-dock operations occupy approximately 1.5 billion square feet of building space throughout the study area. This represents 15 percent of the nation, and 60 percent of the entire west coast markets. Warehouses and distribution centers in the MCGMAP area are an integral part of the regional goods movement system. These centers are places in the supply chain where goods merge and flow from various origins to multiple consumer end points. Warehousing and distribution centers are sites used to receive, deliver, consolidate, distribute, and store goods. Local and regional warehouses typically are selected to serve final users within a 24-hour order placement window. Because the Southern California region is the largest population center west of the Mississippi, many domestic facilities are located in the study area. International goods from multiple origins around the world come to the MCGMAP Region and are merged with other international products coming from multiple origins to leave the region and move to single inland locations (such as Memphis, Chicago, Columbus, etc.) Mixing international cargo is usually referred to as cross docking which means little or no product is going to be delivered locally. This confluence of two types of warehousing activities (serving inbound international freight and local domestic distribution) leads to the wide dispersion of warehouse locations.

Table 10 summarizes the total acreage (square foot) available and under construction for the warehousing, manufacturing, and distribution industry throughout the study area. In addition, the following is worth noting:

- The greater Los Angeles County area is attractive to warehousing and distribution centers due to its proximity to the ports and consumers, the large labor force available, and the existing transportation centers and hubs.
- In Orange County, industrial land is frequently redeveloped for retail activities. Older warehousing and distribution facilities are in the relatively more expensive northern parts of the county, due to proximity to the seaports and current consumers. New warehouse facilities are being built further to the south, where more land is available at relatively lower costs.
- In Ventura County there are very limited warehouse and distribution facilities, relative to the other counties in the study area. The key contributing factor is the focus on agricultural land uses in the county, as well as relatively high housing costs for workers. The Ventura market is relatively stable with slightly declining vacancy levels and moderate increases in available space. The development of new industrial space has regained momentum.
- The Inland Empire (essentially defined as San Bernardino and Riverside Counties) has an especially strong warehouse and industrial market. This subarea is attractive to warehousing and distribution centers because it has areas of land available for large (one million plus square feet) facilities -- something that is in short supply throughout other portions of the MCGMAP study area.
- Warehousing and industrial land uses in San Diego County are concentrated at the border region. These facilities range in sizes that are typically 50,000 square feet.

The five main reasons that firms have located their warehouses and distribution centers in the MCGMAP study area are:

- Access to the two largest ports in the nation that are within the study area which is a strategic advantage point for unloading goods arriving from Asia for distribution around the U.S.
- Access to other Western U.S. cities such as Las Vegas and Phoenix and multiple transportation modes and distribution facilities makes these areas a desirable logistics hub.
- Access to a substantial local market of an estimated 17 million people, making it arguably one of the largest consumer markets in the country.
- The study area represents the third largest manufacturing center in the nation.[29]
- Currently the warehousing, distribution, and manufacturing industry in the study area includes approximately 1.7 billion square feet (SF) of space, with an additional 30 million SF under construction as of the second quarter of 2006.

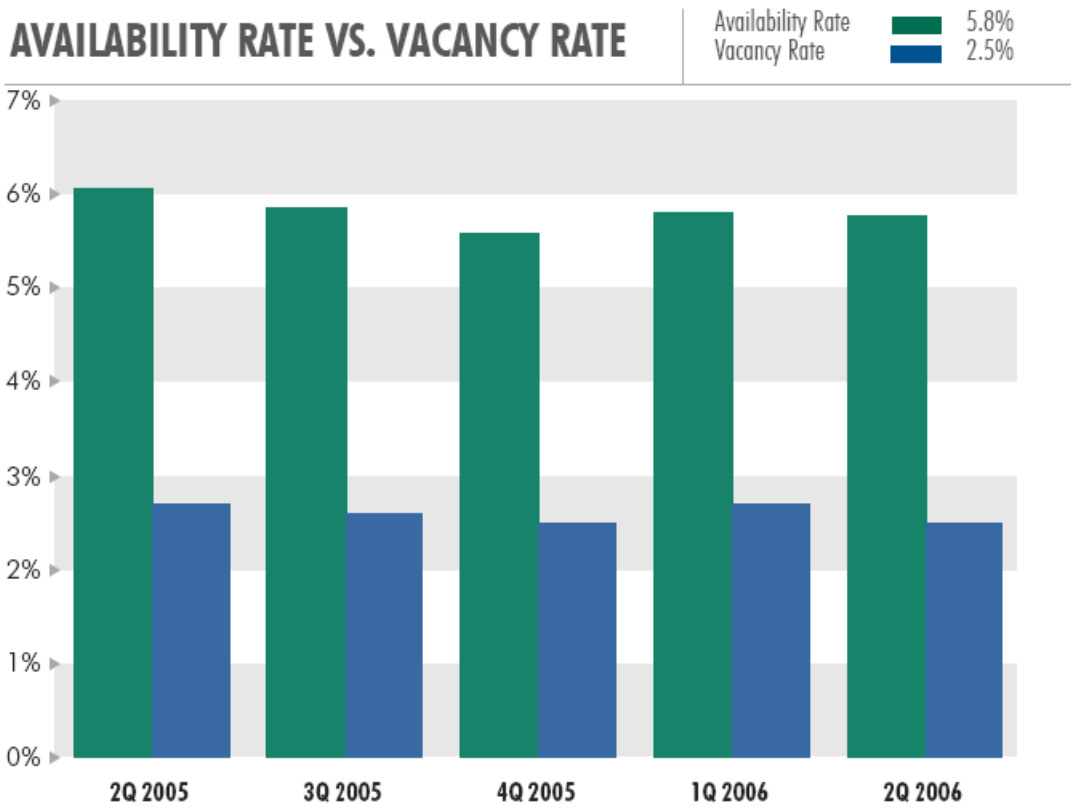
Table 10
Summary of Warehouse and Industrial Space within the MCGMAP Study Area

Market Area	Net Rentable Area (SF)	Availability Rate	Vacancy Rate	SF Net Absorption	SF Under Construction	Avg. Asking Lease Rate per SF
Los Angeles County	920,658,073	4.9%	1.4%	2,022,941	6,110,312	$0.61
Inland Empire[i]	324,901,814	6.2%	3.2%	3,750,391	18,472,426	$0.41
Orange County	245,244,115	5.7%	3.1%	525,978	1,162,263	$0.63
San Diego County	189,907,900	9.0%	5.4%	741,174	4,553,785	$1.05
Ventura County	60,059,272	7.6%	5.2%	461,936	536,202	$0.72
Study Area	1,740,771,174	5.8%	2.5%	7,502,420	30,835,988	$0.65

Source: National Association of Industrial and Office Properties (NAIOP) & C.B. Richard Ellis (CBRE), 2Q2006
Notes: [i] The data used comes from a source that specifically breaks out the Inland Empire as a subregion without giving more detail at the county level.

Figure 13 presents a series of graphs (1 through 4) and summaries related to the warehousing and industrial market in Southern California. Figure 13 represents several key indicators of the warehousing and distribution center marketplace that include (1) demand (availability and vacancy rate), (2) price (lease rates), (3) utilization (net absorption) and (4) construction activities within the study area in 2006.

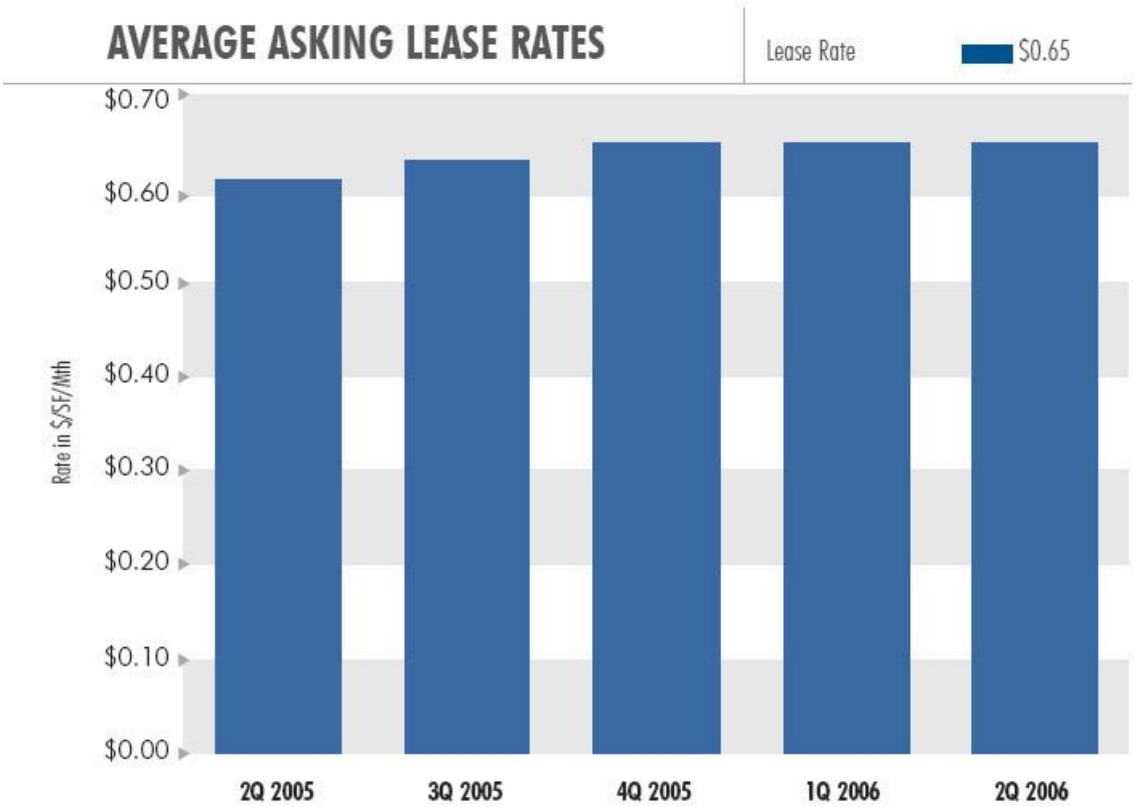
Figure 13



After increasing in the first quarter, the Southern California industrial vacancy rate experienced a drop to 2.5%, while the availability rate remained unchanged at 5.8%. Los Angeles Counties possess the lowest availability rate at 4.9%, while San Diego County and Ventura County reported the highest rates of Southern California at 9.0% and 7.6%, respectively. Orange County and the Inland Empire fall between the spectrums with rates hovering between 5.7% and 6.2%. Vacancy rates ranged throughout the five counties from the record-low 1.4% in Los Angeles County and Inland Empire to San Diego's rate of 5.4%.

Source: NAIOP / CBRE 2Q2006

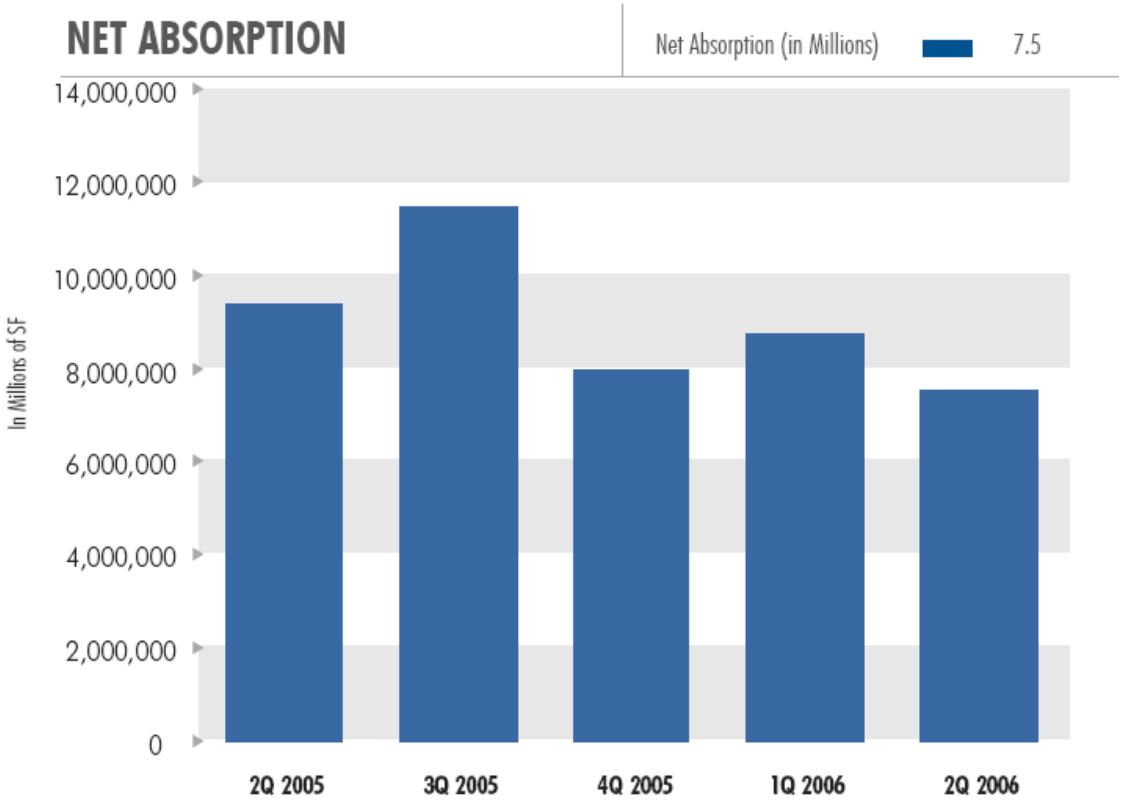
Figure 13
(Continued)



Standing at $0.65 per square foot for three consecutive quarters, the average asking lease rate for the Southern California industrial product remained constant this quarter. Conversely, the majority of the markets witnessed a change in the average asking lease rate. Ventura County added $0.06 this quarter to stand at $0.72 per square foot. San Diego County also experienced an increase, rising $0.03 to $1.05 per square foot. Los Angeles County's lease rate decreased from $0.63 to $0.61 per square foot, as did the Inland Empire, which declined $0.01 to post a rate of $0.41 per square foot. Orange County, remained steady at $0.63 per square foot.

Source: NAIOP / CBRE 2Q2006

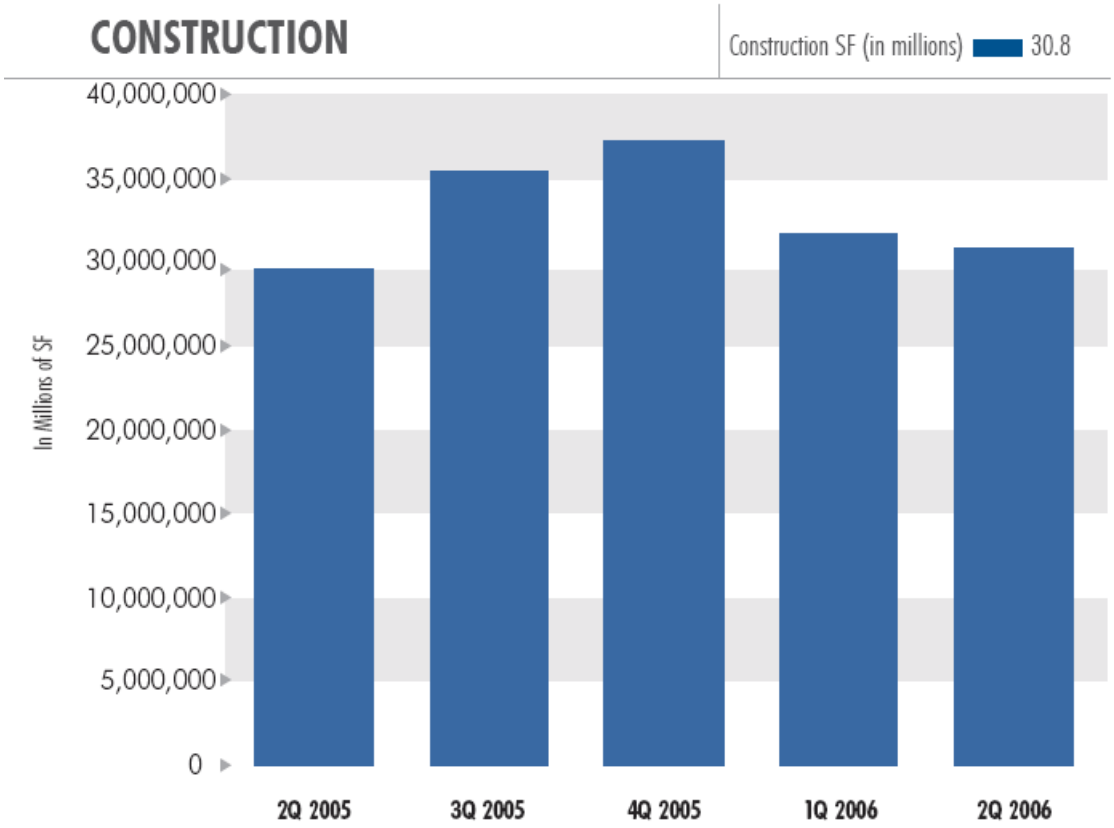
Figure 13
(Continued)



The Southern California industrial market experienced an additional 7.5 million square feet of net absorption in the second quarter, bringing the year-to-date total to over 16.2 million square feet of positively absorbed space. The majority of the absorption was in the Inland Empire where 3.8 million square feet was absorbed into the marketplace. A significant rise in activity was demonstrated in the Los Angeles market, which produced over 2.0 million square feet of absorption. A rise of demand also occurred in Ventura County, resulting in 461,936 square feet. A slowdown did take place in San Diego County, which absorbed a positive 741,174 square feet, whereas the Orange County market posted a steady 525,978 square feet of positive absorption.

Source: NAIOP / CBRE 2Q2006

Figure 13
(Continued)



New construction of industrial product within the Southern California market slowed to just over 30 million square feet under construction in the second quarter. Despite this minimal decrease, it is representative of a 4% annual increase over last year. The Inland Empire accounts for 60% of the total construction activity with 18.5 million square feet currently in the construction phase. Los Angeles County experienced a significant rise in new construction with 6.1 million square feet under development, as did Orange County, which pushed upward to 1.2 million square feet under construction. Construction of new space in San Diego and Ventura Counties kept at a steady level with 4.6 million and 536,202 square feet, respectively.

Source: NAIOP / CBRE 2Q2006

In addition, the warehouse sector is expected to remain strong, growing from 1.5 billion square feet of warehouse floor space in 2005 to over 4.5 billion square feet by 2030. This tripling of warehouse space needs is based on the assumption that international trade through the San Pedro Bay ports will triple from 2005 to 2030 to 42.5 million TEUs. The above trend is also based on the assumption that the demand is directly correlated to the number of TEUs through the ports. If the demand is directly correlated to the growth in population, the total warehouse space will increase to 1.87 billion sq ft. by 2030 due to population growth rate of 23%. Chapter 4 and Tech Memo 4a contain more information about warehousing growth and trends.

Further, the locations chosen by private sector developers for land uses associated with goods movement, specifically warehouses and distribution centers are shifting away from the traditional locations close to the ports and intermodal rail yards. This practice is impacting communities located throughout the study area and, in particular, to the east of Los Angeles. Increased truck travel to reach these more distant locations causes increased emissions and congestion. Moreover, these new warehouse and distribution facilities are appearing in high growth real estate markets where residential and other commercial development demands are growing. The result is a conflict between residential and goods movement uses. Therefore, the same concerns raised by communities around existing goods movement-intensive land uses (increased truck traffic, intrusion on neighborhoods and schools, noise, congestion, emissions, and safety) are emerging in new areas.

REGIONAL ISSUES AND CONSTRAINTS

Community Concerns about Environmental Impacts

The impacts of goods movement on the environment, quality of life and the resulting community concerns about these impacts is a major constraint to continued goods movement activities. Public health and other environmental impacts present a significant challenge to the future development of the goods movement system. Over time, the focus on types of air quality impacts has changed. For much of the 20th century, concerns were generally about the visual impacts. In recent years, as the visual nature of air pollution (smog) was reduced, concern shifted to the health impacts associated with various pollutants. Research conducted by the Keck School of Medicine at the University of Southern California (USC) indicates that the combination of gases and fine particles in transportation exhaust, especially diesel fuels, affects lung function and contributes to arterial thickening, birth defects, and low birth weights.[30] Data also indicates that the closer one lives to pollution sources, such as the ports, intermodal yards, or major freeways, the higher the risk. For example, the increased incidences of cancer and of asthma in children are shown to be related by proximity to pollution sources. Furthermore, the study area is required to demonstrate attainment with National Ambient Air Quality Standards (NAAQS) established per federal mandate. The U.S. EPA routinely evaluates air quality nationwide and periodically updates or establishes new standards (NAAQS). On April 15, 2004, EPA implemented an 8-hour ozone NAAQS (supplanting a previous 1-hour ozone standard), for which the South Coast Air Basin is to demonstrate attainment by 2021. These obligations cannot be achieved without making significant investments in environmental mitigation as well as a more focused effort to reduce the level of emissions from goods movement activities and other sources.

The widespread dissemination of this information has raised awareness and increased concern within affected neighborhoods. Environmental groups have forced a significant slowdown in port development in recent years. For example, the proposed Pier J expansion at the Port of Long Beach was halted due to concerns about the environmental document. Also, improvements to the China Shipping Terminal at the Port of Los Angeles were

delayed because of a lawsuit by the Natural Resources Defense Council (NRDC). Community-based resistance has also affected plans to address the existing levels of highway congestion.

There have also been some successful efforts working with local communities. For example, after nine months of deliberations by a broad-based group appointed by I-710 corridor communities and the I-710 Oversight Policy Committee (OPC) (collectively known as the Tier 2 Committee), a consensus emerged.[31] This consensus also involved community-level committees (known as Tier 1 Committees) consisting of the most directly impacted communities in the corridor. The chairs of the Tier 1 Committees were also represented on the Tier 2 Committee, along with a representative named by each City Council in the remaining corridor cities.[32] The committee recognized that something must be done to address the current congestion and design of the I-710 freeway, and that the hybrid design concept presented could accomplish maximum build-out in a manner that reflected the Tier 1 Committee's concerns and recommendations for their communities.[33]

The experience and results of the I-710/Major Corridor Study show that consensus can be achieved when the community is involved at the local level. The consensus achieved on the I-710 hybrid alternative is a major success story and is proof that responsible agencies and communities can resolve differences and find a common agenda to move forward. The efforts of the I-710 / Major Corridor Study were led by Metro and the Gateway Cities Council of Governments. The MCGMAP will require similar success stories. Nevertheless, concerns over the negative health impacts of diesel emissions potentially threaten the viability of the I-710 improvements and other goods movement projects, including plans to expand rail intermodal capacity, airport capacity, and the development of warehouse and distribution facilities.

Also, the impacts associated with at-grade crossings include noise, congestion, emissions, and safety are still a major concern for some communities. While communities and transportation agencies have worked hard to address at-grade crossing issues, in conjunction with efforts to encourage diversion from truck to rail, there is a significant shortfall in funding to fully implement existing plans. The Alameda Corridor project was successful in eliminating conflicts at 200 at-grade crossings between downtown Los Angeles and the ports. The project continues to reduce accidents, emissions, and congestion, as well as improve safety for the traveling public. There are existing efforts to eliminate at-grade crossings east of Los Angeles. However, the amount of federal funding provided accounts for only 23 percent of what was requested. Alameda-Corridor East related projects, including specific grade separations, received approximately $212 million of the estimated $900 million requested as part of the most recent national transportation reauthorization bill. This is arguably a national issue given that the freight traffic on the rail system is headed for destinations throughout the nation. The shortfall in funding for grade separation projects has implications for the safety of the communities along the rail freight corridors.

Furthermore, Metrolink is embarking on a Sealed Corridor initiative. The purpose of the project is to enhance safety at crossings as well as to inhibit unauthorized vehicular access to rail rights-of-way owned by Metrolink. The current focus is on at least 57 crossings in the San Fernando Valley and Ventura County. This project gained increased attention following an incident within the railroad right-of-way in the San Fernando Valley.

System-wide Goods Movement Data Limitations

Good information and data are required to make informed decisions about the goods movement system and its impacts. Currently, the level of existing data and information is not sufficient to effectively support decisions concerning an ever-changing market-driven goods movement industry. There are two specific areas of concern regarding data limitations. The first is the data and information used to support travel demand modeling tools and techniques. The second is a lack of system-wide performance data for the goods movement system. While carriers and modal operators typically have data and information regarding the performance of their particular areas, there is no system-wide approach to monitoring and managing the performance of the system as a whole. Shippers and receivers have good data about their specific shipments, including location, volume, type, and other information they need to make decisions about the allocation of their inventory and stock. There is no current method to track data that would provide information about the operational aspects of the modal system, efficiencies, performance, bottlenecks and delays that occur, average speeds, the velocity of the system, and the allocation of assets (e.g., trucks, chassis, container slots) other than the areas within their respective sphere.

Not having a means for measuring and determining performance across the system undermines the ability to identify opportunities for optimization throughout the system. System-wide measures will likely help identify opportunities for improving performance. Also, the lack of system-wide performance data undermines the effectiveness of policies and investments directed at specific issues. For example, existing port policies directed at shifting truck traffic to off-peak hours have been effective at reducing congestion on the highway system.[34] However, these policies have had negative impacts for individual truck drivers who spend longer hours away from their families,[35] as well as for communities near warehouses and distribution centers that now have to deal with more noise and traffic at night. Performance measures for all aspects of the goods movement system, including operations and throughput, congestion and delay, air quality and emissions, and others, are needed to improve the effectiveness of the system.

Security

The existing conditions of the goods movement system present significant safety concerns for the public, specifically safety concerns regarding at-grade crossings and truck accidents. In addition, the increased focus on the security of the system has placed a significant fiscal burden on the owners and operators of the goods movement system, particularly at the ports and airports. While there are existing federal programs to improve security, seaports, and airports, owners must fund many of the security projects using their own limited resources. Congress is currently evaluating the effectiveness of security procedures and programs for air cargo and maritime cargo. For example, one of the options for air cargo is to implement 100 percent screening, requiring large amounts of land near air cargo facilities, the consolidation of air cargo facilities, additional warehouse screening buildings, separate secure access roads for trucks, increased security personnel, and screening equipment and technology.

Funding

While the goods movement system is largely intermodal, the organizations and entities involved in movement of goods are structured to operate independently and often with competing interests. This leads to missed opportunities for the coordinated funding and deployment of system-wide solutions. A lack of funding affects all modes. It presents a significant obstacle to reaching a balanced emphasis on expenditures that improves the competitiveness of the goods movement system and minimizes the impact on the health and well being of the community. As such, funding for goods movement-related projects is falling behind. The most tangible example

is the shortfall in funds requested by communities and agencies in the study area in conjunction with the most recent national transportation reauthorization legislation (SAFETEA-LU). Although its political leaders and transportation agencies jointly supported several key projects for funding, the study area received a minor share of the total amount requested. While there is a growing awareness of the existing capital needs required to accommodate goods movement as well as to mitigate the impact of goods movement, this awareness has not translated into funding. The MCGMAP will address the need for mechanisms that translate the value (created by improvements to the goods movement system) into revenue that can be earmarked for improving the infrastructure and meeting mitigation needs.

Fragmented Goods Movement Systems and Processes

The study area's ports, airports, rail carriers, and intermodal terminals have existing capacity constraints that undermine the efficiency and productivity of the system as a whole. Today's goods movement system optimizes each mode within the supply chain independently. Gaps occur at the points of interface where information and ownership of the goods are exchanged. This fragmentation makes it difficult to tackle the issues in a coordinated and strategic manner. Although the system operates well enough to allow goods to effectively move from mode to mode, the organizations involved in goods movement (private carriers, intermodal operators, warehouse and logistics operators, port owners and operators, and the public entities and transportation agencies) function independently. Many of the identified issues and constraints require a system-wide solution. Private sector entities operate in a competitive environment that make it difficult to create broad-based support for major solutions, since a solution that helps one mode may reduce the competitiveness of another. While individual operators within the system address operational and investment strategies within their respective sphere of influence, they neither have the means nor the information to address system-wide issues. Coordination among the modal components, where it does exist, is solely undertaken to increase their competitive edge. Wal-Mart is the leader in supply chain integration and it has often been said that Wal-Mart is a supply chain company that happens to have retail stores.

Public agencies each have their own specific transportation planning and outreach processes that typically have differing priorities and time horizons for decision making and investments. A project viewed as a priority in one jurisdiction may be viewed as competition for finite resources by a neighboring jurisdiction. There are many communities affected by goods movement throughout the study area, and each represents potentially different ideals and priorities. One community's view of economic growth and prosperity may translate to health and congestion concerns in another. The challenge is to develop an institutional approach that can garner the collective support of communities as well as the public and private sectors to tackle specific solutions that are broad and system-wide.

Chapter 4 – Future Demand Forecasts

This chapter summarizes the work done under Task 4 to build the Action Plan, which is further described in Tech Memos 4a (Freight Demand) and 4b (System Performance Report). These memoranda documents projected levels of goods movement activities, evaluate highway and rail system performance, and outline four scenarios for future growth and investment in goods movement facilities. The scenarios contained at the end of this chapter will be evaluated in Chapter 6 to determine a range of potential projects, strategies, and mitigation measures. In order to evaluate the potential impacts of various components of the region's freight system demand forecast for 2030 were developed. The following is a summary of freight demand forecasts for various components of the region's goods movement system that include marine cargo, air cargo, rail, truck flow and warehouse, and distribution centers:

Marine Cargo Forecasts

The study region's ports expect dramatic growth in cargo flows. Driving this growth is the nation's reliance on imports from Asia, particularly from China, whose economy has been growing at an average annual rate of 9 percent over the past two decades. China is on pace to become the largest exporter in the world, overtaking the U.S. and Germany by 2010, producing as much as 10 percent of global trade, up from a current share of 6 percent[1].

Container volume through the San Pedro Bay Ports of Los Angeles and Long Beach are projected to triple from 15.7 million Twenty-Foot Equivalent Units (TEUs) in 2006 to 42.5 million TEUs by 2030[2]. These forecasts are capacity constrained at a level significantly below anticipated demand for the study area. One independent study has predicted unconstrained cargo demand to reach 59.4 million TEUs by 2020[3]. The 42.5 million TEU forecast represents a compound annual growth rate that is half the San Pedro Bay Ports historical growth rate of 9.7 percent between 1985 and 2005, and half of China's growth rate over the past two decades. These capacity constrained forecasts also consider that there will be an improvement in terminal productivity from a current average throughput level of 4,700 TEUs per acre per year to over 10,000 TEUs per acre per year. The actual number of containers utilizing the landside transportation system will grow from a level of 7.7 million containers to 23 million by 2030, of which 23 percent or 5.3 million will be local and 77 percent or 17.7 million are considered long-term discretionary [non-local][4]. Of the long-term discretionary market, 52 percent or approximately 9.2 million containers would move by rail and the remainder by long-haul truck.

Air Cargo Forecasts

Growth in air cargo has moderated in the last few years as compared to the booming 1980s and 1990s. While air cargo will continue to focus on major international gateways such as Los Angeles International Airport (LAX), the trend away from belly space (described later in this section) provides opportunity for air cargo development at smaller regional airports.

According to Boeing, which manufactures air cargo aircraft, the domestic and international air cargo sectors are expected to continue growing at an annual rate of 4.1 percent and 6.8 percent respectively. Using these rates, air cargo volumes for the study area will grow from a level of 2.8 million tons in 2004 to 10.7 million tons by 2030, of which 5.9 million tons will be international and 4.8 million tons will be domestic. The SCAG air cargo forecast through the year 2030 for the region fall between the Boeing based and FAA based air cargo forecasts. The SCAG forecasts anticipate the annual tonnage for the year 2030 to be over 8.7 million tons.

Table 11
Comparison of Air Freight Forecasts within the Study Region

Forecast	2010 Annual Tons	2020 Annual Tons	2030 Annual Tons
SCAG	3,300,000	6,312,000	8,724,000
FAA	3,585,600	5,668,900	n/a
Boeing	3,735,469	6,319,300	n/a

Table 12 details the growth rates used to develop the air cargo forecasts presented in Table 13. Table 13 details the total air cargo forecast for the study area, encompassing airports reporting air cargo activity. (LAX accounts for the majority of current and forecasted activity or over 75 percent of total air cargo volume). As illustrated in Table 14, the SCAG forecasts show these airports, particularly March Air Reserve Base (RIV), as garnering an increasing share of the region's total air cargo activity; 9 percent by 2010, 17 percent by 2020, and 20 percent by 2030.

Table 12
2004-2024 Air Cargo Forecast Factors
Boeing and FAA Growth Rates

Market Pair	Direction	Annual Growth
Boeing Forecast		
Domestic	Inbound	4.1%
	Outbound	4.1%
US-Canada	Inbound	6.8%
	Outbound	6.8%
US-Asia Pacific	Inbound	7.3%
	Outbound	7.2%
US-Europe	Inbound	5.8%
	Outbound	5.2%
US-Latin America/	Inbound	6.1%
Caribbean*	Outbound	5.5%
US-Mid-East/Africa	Inbound	4.7%
	Outbound	4.7%
FAA Forecast		
Domestic		3.3%
International		6.3%

*Includes Mexico
Source: Boeing World Air Cargo Forecast 2004/2005,
FAA Aerospace Forecasts, Fiscal Years 2005-2016

Table 13
MCGMAP Region Air Cargo Forecast Summary
2004-2024 Annual Tons

	Annual Growth	2004 (Actual)	2009	2014	2019	2024
Boeing Forecast						
Domestic Total:		**1,680,586**	**2,054,539**	**2,511,702**	**3,070,589**	**3,753,836**
Inbound	4.1%	792,773	969,176	1,184,830	1,448,471	1,770,775
Outbound	4.1%	887,813	1,085,363	1,326,871	1,622,118	1,983,061
International Total:		**1,069,871**	**1,493,451**	**2,087,059**	**2,919,693**	**4,088,588**
Inbound	6.8%	679,852	957,364	1,348,905	1,901,581	2,682,046
Outbound	6.8%	390,019	536,086	738,154	1,018,113	1,406,542
Boeing Forecast Total:		**2,750,457**	**3,547,990**	**4,598,761**	**5,990,282**	**7,842,424**
Inbound		1,472,625	1,926,540	2,533,735	3,350,052	4,452,821
Outbound		1,277,832	1,621,450	2,065,025	2,640,231	3,389,603
FAA Forecast						
Domestic	3.3%	1,680,586	1,976,798	2,325,220	2,735,052	3,217,119
International	6.3%	1,069,871	1,452,104	1,970,898	2,675,041	3,630,753
FAA Forecast Total:		**2,750,457**	**3,428,902**	**4,296,117**	**5,410,092**	**6,847,872**

*Includes Mexico

Source: Bureau of Transportation Statistics - FAA T-100 Data, Boeing World Air Cargo Forecast 2004/2005, FAA Aerospace Forecasts, Fiscal Years 2005-2016

Table 14
SCAG Air Cargo Forecast
2010, 2020, 2030 Annual Tons

		2010	2020	2030
SCAG Forecast				
Bob Hope-Burbank	BUR	60,000	87,000	87,000
Los Angeles International	LAX	1,570,000	2,059,000	2,340,000
Long Beach	LGB	86,000	133,000	137,000
Ontario International	ONT	876,000	1,536,000	2,252,000
Palmdale Regional	PMD	119,000	605,000	1,024,000
Palm Springs International	PSP	82,000	123,000	128,000
March Air Reserve Base	RIV	132,000	627,000	1,117,000
San Bernardino International	SBD	253,000	756,000	1,092,000
John Wayne-Orange County	SNA	41,000	43,000	43,000
Southern California Logistics	VCV	81,000	343,000	504,000
SCAG Forecast Total		**3,300,000**	**6,312,000**	**8,724,000**

Source: SCAG 2004 Regional Transportation Plan, Technical Appendix D-6-11, Preferred Aviation Plan

Competition for space impacts the airports within the study area, particularly at LAX, where a high demand exists for both passenger and cargo services. At LAX, there are delays in processing cargo due to the scarcity of on-airport cargo warehousing and processing facilities. Runways, taxiways, aprons to park aircraft, maintenance facilities, and cargo-handling facilities, which are essential for air cargo services, require a substantial amount of land. One strategy to alleviate this competition for space at LAX is to attract cargo to newly developed cargo-only airports within the study area. Ontario Airport is currently filling this role, and it is anticipated that as Los Angeles metropolitan area grows, March Air Reserve Base and Southern California Logistics Airport will also expand activity in support of the region's air cargo market**.** Also, the new master plan for the Palmdale Regional Airport could play a significant role in the ways airports and airlines do business today. This new master plan will guide the development at the airport through the year 2030.

Rail Forecasts

Train volumes are expected to increase significantly on the study area's mainline tracks. Growth in train traffic is driven by international trade, domestic intermodal and carload business (which is assumed to grow at the same rate as the domestic economy), and passenger service (Amtrak and Metrolink). These projections are based on the assumption that TEUs through the Ports of Los Angeles and Long Beach will triple to 42.5 million TEUs from 2005 to 2030. Depending on Metrolink's ultimate growth plan for passenger services, weekday train volumes through the Colton crossing could reach 255 trains by 2025. Train traffic through the Alameda Corridor is expected to reach 144 trains per weekday (an increase of nearly three times averaging 47 trains per day in 2005), and 189 trains per weekday through the Cajon Pass (compared to 96 trains for the year 2000).

Growth forecasts are translated into freight and passenger rail traffic based on computer simulations of rail traffic patterns along the Alameda Corridor through 2025, including rail infrastructure improvements needed to accommodate the expected growth. The forecasts indicate the following:

- Rail-freight traffic experiences an increase of more than 100 percent from 112 in 2000 to 250 by 2025.

- Passenger train (commuter rail) volumes escalate to 140 by 2025 from 58 in 2000, an increase of one-and-half times, or 150 percent.
- Total trains volume increases to more than double from 170 in 2000 to 390 by 2025, or by over 100 percent.

The rail segments that experience significant increase in train volumes by 2025 are as follows.

- Freight trains passing through the segments from Barstow to San Bernardino, San Bernardino to Colton, Colton to West Riverside, and Fullerton to Hobart and through the Cajon Pass would be between the ranges of 161 to 212 trains per day.
- Commuter rail between Fullerton to Hobart, Hobart to Redondo, and Orange to San Diego via Irvine and Oceanside would range between 93 to 120 trains per day.
- Total trains (freight and passenger) on the segments from West Riverside to Atwood, Fullerton to Hobart, Hobart to Redondo Junction and through the Cajon Pass would have to accommodate 163 to 255 trains per day.

Figure 14 on the following page shows the Year 2025 forecast for freight and passenger train volumes within the study region.

Within the study area rail lines, increased freight volumes to and from the Ports of Los Angeles and Long Beach combined with increased passenger rail service along already congested lines will lead to further delays along the rail network. The delays would increase on the BNSF freight line from 32 minutes in 2000 to 206 minutes by 2010 and on the UP freight line from 30 minutes in 2000 to 197 minutes by 2010 per train. These delays will impact both passenger service and freight supply chains. There are also capacity constraints in terms of the number of tracks available and the demand for both passenger and freight service along shared lines.

Intermodal Rail Forecasts

There are three distinct intermodal rail market components (1) international on-dock and off-dock, (2) transload intermodal (which is international cargo converted into domestic containers), and (3) exclusive domestic intermodal. All are expected to grow significantly through 2030. Table 15 contains a summary of the rail intermodal forecasts. As a whole, the study area is expected to generate roughly 13.5 million intermodal lifts by 2030, a threefold increase from 2005 levels. Approximately, 68 percent of the intermodal market is expected to be direct marine intermodal transfers, 14 percent is expected to be transloaded marine cargo, and 18 percent is expected to be exclusively domestic.

Table 15
Summary of Intermodal Forecasts
Millions of Containers/Lifts

	2010	2020	2030
Int'l Intermodal	4.259	7.827	9.189
Transload Intermodal	0.871	1.601	1.879
Domestic Intermodal	1.428	1.863	2.430
Total	6.558	11.291	13.498

Source: Wilbur Smith Associates, 2006

Legend

Volumes (Trains/Day)

- 27 - 49
- 50 - 81
- 82 - 130
- 131 - 162
- 163 - 255

- Water
- Urban Areas
- County Boundary
- Freeways
- Ports
- Airports

Year 2025 Forecast of Freight and Passenger Rail Volumes on the Study Area Mainlines

Source: Wilbur Smith Associates, 2006
TeleAtlas StreetMap USA

0 2.5 5 10 15 20 Miles

N

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Figure 14

Truck Flow Forecasts

Despite projected growth in intermodal rail volume, which assumes an aggressive on-dock rail expansion program, truck traffic throughout the region is expected to increase substantially through 2030. The SCAG Heavy Duty Truck model projects truck vehicle miles of travel (VMT) will increase by over 110 percent by 2030, growing from a level of 22.4 million VMT in 2000 to 48.4 million VMT by 2030. Some freeways in the region currently handle up to 40,000 trucks per day, and by 2025, these freeways may need to handle up to 80,000 trucks per day[5]. As a result of the growth in passenger and truck traffic, the highway system's performance will deteriorate significantly. Average speeds will drop from 35.9 mph in 2005 to 31.9 mph by 2030, causing an average of 5.4 million hours of delay daily for all traffic and 242,000 hours of delay for heavy duty trucks[6]. Areas in the vicinity of freight corridors and facilities (e.g., seaports, warehouses, etc.) will continue to experience significant impacts due to truck traffic. While the share of automobile and truck traffic at the San Pedro Bay Ports was relatively balanced between the two ports in 2000, truck volumes are expected to be 50 percent higher than automobile traffic by 2020[7]. While several highway routes serve as key transportation corridors for freight movements, the I-710 and I-110 corridors are expected to experience the most significant increases in peak-hour port truck volumes by 2025[8].

Travel demand forecasts for the study area were prepared using the Southern California Association of Governments (SCAG) Draft 2030 Air Quality Management Plan (AQMP) Baseline model. For instance, the forecast truck volumes for the Year 2030 indicate the following:

- US-101 will experience significant increase in truck volumes between I-110 to SR-170 from 7,000 to 35,000 by 2030 and between SR-170 to I-405 from 8,000 to 26,000, an increase of more than 300 percent and 200 percent, respectively, when compared to 2003.
- I-605 between SR-91 and I-105 shows an increase from 11,000 in 2003 to almost 29,000 by 2030, an approximately 150 percent increase in daily volumes.
- SR-60 from its terminus to I-710 shows an increase of approximately 110 percent from 10,000 in 2003 to more than 21,000 daily volumes by 2030.
- Truck volumes on I-405 between I-110 and SR-91 escalate from 11,000 to more than 24,000 by 2030, an increase of more than 100 percent.
- The section of I-15 between I-210 to I-215 will experience an increase of more than 100 percent truck volumes from 17,000 in 2003 to 36,000 by 2030.
- Truck volumes on a section of I-110 between I-105 and I-10 increase from 15,000 to almost 30,000 by 2030, an increase of more than 100 percent.
- Truck volumes on I-710 between I-5 and SR-60 increase to more than 70 percent from 11,000 in 2003 to 19,000 by 2030.
- On I-10, the section between I-405 and I-110 shows an increase of 60 percent from 10,000 in 2003 to more than 16,000 truck volumes by the year 2030.
- SR-91 will experience an increase in truck volumes by about 60 percent between I-710 and I-605 from 25,000 in 2003 to 40,000 by 2030.
- The daily truck volumes on I-5 between SR-55 and SR-57 show an increase of more than 50 percent from a little more than 20,000 in 2003 to about 34,000.

Figures 15, 16, 17, 18, and 19 on the following pages depict Year 2030 forecast volumes on the roadways for the five counties within the SCAG region (e.g. Los Angeles, Orange, Riverside, San Bernardino and Ventura). Figure 15 shows the Year 2030 ADT volumes for trucks, while Figure 16 shows the Year 2030 ADT volumes for vehicles. Figures 17, 18 and 19 show the range for port-related ADT volumes for trucks, external (through the region) ADT volumes for trucks, and internal (within the region, not port-related or external) ADT volumes for

trucks, respectively. Figures 20 and 21 shows the mobility problems that occur on the highway system during peak hours. The high volume-to-capacity ratios are concentrated in along corridors that currently and in the future will continue to be major connectors that feed the Los Angeles central business district, other industrial and warehouse centers, residential areas, and other employment centers. (The volume-to-capacity ratios compare daily roadway capacity to average daily traffic volumes and therefore may be lower than if the ratios were computed for peak-hour conditions.)

0
1 - 7409
7410 - 11632
11633 - 15561
15562 - 36515

Water
Urban Areas
County Boundary
Other Highways
Ports
Airports

Year 2030 System Performance

Forecast ADT on SCAG Region Highways
Trucks

0 5 10 20 30 40 Miles

10/18/06

Figure 15

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

85 - 28143
28144 - 56634
56635 - 99072
99073 - 126304
126305 - 268315

Water
Urban Areas
County Boundary
Other Highways
Ports
Airports

Year 2030 System Performance

Forecast ADT on SCAG Region Highways Vehicles

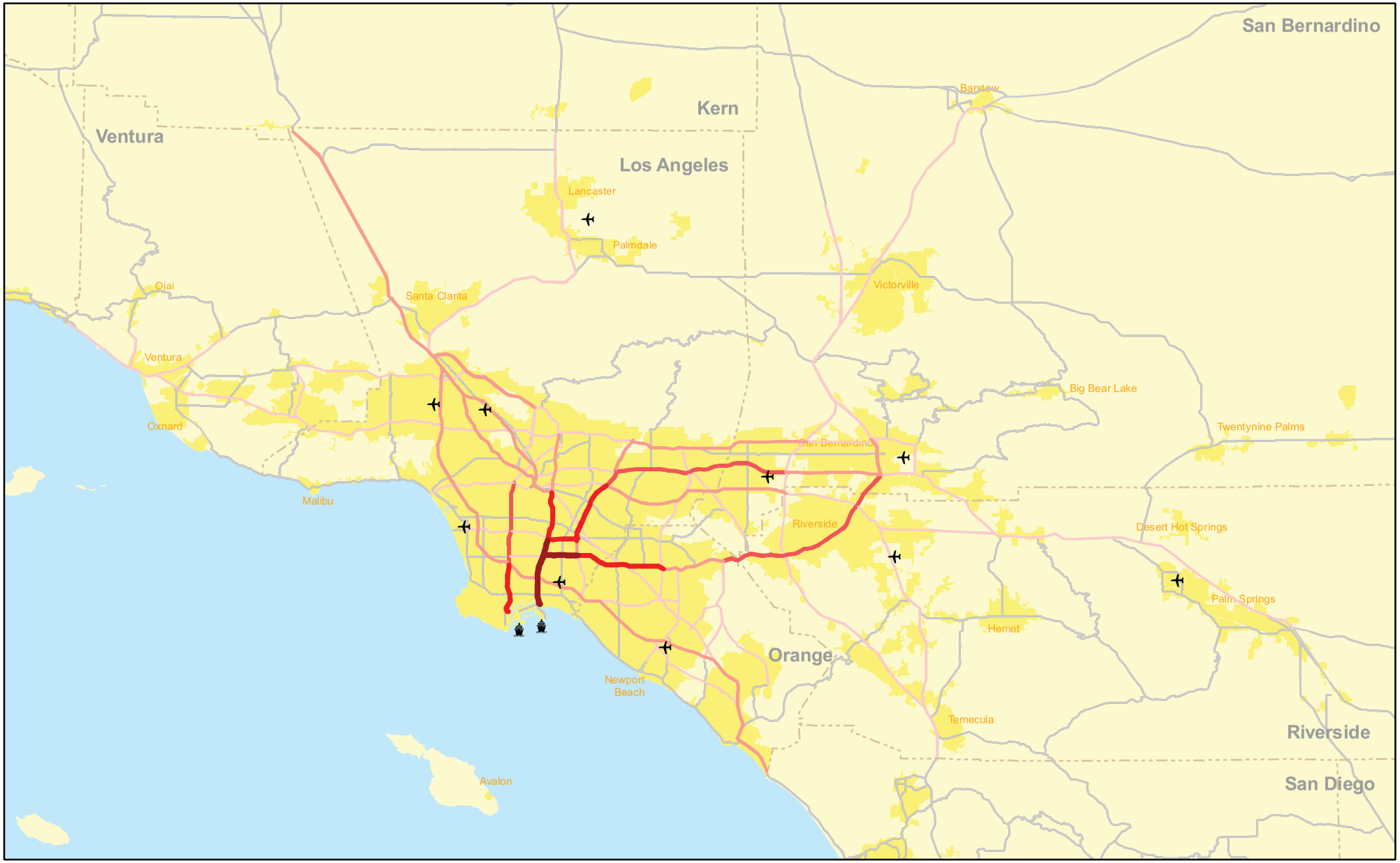
0 5 10 20 30 40 Miles

10/18/06

Figure 16

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume

- 0 - 1000
- 1000 - 5000
- 5000 - 10000
- 10000 - 20000
- greater than 20000

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 Heavy Truck Volume

Port Origin/Destination

0 5 10 20 30 40 Miles

Figure 17

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

02/19/07

Truck Volume

- 0 - 1000
- 1000 - 5000
- 5000 - 10000
- 10000 - 20000
- greater than 20000

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 Heavy Truck Volume

External (Outside the Region) Origin/Destination

0 5 10 20 30 40 Miles

Figure 18

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

02/19/07

Truck Volume

- 0 - 1000
- 1000 - 5000
- 5000 - 10000
- 10000 - 20000
- greater than 20000

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 Heavy Truck Volume

Internal (Inside the Region) Origin/Destination

0 5 10 20 30 40 Miles

Figure 19

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

02/19/07

VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast V/C Ratios on SCAG Region Highways
AM Peak

0 5 10 20 30 40 Miles

Figure 20

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

10/18/06

VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast V/C Ratios on SCAG Region Highways
PM Peak

0 5 10 20 30 40 Miles

Figure 21

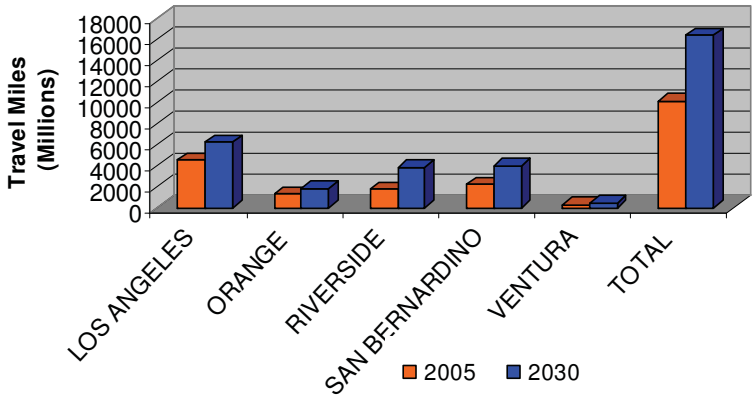
WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

10/18/06

Figure 22 shows the distribution of Year 2030 forecast annual truck VMT for the five (5) counties in the SCAG region. The greatest percentage increases in truck VMT are anticipated to occur in Riverside and San Bernardino Counties, although total truck vehicle miles traveled will remain highest in Los Angeles County.

Figure 22
2030 Annual Statewide Truck Mile Travel Distribution by County



Source: SCAG Regional Transportation Plan. 2004

Table 16 presents the comparison of traffic volumes between the SCAG Model 2030 and post-processed traffic volumes. The post-processed volumes are the adjusted Year 2030 volumes that are based on the calculated difference in forecast volumes for the base year (Year 2003) compared to available existing traffic counts. Table 16 shows how the difference in existing counts versus model forecasted base year counts affects the Year 2030 forecasted volumes.

Table 16
Traffic Volume Comparison Year 2030

Route	SCAG Model 2030 -Vehicle	SCAG Model 2030 -Truck	Post-Processed Year 2030- Vehicle	Post-Processed Year 2030- Truck
I-10	242,869	21,637	254,027	20,647
I-101	303,189	29,322	283,225	17,171
I-105	184,343	17,945	198,677	18,570
I-110	241,419	23,953	221,046	20,745
I-15	203,135	27,211	236,353	29,602
I-210	208,177	29,969	244,391	24,701
I-215	193,798	18,178	136,286	17,844
I-405	275,257	24,102	289,072	16,943
I-5	285,731	34,129	290,342	28,885
I-605	235,981	30,664	216,554	29,698
I-710	209,074	35,766	192,984	37,134
SR-134	222,726	18,311	222,433	12,232
SR-55	234,364	15,433	272,124	18,984
SR-57	229,542	18,485	254,649	20,902
SR-60	248,431	24,011	223,096	23,794
SR-91	249,855	35,301	283,066	34,160
SR-118	207,214	13,400	268,083	29,544
SR-170	257,239	22,007	211,122	14,197

Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

Figure 23 illustrates that the SCAG model estimated higher truck volumes on I-10, I-101, I-110, I-210, SR-60, and SR-91 than the post-processed traffic volumes. Figure 24 shows estimated higher vehicle volumes in 2030 on I-101, I-110, I-605, I-710, and SR-60 based on the SCAG model. This indicates that SCAG's forecasts predicted more vehicles on these freeways under existing conditions than actually present. Figure 25 shows estimated higher truck and vehicle volumes on I-101, I-110, I-605, SR-134, and SR-60 based on the SCAG model in 2030, while post-processing results in higher truck and vehicle volume on I-15, SR-55, and SR-57 in 2030. This indicates that SCAG's forecasts predicted more trucks on these freeways under existing conditions than were actually present.

Figure 23
Total Truck Volume Comparison Year 2030

Figure 24
Total Vehicle Volume Comparison Year 2030

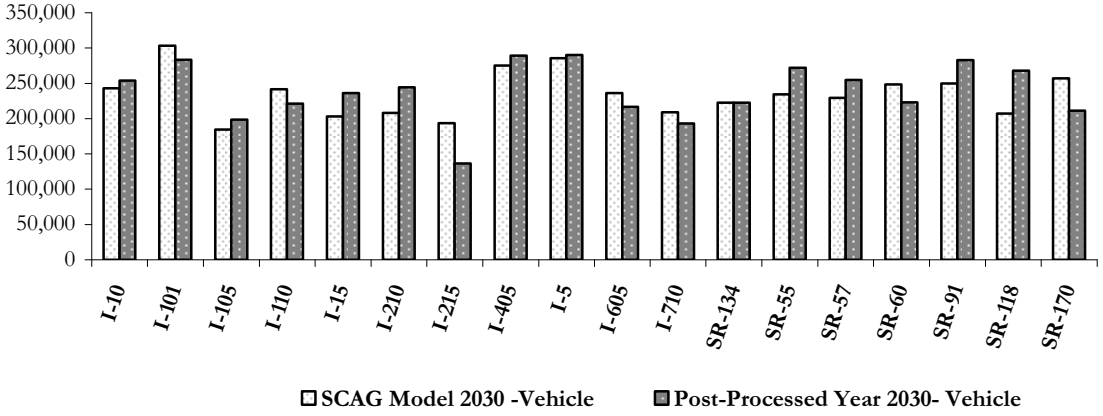
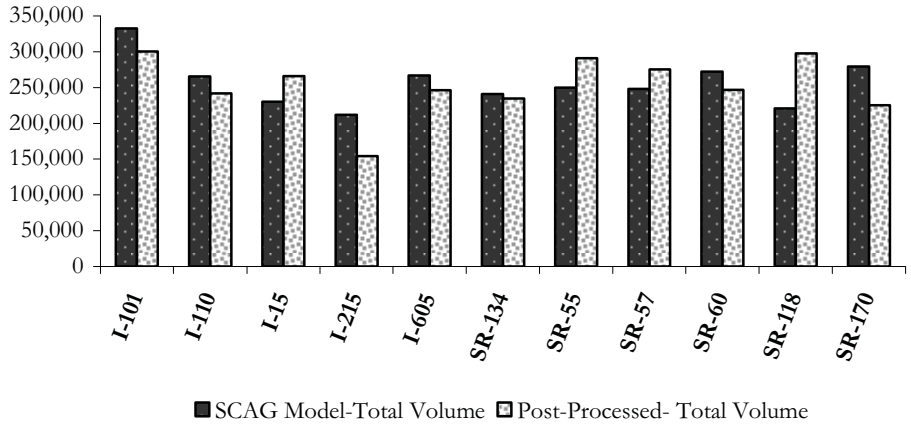


Figure 25
Total Traffic Volume Comparison Year 2030



Warehousing and Distribution Center Forecasts

Forecasts of warehousing and distribution centers starts with establishing current conditions and then projecting total future square footage, allocating growth based on site development constraints and location preferences. The warehouse sector is expected to grow from approximately 1.5 billion square feet of warehouse floor space in 2005 to over 4.5 billion square feet by 2030. This tripling of warehouse space needs is driven by a tripling of international trade through the San Pedro Bay Ports. Based on the findings of Tech Memo 4a, fifty percent of the new warehouse space is expected to be constructed in San Bernardino and Riverside Counties, while 20 percent, 8 percent, 8 percent, and 5 percent are expected to be constructed in Los Angeles, Imperial, Orange and Ventura Counties, respectively. Warehouse growth forecasts were calculated based on projected growth of container volumes through the San Pedro Bay Ports of Los Angeles and Long Beach, as it is for the best indicator for forecasting future warehouse needs.

Also, the regional outlook for warehouses and distribution centers will remain strong in all Southern California subregions. The location of warehouses has shifted north and east to the high deserts of Los Angeles County and further east into the Inland Empire and beyond. This is driven primarily by the limited available land for new development close to the ports (i.e., Los Angeles and Orange Counties). As the location of warehouse and distribution facilities move farther east to the high desert and Inland Empire, the length of truck trips will increase. This will result in more truck vehicle miles of travel and increases in associated environmental and community impacts (e.g., emissions, noise).

Potential Freight Growth Scenarios

Four scenarios were developed to evaluate the impacts of future growth coupled with various infrastructure investment levels assumed in the SCAG 2004 Regional Transportation Plan (RTP). These scenarios were also developed to assist in making strategic decisions about a wide range of possibilities and potential outcomes in terms of projected freight growth and levels of investment in transportation infrastructure.

The following four scenarios are discussed further in Chapter 6:

- Scenario 1 – High Growth - Current Investment Levels
- Scenario 2 – Low Growth - Current Investment Levels
- Scenario 3 – Moderate Growth - Current Investment Levels
- Scenario 4 – High Growth - Full Investment Levels

Scenario 1 – The purpose of this status quo landside infrastructure scenario is to evaluate the impact of continued growth in goods movement and passenger traffic without the requisite investment in landside improvements. This scenario assumes that the container volume growth projected by the Ports of Los Angeles and Long Beach of 42.5 million TEUs come to fruition without the requisite investments in highway and rail infrastructure. The following is also assumed:

- Port throughput will increase as currently projected; and
- International trade forecast of 42.5 million TEUs annually in 2030.

Scenario 2 – The purpose of this scenario is to evaluate the impact given a lower international trade forecast. This scenario assumes that port container volume will be limited to 33 percent of projected growth, which results in approximately 24 million TEUs. The resulting 24 million TEUs are calculated as follows:

- The net change between the 2005 level of 14.2 million TEUs and the base case forecast of 42.5 million TEUs is 28.3 million TEUs (or 42.5 -14.2 = 28.3);
- 33 percent of 28.3 million TEUs is 9.3 million TEUs; and
- 9.3 million added to 14.2 million is 23.5 million TEUs (9.3 + 14.2 = 23.5), or 24 million TEUs (rounded to the nearest million).

Scenario 3 - The purpose of this scenario is to evaluate the impact of lower than expected levels of international trade. It assumes growth will be limited to 66 percent of projected growth, which results in a lower forecast for 2030 of approximately 33 million TEUs for 2030. This figure represents the maximum container volume the Ports estimate can be handled without expanding current physical capacity at the ports. The resulting 33 million TEUs (in 2030) is calculated as follows:

- The net change between the 2005 level of 14.2 million TEUs and projected growth of 42.5 million TEUs is 28.3 million TEUs (or 42.5 - 14.2 = 28.3);
- 66 percent of 28.3 million TEUs is 18.7 million TEUs; and
- 18.7 million added to 14.2 million is 32.9 million TEUs (18.7 +14.2 = 32.9), or 33 million TEUs (rounded to the nearest million).

Scenario 4 –This scenario evaluates the impact of maintaining the maximum amount of growth in trade that is expected through the study area's gateways, while concurrently investing in the study area's landside

infrastructure and mitigating the impact associated with goods movement. Projects and strategies contained in Chapter 6 are evaluated under Scenario 4. The following is also assumed under this scenario:

- Port throughput will increase as currently projected;
- 42.5 million TEUs annually in 2030; and
- "Full investment levels" would require additional investment beyond the existing committed funding plans (i.e., the constrained project lists in the 2004 SCAG Regional Transportation Plan) of the project partners, the state, the ports, railroads and others.

Chapter 5 – Economic and Environmental Issues and Constraints

This chapter describes the logistics industry's role in generating jobs and economic activity within the study region and identifies the environmental and community impacts associated with goods movement. This chapter also includes current efforts that are underway to address environmental impacts. More information about these topics are included in Tech Memos 5a (Economic Benefits and Costs of Growth in Goods Movement) and 5b (Environmental and Community Impacts).

Economic Effects

To estimate the total volume of economic activity generated by the logistics sector throughout the study region, the total economic activity (or spending), total value added (or gross domestic product), total jobs (e.g., wages and salary, income or spending power generated by this industry and indirect business taxes property taxes, fees, licenses and excise taxes paid to the government) have to be examined. For example, Southern California's goods movement sectors create considerable positive affects on the regional and national economy due to the variety of activities involved in moving goods. In particular, all subsectors within the logistics industry (e.g., wholesale trade, trucking, supply management, warehousing, couriers, air, sea, and rail transportation) grew from 1990 to 2005 by 103,400 jobs (18.4 percent) and are competitively situated to continue to grow. In addition, Southern California's burgeoning population requires a logistics sector that matches its size and growth. The rapid growth of e-commerce and associated "just-in-time" delivery is adding to this pressure and a major difficulty for the logistics sector is the fact that it is straining the facilities and supporting infrastructure needed to accommodate the increased velocity, decreased shelf time, and anticipated growth in trade. Further, environmental and community impacts have economic costs (e.g., public health care) that have to be considered. These costs must ultimately be weighed against the benefits associated with goods movement. Environmental and community impacts are discussed in the next section.

As shown in Tech Memo 5a, in 2005, the Ports of Los Angeles and Long Beach were ranked second and third in their dollar volume of U.S. international trade and Los Angeles International Airport (LAX) was ranked seventh. In container terms, these ports, in combination with the Port of San Diego and Port Hueneme, handled 41.8 percent of 2005 U.S. imports and 68.4 percent of all containers reach the West Coast (including Vancouver).

The direct economic impact of logistics activities within the study region includes:

- $90.7 billion, or 6.6 percent, of the total $1,375 billion in economic activity.
- $63.6 billion, or 7.8 percent, of the total $812.6 billion in economic value created.
- 687,837, or 6.1 percent, of the total 11,321,518 people employed.
- $52.6 billion, or 7.0 percent, of the total $750.6 billion earned income.
- $11.1 billion, or 17.8 percent, of the total $62.0 billion in sales taxes, property taxes, fees, licenses, and excise taxes paid to government.

The indirect and induced impact of logistics activities within the study region (due to activities in other sectors and throughout the economy) include:

- $170.4 billion, or 12.4 percent, of the total $1,375 billion in economic activity.
- $113.2 billion, or 13.9 percent, of the total $812.6 billion in economic value created.
- 1,441,016, or 12.7 percent, of the total 11,321,518 people employed.
- $98.6 billion, or 13.1 percent, of the total $750.6 billion earned income.

- $14.6 billion, or 23.5 percent, of the total $62.0 billion in tax and fee revenues to government.
- Each new logistics job supports a total of 2.19 new jobs in the economy.
- A $1.00 increase in logistics activity initiates a total of 1.97 times that amount in the local economy.

Also, Table 17 shows a surplus of $176.5 billion in international trade through California, which exceeds the amount of shipments destined for California handled by other states. This table highlights the disproportionate role of California as a gateway for international trade.

Table 17

California's Aggregate International Trade-Related Shipping Services Surplus, 2000

	Shipments for California Through Other States[a]	Shipments for Other States Through California[b]	Shipping Services Surplus
	Billion dollars		
Exports	29.1	49.4	20.3
Imports	91.8	248.0	156.2
Total	120.9	297.4	176.5
	Billion kg		
Exports	9.9	20.5	10.6
Imports	68.2	90.0	21.8
Total	78.1	110.5	32.4

[a]These figures include both imports for Californians that arrive on U.S. shores in other states and California exports that depart from U.S. shores via port facilities in other states.

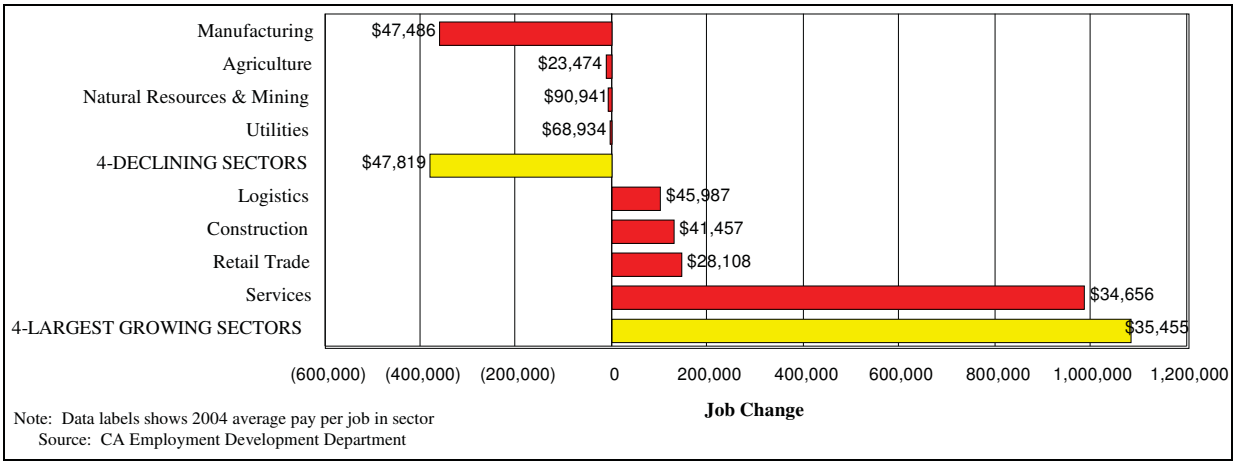
[b]Similarly, the figures in this column also account for both imports arriving in California and exports departing through California ports.

Source: California's Global Gateways: Trends and Issues; Haveman & Hummels, 2004.

As of 2006, 21.3 million people live in the six county study area and Imperial County, of which approximately 43.8 percent have no formal college training. By 2030, forecasters expect this number to increase to 26.8 million. Historically the manufacturing industry provided good entry-level pay and job ladders that allowed many people to eventually earn middle class wages. Middle class is defined as the income range containing the 12.5 percent of Southern California's households below ($37,163) and above ($66,099) its 2004 median income of $49,435.

With average manufacturing pay at $47,486 per job in 2004, the manufacturing sector has been largely responsible for the vast majority of jobs lost in Southern California's four major declining sectors, removing 381,000 jobs with an average pay of $47,819, as shown in Figure 26. Furthermore, from 1990-2005, the four sectors (logistics, construction, retail trade, and services) adding the most new jobs to Southern California's economy, grew by 1,083,000 positions. However, in 2004, the average pay for these sectors was only $35,455. There has been a $12,000 difference between the pay in shrinking sectors versus that in the four fastest-growing sectors due to the prevalence of lower paying retail trade ($28,108) and the full range of service sectors ($35,455) in the region's job growth. This is likely a major contributing factor for Southern California's falling per capita income ranking.

Figure 26
Major Gaining & Losing Sectors, Southern California
Size of Job Change, 1990-2005 Average Pay



The logistics industry has the potential to replace manufacturing in its role of providing good entry-level pay and job ladders for people without advanced schooling because it offers a median beginning pay at 32.1 percent above the minimum wage ($8.91 or $18,542 per year) and it has defined paths by which workers can graduate to median pay levels that exceed $40,000 per year. Moreover, the average pay for all logistics jobs in 2005 was $47,411 per year, just 2 percent below all manufacturing jobs ($48,397).

In addition, the overall pay in logistics subsectors appear to run 12.5 percent to 14.4 percent above that derived from the general occupational pay scales used to calculate incomes. For example, in the wholesale trade subsectors, 80.6 percent of the jobs require no advanced schooling and another 5.7 percent require either trade or community college training. In transportation and warehousing subsectors, 92.9 percent of the jobs require no advanced schooling and another 1.1 percent requires trade school training. Lastly, the entry pay of the logistics subsectors are very competitive when compared to alternative sectors without educational barriers such as:

- Retail trade ($28,840)
- Gaming ($28,385)
- Accommodation ($24,019)
- Agriculture ($22,793)
- Other services (automotive, household and electric repair and maintenance, personal care, laundry, member associations, household workers) ($22,340),
- Eating and drinking ($15,132)

Table 18 shows “multipliers” or the extent to which increases in logistics activity, caused by money entering the region from elsewhere, will impact the full economy. The analysis found that each new logistics job supports a total of 2.19 new jobs in the economy. A $1.00 increase in logistics activity sets off a total of 1.97 times that amount in the local economy. Similar ratios were determined for the impact of additional jobs or activity in each of the major subsectors of logistics listed in Table 18.

Table 18
Logistics Subsectors Output and Employment Multipliers

Logistics Sector		Direct Impact	Indirect Impact	Induced Impact	Total Impact	Total Multiplier
Wholesale Trade Only	$	$1,000,000,000	$239,235,367	$712,566,964	$1,951,802,331	**1.95**
	Jobs	7,166	2,009	7,211	16,386	**2.29**
Air Transportation	$	$1,000,000,000	$509,515,482	$540,084,339	$2,049,599,821	**2.05**
	Jobs	4,541	3,765	5,241	13,547	**2.98**
Rail Transportation	$	$1,000,000,000	$307,172,558	$510,291,441	$1,817,463,999	**1.82**
	Jobs	3,943	2,283	4,885	11,111	**2.82**
Water Transportation	$	$1,000,000,000	$380,790,248	$472,802,455	$1,853,592,703	**1.85**
	Jobs	2,147	5,417	4,601	12,165	**5.67**
Truck Transportation	$	$1,000,000,000	$520,062,441	$592,974,407	$2,113,036,848	**2.11**
	Jobs	9,280	3,630	5,659	18,569	**2.00**
Couriers	$	$1,000,000,000	$293,998,557	$591,121,230	$1,885,119,787	**1.89**
	Jobs	15,122	1,988	5,621	22,731	**1.50**
Warehousing & Storage	$	$1,000,000,000	$244,287,506	$597,373,127	$1,841,660,633	**1.84**
	Jobs	11,204	1,763	5,652	18,619	**1.66**

Source: IMPLAN Model Used with $1,000,000,000 assumption for each logistics subsector

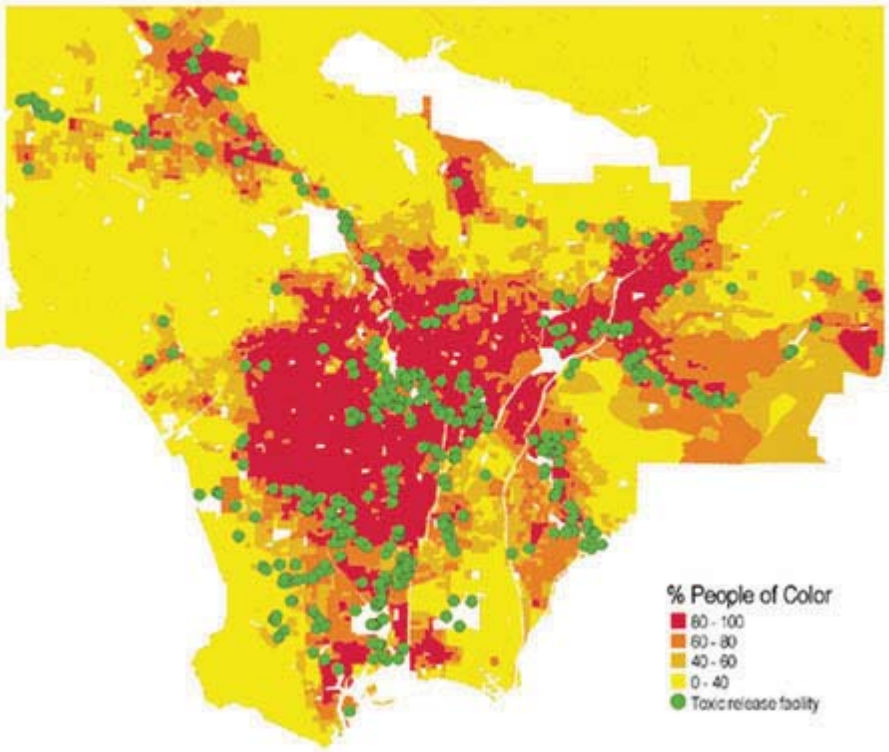
Environmental and Community Impacts

While specific environmental and community impacts and mitigation measures are numerous, vary widely, and require more detailed analysis that is beyond the scope of this multi-county study, there are common issues and concerns that resonant throughout the study region worth noting. These include, but are not limited to, air quality, health, noise, light, visual (e.g., stacked containers), vibration, safety, water quality, quality of life, traffic congestion, and environmental justice issues .

Emerging health problems and environmental justice issues linked to goods movement are of particular concern to community groups given the mixed land uses in many lower-income Southern California neighborhoods. Environmental justice is of particular concern for communities in proximity to the ports (Long Beach, Los Angeles, Hueneme, and San Diego), major goods movement corridors, facilities, equipment, and industrial operations. Environmental justice is defined by state law as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." Figure 27 illustrates the racial/ethnic composition of the neighborhoods in Los Angeles County in 1996.

Figure 27

Toxic Release Facilities Relative to Racial/Ethnic Composition of Neighborhoods, Los Angeles, 1996



Reproduced with permission from Communities for a Better Environment, "Holding Our Breath", 1998.

A significant percentage of residents in neighborhoods adjacent to the study region's ports are ethnic minorities and/or live below the poverty line. According to the 2000 census, approximately 23 percent of the population in the City of Long Beach was below the poverty line, and approximately 67 percent of the population was defined as a minority group. In the City of Port Hueneme, the 2000 census identified approximately 12 percent of the population living below the poverty line and approximately 43 percent of the population was defined as a minority group. Of the City of Los Angeles' 3.9 million residents, 70,000 live in San Pedro, a working class community where about two-thirds of residents are Latino, and 22 percent live below the poverty line.[1] Additionally, in the Barrio Logan neighborhood**s** surrounding the Port of San Diego, the 1990 census reported approximately 41 percent of the population living below the poverty line and approximately 93 percent of the population was defined as a minority group.

In addition, environmental and community health impacts are felt throughout the study region. For example, a recent University of Southern California publication has shown decreased lung capacity among residents living near goods movement facilities and major highway corridors. The document revealed that "children who lived within 500 meters of a freeway, or approximately a third of a mile, since age 10 had substantial deficits in lung function by the age of 18, compared to children living at least 1,500 meters, or approximately one mile, away."

The impacts of goods movement on the environment and community result in increased health care costs and greater health risks to specific populations. As shown in Figure 28, there are high costs associated with

environmental impacts of goods movement which in turn impacts the region's economy. Figure 29 highlights the increased cancer risk for populations living in Los Angeles and the vicinity. It also shows cancer risks are elevated near goods movement facilities and major highway corridors. Figure 30 shows the increased cancer risk for populations living within the South Coast Air Basin.

Figure 28

Annual (2005) Health Effects of PM and Ozone Pollution from Freight Transport in California[85]

Health Outcome[A]	Cases per Year	2005 Valuation ($ Millions)
Premature Death[B]	2,400	19,000
Hospital Admissions (respiratory causes)	2,000	67
Hospital Admissions (cardiovascular causes)	830	34
Asthma and Other Lower Respiratory Symptoms	62,000	1.1
Acute Bronchitis	5,100	2.2
Work Loss Days	360,000	65
Minor Restricted Activity Days	3,900,000	230
School Absence Days	1,100,000	100
Total	**NA**	**19,499**

Source: California Air Resources Board, March 2006.

A Does not include the contributions from particle sulfate formed from SOx emissions, which is being addressed with several ongoing emissions, measurement, and modeling studies.

B Includes cardiopulmonary- and lung cancer-related deaths.

.

According to CARB, carcinogenic risk refers to the increased probability that an individual exposed to an average air concentration of a chemical will develop cancer when exposed over a 70-year period. Cancer risks are expressed on a per-million basis for comparative purposes. According to the SCAQMD Multiple Air Toxics Exposure (MATES-II) Study, diesel particulates account for 71 percent of the cancer risks (1,400 in one million) relating to pollutants in the South Coast Air Basin. According to the MATES-II study, individuals in areas of maximum risk are 14 times more likely to contract cancer due to diesel emissions. Figure 30 displays the cancer risk from airborne toxics including diesel emissions for the counties of Los Angeles, Orange, Riverside, San Bernardino, and Ventura.[2]

Figure 29
Cancer Risk
Los Angeles and Vicinity

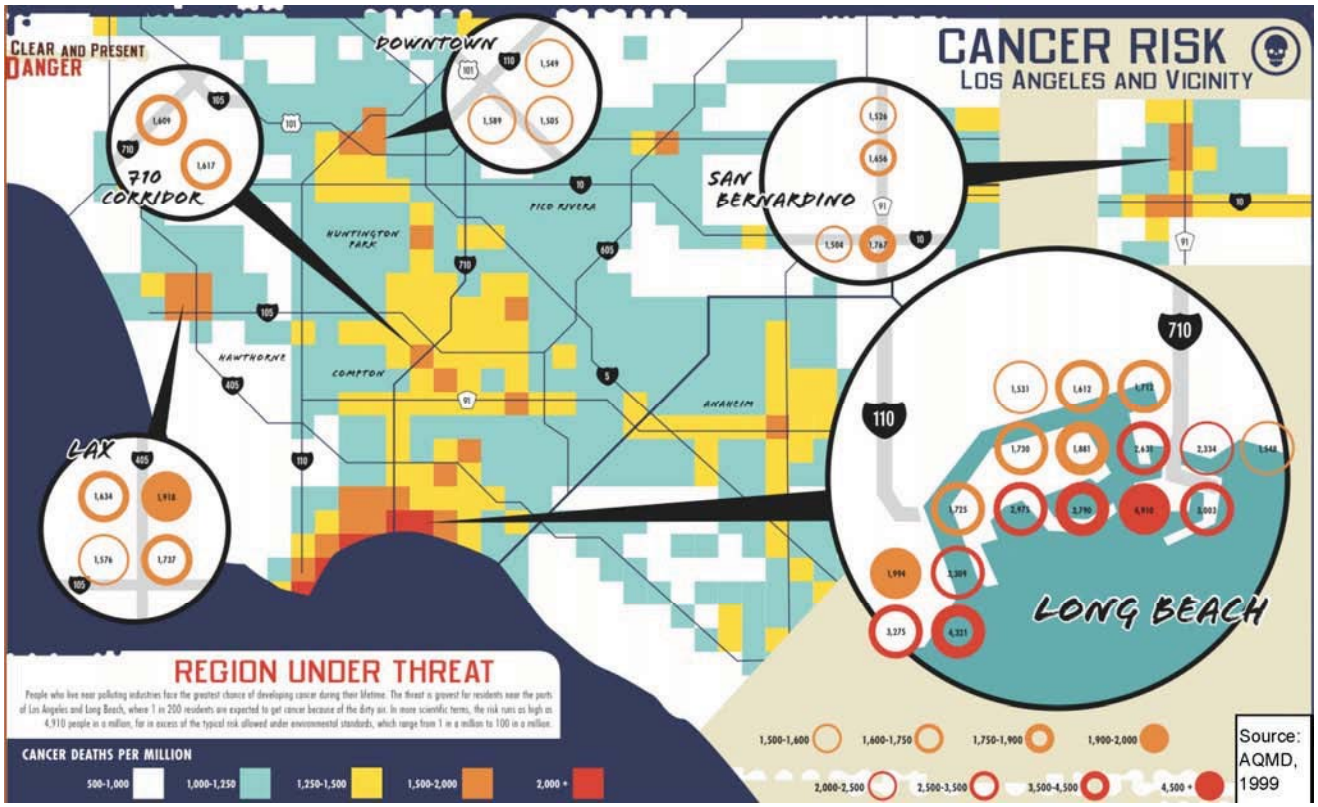
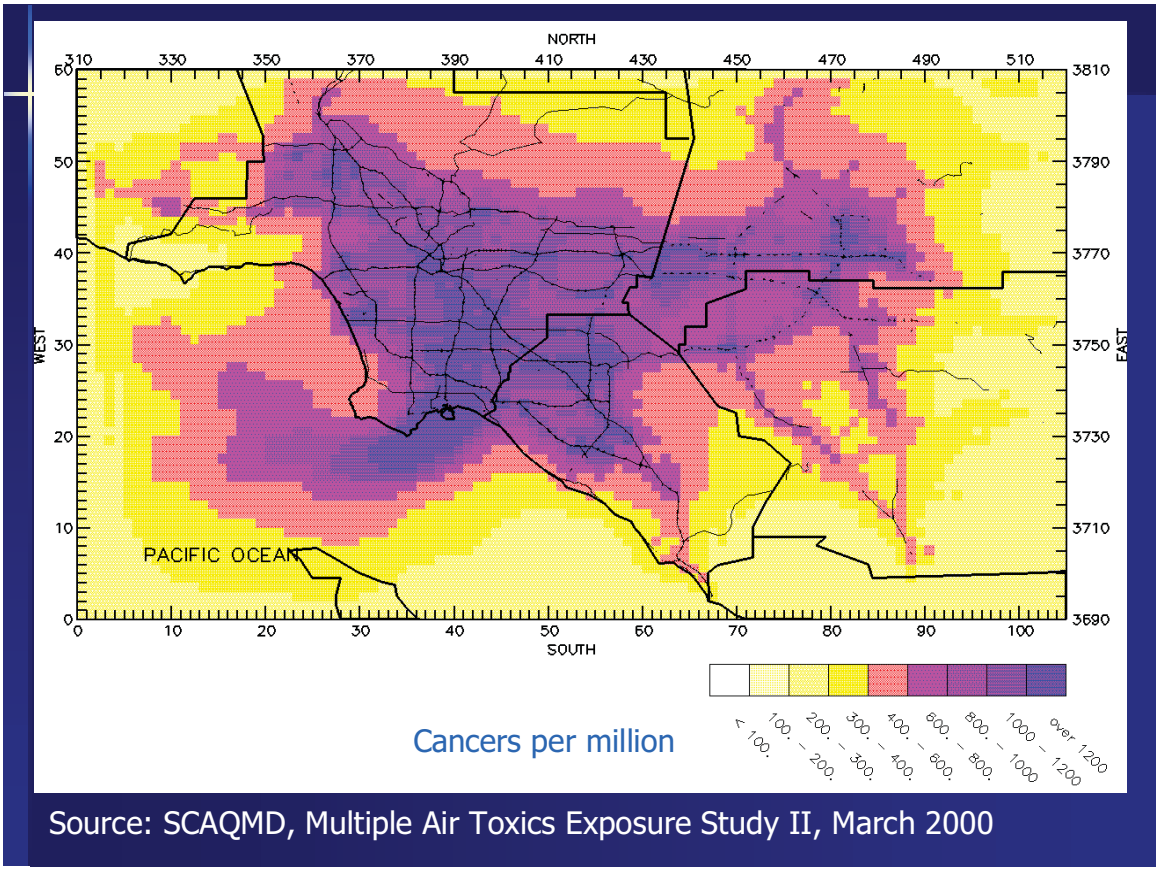


Figure 30
Estimated Risk of Cancer from All Toxics: All Emission Sources



Source: SCAQMD, Multiple Air Toxics Exposure Study II, March 2000

To date there have been landmark environmental mitigation plans, described later in this section, targeting air pollution and diesel emissions from goods movement sources to protect public health and improve air quality. As an example, the 2007 South Coast Air Quality Management District's Air Quality Management Plan (AQMP) proposes broad control measures for key goods movement pollutants (e.g., diesel particulates, sulfur oxides and nitrogen oxides) to attain federal annual PM2.5 and 8 hour ozone ambient air quality standards by applicable deadlines (2015 and 2023, respectively) and to reduce local toxic risks.

A standard establishes the concentrations above which a pollutant is known to cause adverse health effects to sensitive groups within the population, such as children and the elderly. An ambient air quality standard is the definition of "clean air." Area designations for federal ambient air quality standards for each of the MCGMAP counties are summarized in Table 19. The federal nonattainment designations shown in the table are ranked in decreasing order of severity as Extreme, Severe 17, Severe 15, Serious, Moderate, and Marginal. San Diego County is ranked as Basic (Subpart 1), which means it is an area that was previously reaching attainment status before changes to the 8-hour Ozone standard and is on a less-prescriptive timeline than the other attainment designations. As shown in Table 19, much of the study area is in nonattainment for ozone and particulate matter.

Table 19
Federal Nonattainment Designations per Criteria Pollutants

County[a]	POLLUTANT[b]					
	Ozone (8 Hr.)	PM10	PM2.5	NO_2	SO_2	CO
Los Angeles	Severe 17[c] / Moderate	Serious	Nonattainment	-	-	-
Orange	Severe 17[c]	Serious	Nonattainment	-	-	-
Riverside	Severe 17[cd] / Serious	Serious	Nonattainment	-	-	-
San Bernardino	Severe 17[c] / Moderate	Serious / Moderate	Nonattainment	-	-	-
Ventura	Moderate	-	-	-	-	-
Imperial	Marginal[e]	Serious	-	-	-	-
San Diego	Basic (Subpart 1)	-	-	-	-	-

Notes:

[a] Some designations only apply to portions of counties and vary by basin, hence multiple designations.

[b] Current EPA Nonattainment Designations for All Criteria Pollutants Accessed July 13, 2007 at http://www.epa.gov/oar/oaqps/greenbk/ancl.html .

[c] The SCAQMD has requested this designation for the portions in the South Coast Air Basin be redesignated Extreme.

[d] The SCAQMD has requested this designation for portions of the Salton Sea Air Basin in the Coachella Valley be designated Severe-15.

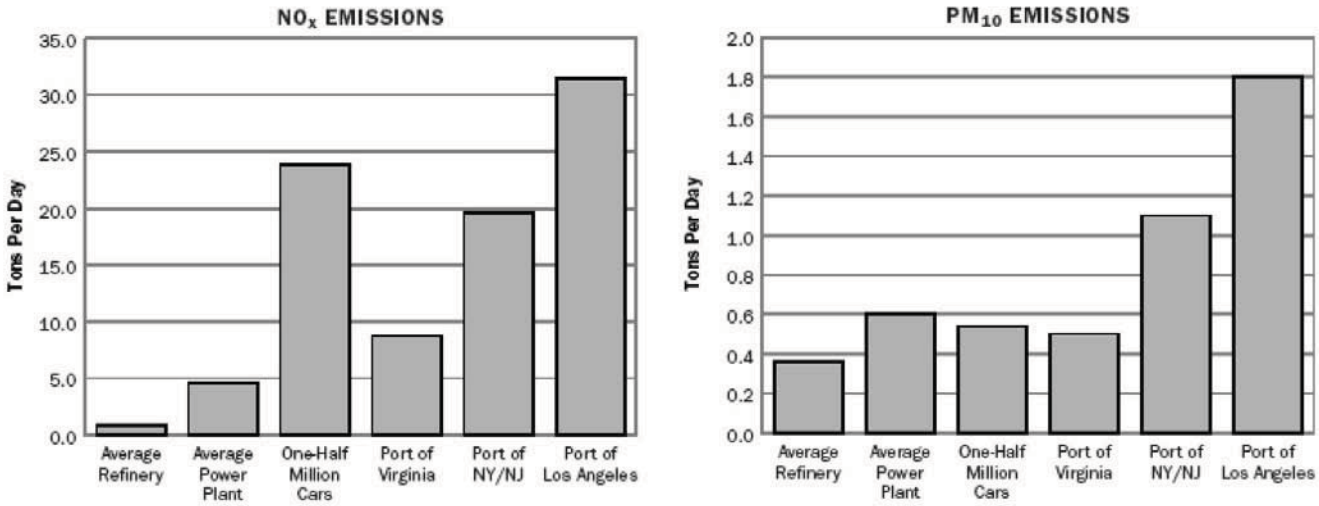
[e] Imperial county did not attain the 8-hour ozone attainment standard of June 15, 2007. This designation will be reclassified by EPA as Moderate when its findings are finalized.

Source: Wilbur Smith Associates, 2007.

Figure 31 shows that toxic air contaminates and other emissions are generated in a much larger percentage near the Ports of Los Angeles and Long Beach as compared to other national port facilities, refineries, power plants, and cars.

Figure 31

Nitrogen Oxides (NO_x) and Particulate Matter (PM_{10}) Pollution from Ports Compared to Refineries, Power Plants, and Cars

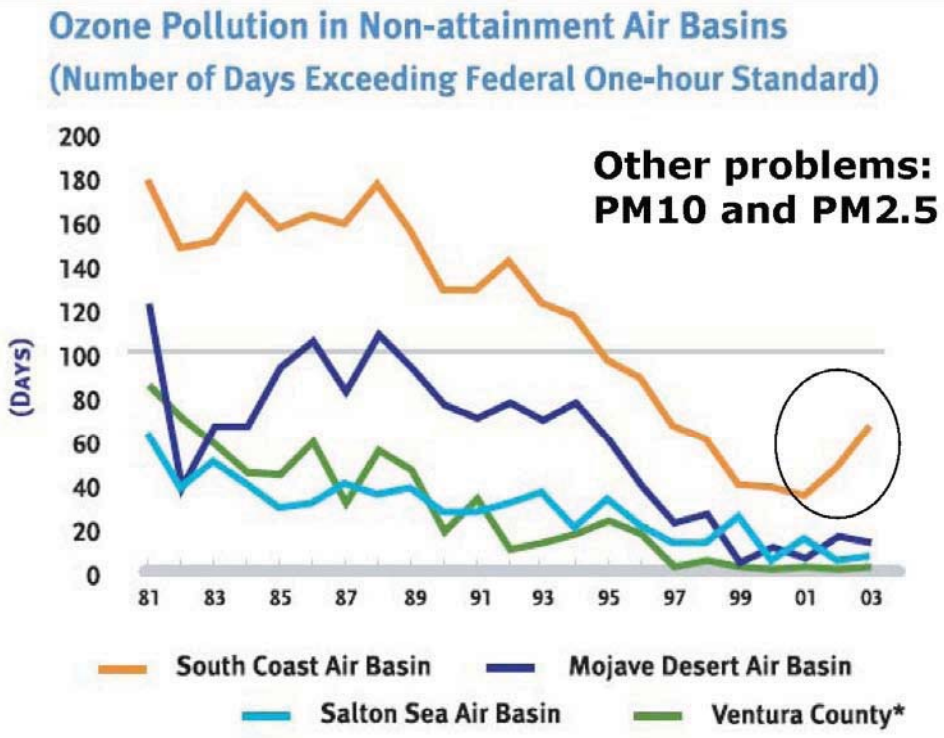


Sources: Seaports of the Americas, American Association of Port Authorities Directory (2002): 127. U.S. EPA, National Emission Trends, Average Annual Emissions, All Criteria Pollutants, 1970–2001, August 13, 2003. Energy Information Administration, Petroleum Supply Annual 1982, Volume 1, DOE/EIA-0340(82)/1 (June 1983, Washington, DC), pp. 97-103 and Petroleum Supply Annual 2000, Volume 1, DOE/EIA-0340(2000)/1 (Washington, DC, June 2001), Table 40. Energy Information Administration, Form EIA-861, "Annual Electric Utility Report." As posted at www.eia.doe.gov/cneaf/electricity/public/t01p01.txt, U.S. Dept of Transportation, Federal Highway Administration, 2000 Highway Statistics, State Motor-Vehicle Registrations.

Figure 32 highlights the following issues:

- Ozone pollution is again on the rise, most likely due to NOx precursor emissions from diesel emissions.
- Although PM10 is a concern, the current health focus is on PM2.5 and ultrafine particulates.

Figure 32

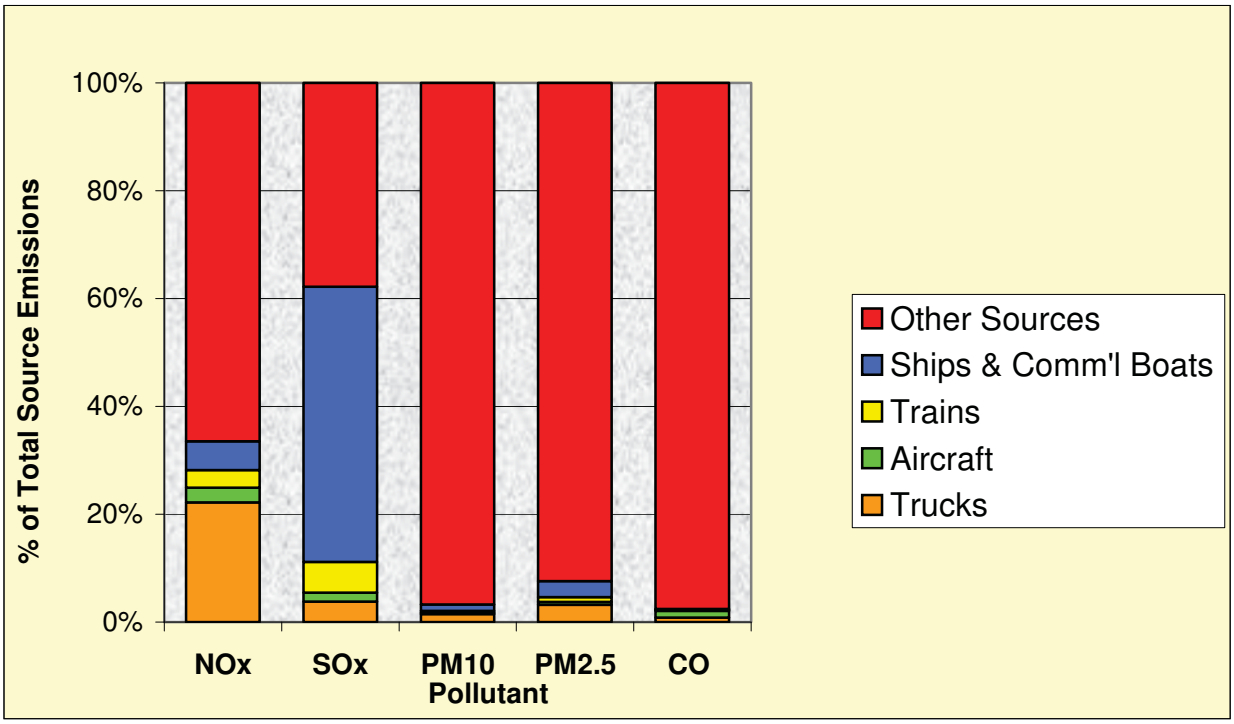


** Ventura County is part of the South Central Coast Air Basin*

Source: California Air Resources Board and South Coast Air Quality Management District

Figure 33 shows the estimated emission sources for the Year 2005 which includes the goods movement industry.

Figure 33
2005 Estimated Annual Average Emissions in South Coast Air Basin



Source: Final 2003 Air Quality Management Plan. South Coast Air Quality Management District.

As referenced earlier and indicated in Figure 33, the goods movement industry is a major contributor to the South Coast Air Basin (SCAB) emissions, especially nitrogen oxide (NOx) and sulfur oxide (Sox). Other emission sources contributing to the basin's degraded air quality, as reported by the South Coast Air Quality Management District (SCAQMD) include:

- On-Road Mobile – automobiles and lighter duty trucks. (Excludes heavy, heavy duty (HHD) trucks accounted for in goods movement truck category.)
- Other Mobile – off road sources, such as recreational boats, off-road recreational vehicles, and farm equipment. (Excludes goods movement categories of aircraft, trains, and ships.)
- Stationary and Area – numerous sources, such as utilities, oil and gas production, waste disposal, cleaning and surface coating, industrial processes (e.g., food and agriculture, electronics, and wood and paper), and solvent evaporation.

The percentage contribution of these emission sources in comparison to the goods movement industry is presented in Table 20. The table indicates trucks account for over 20 percent of the NOx emissions. Ships and commercial boats account for over 50 percent of the SOx emissions.

Table 20
2005 Estimated Annual Average Emissions in South Coast Air Basin
(Percent of Total)

SOURCE	POLLUTANT				
	NOx	SOx	PM10	PM2.5	CO
Goods Movement	33.5%	62.2%	3.3%	7.6%	2.4%
On-Road Mobile	37.3%	4.3%	5.1%	8.4%	65.1%
Other Mobile	19.1%	0.9%	5.3%	12.0%	27.4%
Stationary & Area	10.0%	32.6%	86.3%	72.1%	5.1%

Source: Final 2003 Air Quality Management Plan. South Coast Air Quality Management District.

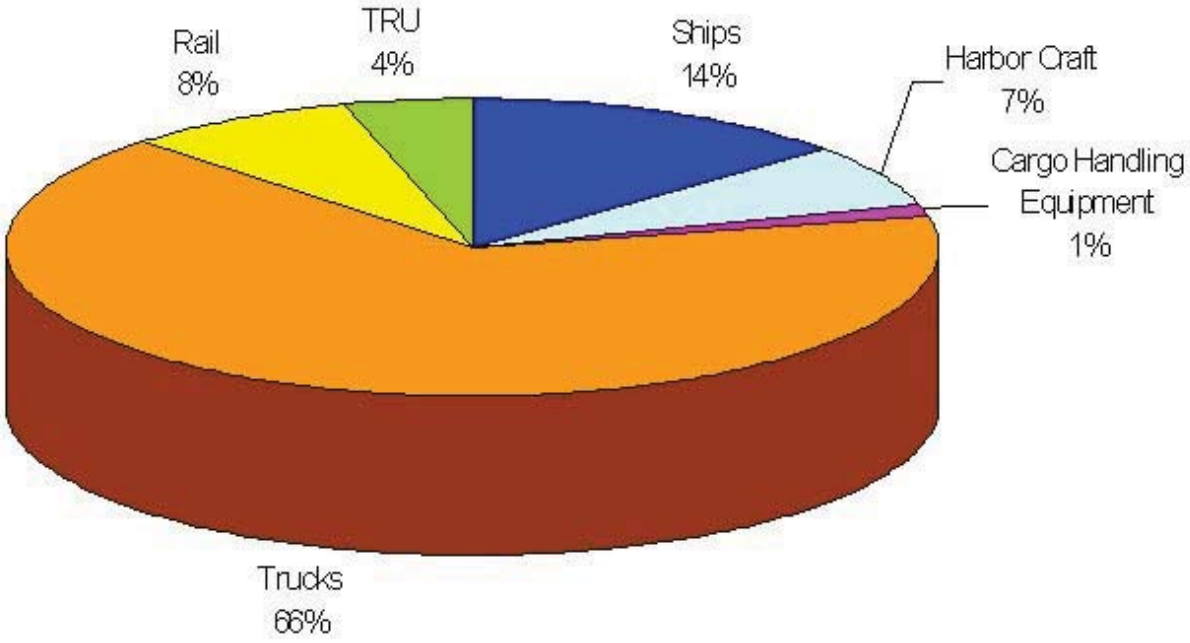
As shown in Figure 34, statewide 2001 diesel PM emissions inventory from ports and goods movement were approximately 57 tons per day, with modal contributions as follows: 66 percent truck emissions, 8 percent rail, 14 percent ships, 7 percent harbor craft, 4 percent transport refrigeration units (TRU), and 1 percent cargo handling equipment.[3]

The counties within the MCGMAP region are actively trying to identify the sources for air quality impacts and develop plans to reduce the air quality impacts of goods movement. The San Diego 8-Hour Ozone Plan was approved by the California Air Resources Board (CARB) on May 24, 2007 and was sent to the Environmental Protection Agency (EPA) for approval. This plan revealed that since 2003 transported pollution from the South Coast Air Basin has contributed to the county exceeding its 8-hour ozone standard. San Diego experienced an increase in 2006 of the number of days over the standard even though ozone-forming emissions have declined. The two air basins are intrinsically linked.

The CalEPA and CARB Goods Movement Reduction Plan of March 21, 2006 found that "…goods movement emissions in the South Coast represent about 25 percent of the statewide good movement inventory. Currently trucks are the dominant source of diesel PM and NOx. As adopted regulations continue to be implemented, truck emissions are projected to decrease. Ship emissions are projected to increase by a factor of three, based on projected container growth at the Ports of Los Angeles and Long Beach. Truck and other categories will still generate significant emissions in 2020".

The significance of diesel particulate matter relating to health is firmly established. Diesel particulate matter is a cause for special concern to human health because 50 to 90 percent of the particles are very small (i.e., ultrafine[4]) and can readily enter into and deposit within the lungs and pass through the bloodstream to the cellular level. However, it should be noted that ultrafine particulate matter is not exclusive to diesel emissions – ultrafine particles originate from any combustion process using any fuel, including gasoline, compressed natural gas (CNG), and liquid natural gas (LNG). Combustion sources other than mobile sources include stationary, industrial, occupational, and atmospheric conversion.[5] Independently published research reinforces the emissions health risks by establishing a diesel exhaust-cancer connection. In more than 35 studies involving railroad workers exposed to occupational diesel exhaust, the excess risk of lung cancer is consistently elevated by 20 to 50 percent.[6]

Figure 34
Diesel PM Statewide 2001 Emissions from Ports and Goods Movement

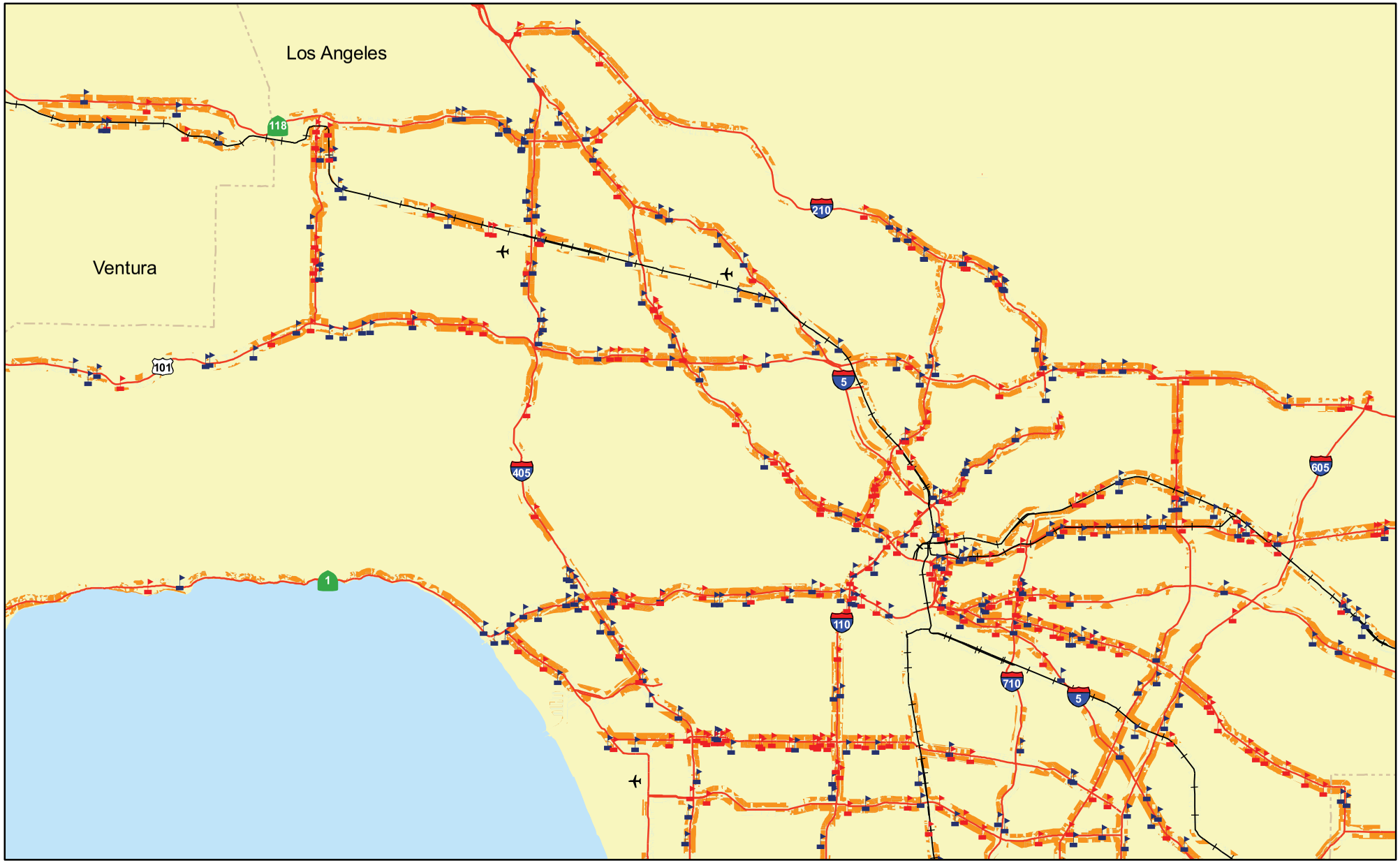


Source: Emission Reduction Plan for Ports and Goods Movement in California. California EPA and California Air Resources Board. March 21, 2006.

Further, according to research compiled by the Keck School of Medicine of USC[7] health effects are attributable to diesel particulate matter and increased incidences of:

- Asthma
- Preterm and low birth weight babies
- Cardiac birth defects
- Thickening of arterial walls
- Oropharyngeal (mouth and throat) cancer
- Slowed lung development in children

As referenced earlier, this is of particular concern when goods movement facilities and corridors are located near homes and schools. Figures 35-37 show schools and residential land uses along goods movement corridors throughout the study area. Additionally, recent CARB analysis reveal that there have been 2,400 premature deaths (defined as up to 14 years premature of average mortality rate) statewide, with 1,200 each year in the South Coast Air Basin due to PM2.5 pollution. CARB previously estimated that 2,400 people die prematurely each year due to PM2.5 exposure in the South Coast Air Basin.



Schools
0 - 150 meters
150 - 300 meters
Residential Land within 1/4 mile
Ports
Airports
Major highways
Railroads
County

Transportation Facility Corridors

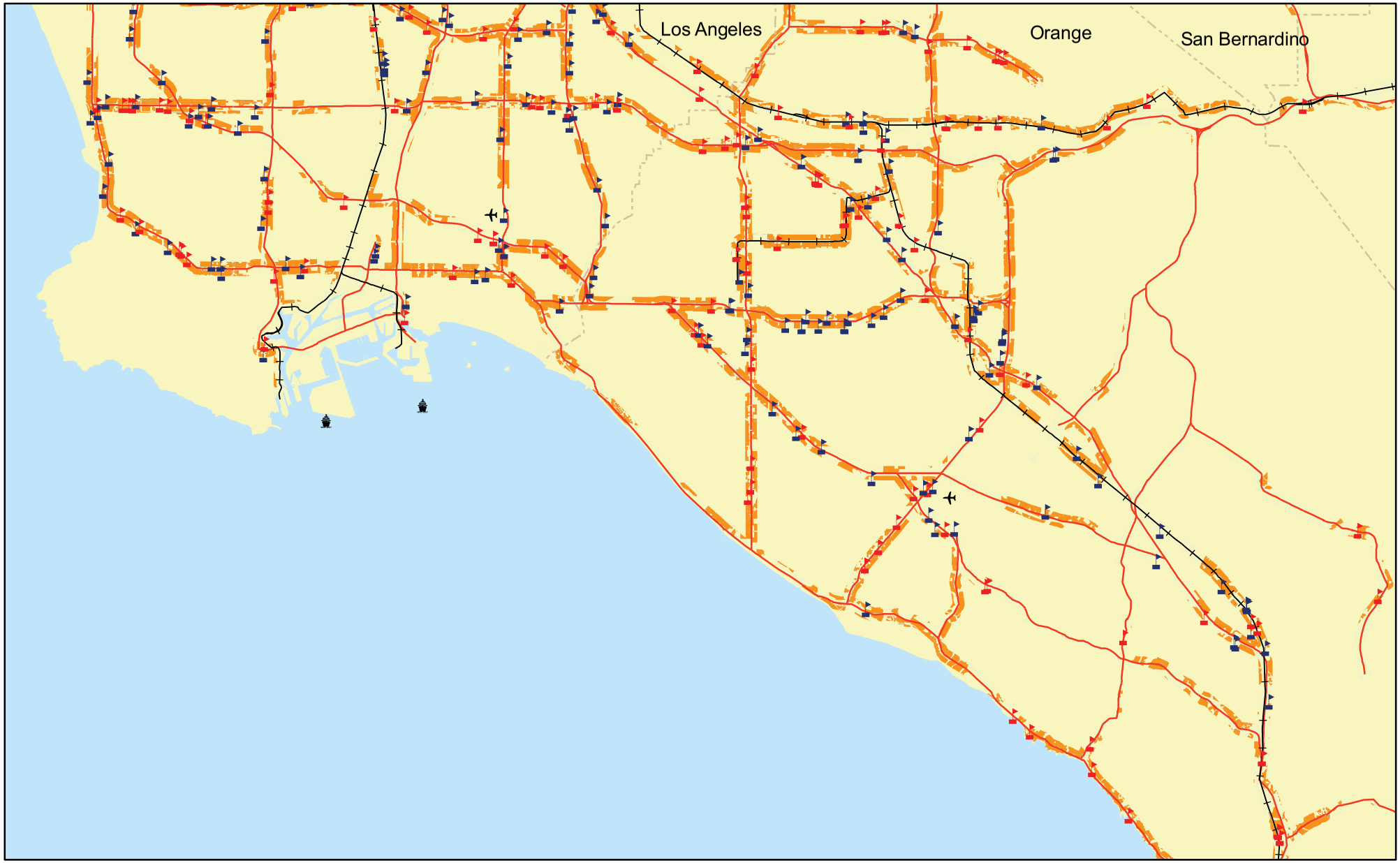
Schools and Residential Landuse
Central Los Angeles County

0 2 4 8 Miles

Figure 35

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Source: TeleAtlas StreetMap USA
SCAG 2000 Land Use



Schools
0 - 150 meters
150 - 300 meters
Residential Land within 1/4 mile
Ports
Airports
Major highways
Railroads
County

Transportation Facility Corridors

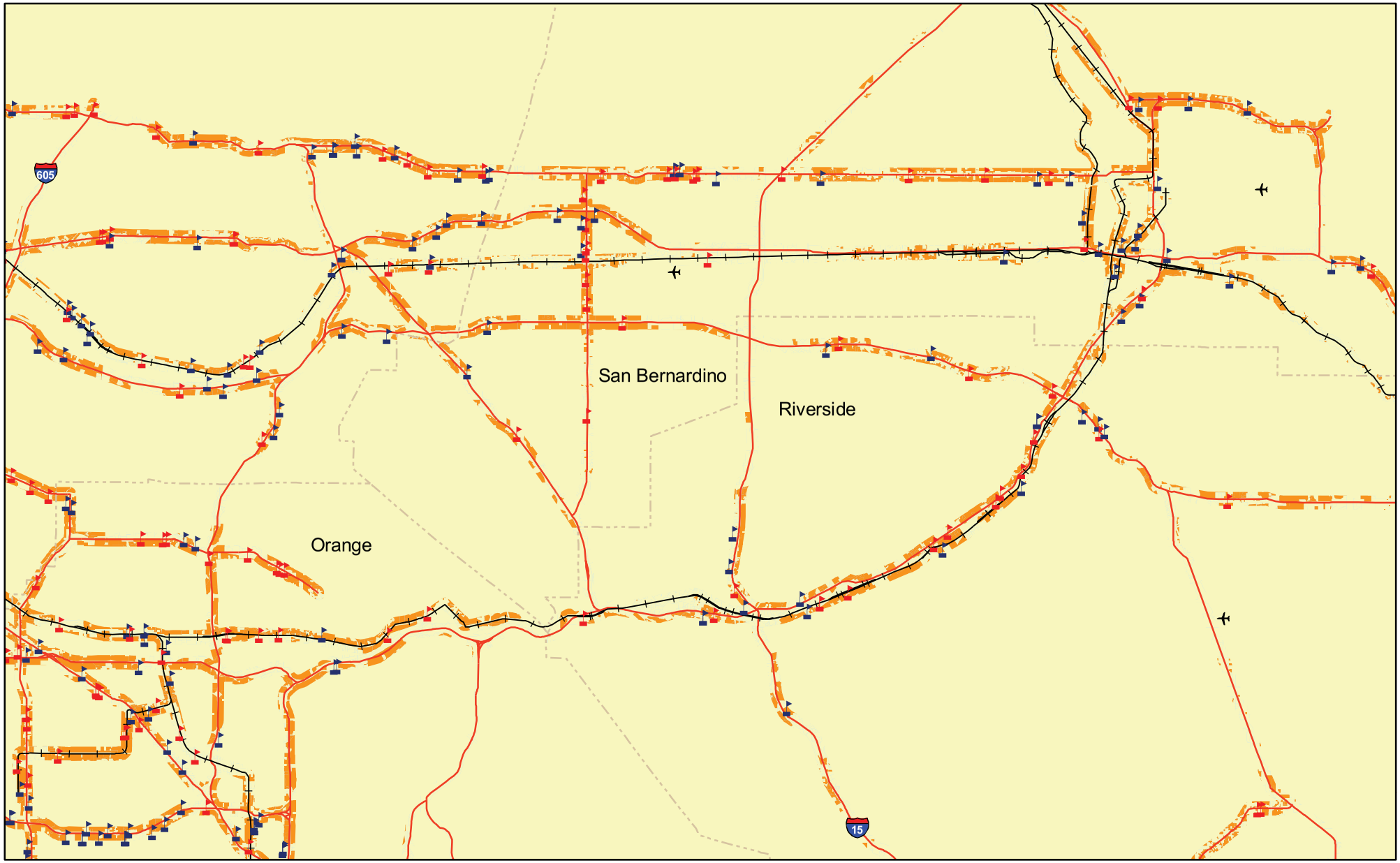
Schools and Residential Landuse
Orange County

0 2 4 8 Miles

Figure 36

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: TeleAtlas StreetMap USA
SCAG 2000 Land Use



Schools
0 - 150 meters
150 - 300 meters
Residential Land within 1/4 mile
Ports
Airports
Major highways
Railroads
County

Transportation Facility Corridors

Schools and Residential Landuse
Western San Bernardino and Riverside

0 2 4 8 Miles

Figure 37

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

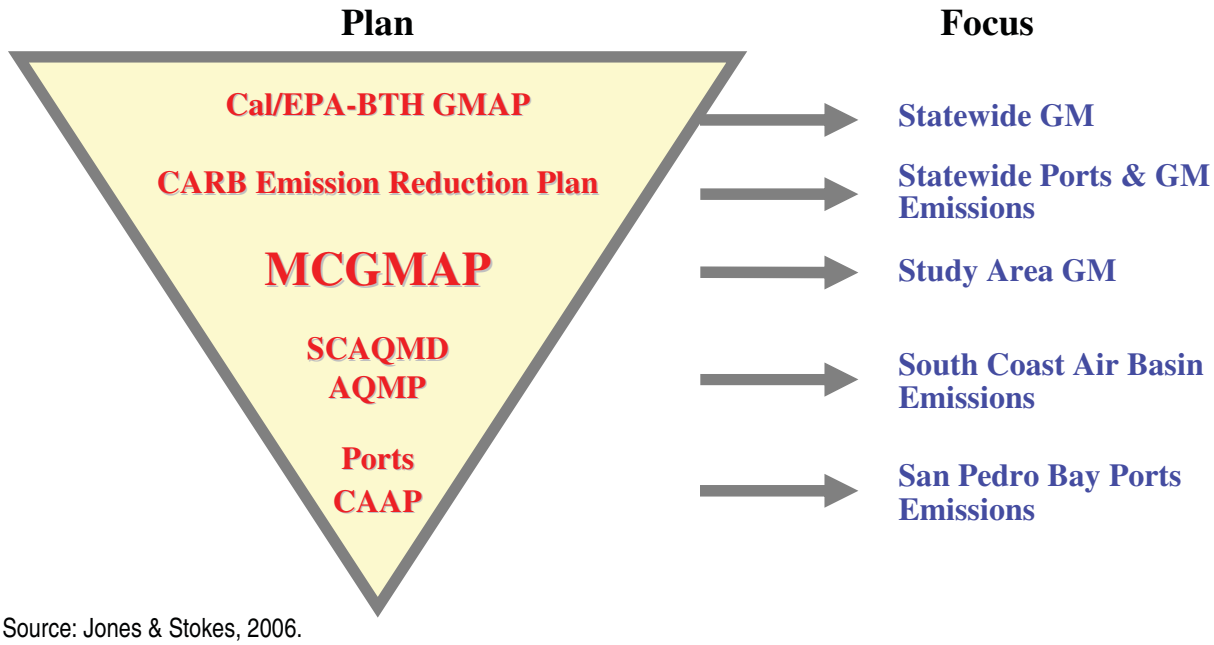
Source: TeleAtlas StreetMap USA
SCAG 2000 Land Use

Current Environmental Protection Efforts

The study area covers a large geographic area that contains a wide variety of topography, air, water, and other environmental characteristics. Due to its unique geographic location, the state's environmental quality and control is shared by international treaties, federal, state, and regional agencies. There are approximately 30 agencies with jurisdiction over a broad range of environmental impacts. Landmark environmental legislation includes the Clean Air Act, Clean Water Act, and Noise Control Act; however, it is the reduction of air pollutants via cleaner fuels, operational changes, and technological improvements that has received the primary focus. A comprehensive list of regulatory agencies, jurisdictions, and responsibilities are included in Table 1 of Appendix B . The six county study area (and Imperial County) encompasses four of California's 15 air basins and four of California's 35 Air Quality Management Districts as described in Table 2 of Appendix B.

California transportation agencies are aggressively addressing goods movement emissions. Four landmark plans are currently shaping and influencing the goods movement industry within the study area as follows: (1) California EPA (Cal/EPA) and the Business, Transportation, and Housing Agency (BTH) *Goods Movement Action Plan Phase II Progress Report: Draft Framework for Action* (March 2006), (2) CARB *Emission Reduction Plan for Ports and Goods Movement in California* (March 2006), (3) SCAQMD *2003 Air Quality Management Plan*, and (4) the Ports of Long Beach and Los Angeles *San Pedro Bay Ports Clean Air Action Plan* (Draft – June 2006). The Action Plan is intended to supplement the above referenced plans. The focus for each agency's plan is presented in Figure 38. Note that as of the date of completion of the final MCGMAP, many of these Draft plans have been finalized by the respective agencies.

Figure 38
Focus of Agency Plans



Source: Jones & Stokes, 2006.

An overview of some of the plans within the study area follows:

1-The California Environmental Protection Agency (Cal/EPA) and Business Transportation and Housing Agency (BTH) Goods Movement Action Plan is a statewide goods movement action plan proposed by the governor to generate jobs, increase mobility and relieve traffic congestion, improve air quality and to protect public health, enhance public and port safety, and improve California's quality of life. The plan addresses goods movement infrastructure and operations, as well as air quality emission reduction efforts. The state's action plan is based upon CARB's Emission Reduction Plan and, establishes the following goals:

- Reduce emissions to Year 2001 levels by 2010.
- Continue reducing emissions past Year 2001 levels until attainment of applicable standards is achieved.
- Reduce diesel-related health risks by 85 percent by Year 2020.
- Ensure sufficient localized air toxics risk reductions in each affected community.

Funding of the state's estimated fifteen billion dollar ($15 billion) action plan is proposed to include: $1.95 billion in previously committed public funding; a proposed bond (S.B. 1266 – Highway Safety, Traffic Reduction, Air Quality, & Port Security Bond Act of 2006) encompassing $2 billion for trade corridor improvement projects with 1:1 matching, plus $1 billion for air quality improvements (no matching requirement); and suggested funding strategies (regulations, incentives, federal funding, user-based fees, and market-based approaches). A key component of the plan is the simultaneous and continuous improvement in infrastructure and mitigation. As defined by the state of California, "the total cost of a goods movement related infrastructure project should include the cost of required project-specific mitigation and the combined cost should be funded as the cost of the project". A preliminary working list of candidate projects has been developed based on criteria. Examples of goods movement infrastructure projects include dock-rail facilities, the Alameda Corridor East and rail capacity improvements (Table 3 of Appendix B).

2-The California Air Resources Board (CARB) Emission Reduction Plan focuses on statewide emission reductions specifically from ports and the goods movement industry. Whereas the Cal/EPA-BTH action plan addresses both infrastructure projects and air quality projects, CARB's plan focuses solely on air quality per their legislative purview. While the plans are consistent with one another, the Emission Reduction Plan is broader in terms of air quality efforts. Overall goals of the CARB plan include:

- Reduce total statewide international and domestic goods movement emissions back to Year 2001 levels or below by Year 2010.
- Reduce statewide diesel particulate matter health risk from goods movement by 85 percent by Year 2020.
- Reduce NOx emissions from international goods movement in the South Coast by 30 percent from projected Year 2015 levels, and 50 percent from projected Year 2020 levels (based on preliminary targets for attaining federal air quality standards).
- Apply plan strategies statewide to aid all regions in attaining air quality standards.

To meet these goals, the plan's regulatory strategies include several measures, including:

- More stringent emissions standards
- Cleaner fuels
- Shore power
- Speed reduction of ships
- Engine upgrades and retrofits
- Emissions control devices

Implementation of the Emission Reduction Plan is estimated to cost $6 to $10 billion over 15 years. CARB estimates that the economic benefits in terms of the savings via the avoidance of adverse health impacts over the same time period are $34 to $47 billion. Funding of the plan assumes all industries involved must share in investment costs, and is generally unfunded by CARB itself. The agency, however, does acknowledge that incentives are critical to some sectors, and has also proposed the creation of a special $5 million annual fund for goods movement demonstration projects. In addition to incentives, possible funding strategies include the state's proposed bond (S.B. 1266), container fees, federal funding, other user fees, and market-based approaches.

3-The Southern California Air Quality Management District 2003 Air Quality Management Plan (AQMP) is a mandated document that develops emissions budgets for the State Implementation Plan (SIP) conformity with state and national ambient air quality standards. The SIP is ultimately approved by the U.S. EPA to satisfy requirements of the federal Clean Air Act following approval by CARB. One of the Air Resources Board (ARB) responsibilities is to propose the state and federal strategy for the SIP to reach the federal standards. The SIP is a comprehensive strategy designed to attain federal air quality standards as quickly as possible through a combination of technologically feasible and cost-effective measures. It outlines ARB staff's assessment of how far adopted regulations will take us towards attainment of federal standards, what new actions could be taken, how the timing of new technology and incentive funds comes into play, and what the earliest feasible timeframes for meeting standards is likely to be in each region.[8] Goods movement-related [mobile source] emissions projections are integral to the AQMP. SCAQMD's air pollution control strategy focuses on controlling man-made sources through technologies and management practices, and relies on mobile source control measures developed by CARB.

SCAQMD acknowledges the importance of a multi-agency approach in addressing long-term air quality improvements. The SCAQMD reports "to ultimately achieve ambient air quality standards and demonstrate attainment, additional long-term emission reductions will be necessary from sources including those primary under the jurisdiction of California Air Resource Board (e.g., on-road motor vehicles, off-road equipment, and consumer products) and U.S. Environmental Protection Agency (e.g., aircraft, ships, trains, and pre-empted off-road equipment.) Without adequate and fair share level of reductions from all sources, the emission reduction burden would unfairly be shifted to sources that have otherwise done their part for clean air."[9]

Clean air progress is a challenging task that must account for complex interactions between emissions and resulting air quality, but also to pursue the most effective possible set of air quality improvement strategies while maintaining a healthy economy.[10] To ensure continued progress toward clean air and compliance with state and federal requirements, the AQMP is developed by SCAQMD in conjunction with CARB, SCAG, and the U.S. EPA. Every three years, AQMD revises the AQMP for air quality improvement. Each iteration of the plan is an update of the previous plan and has a 20-year horizon. The previous 2003 AQMP focuses on demonstrating attainment with the federal PM10 ambient air quality standard by 2006 and with the federal 1-hour ozone standard in Year 2010 while making notable progress toward attainment of state standards and upcoming new federal standards. The 2007 Plan was in progress during the analysis and research for this plan. The 2007 Plan was completed on June 1, 2007. Its focus, in part, is new federal 8-hour ozone and PM2.5 standards.

4-The San Pedro Bay Ports Clean Air Action Plan (CAAP) is the most recently developed plan to target goods movement emissions at the San Pedro Bay Ports of Los Angeles and Long Beach. Jointly developed with the SCAQMD, the Ports released the draft plan in June 2006, which is expected to be approved by the Ports' governing boards in September of the same year. Excerpts of the CAAP can be found in Table 4 of Appendix B .

The CAAP established attainment standards on three levels: San Pedro Bay standards, project specific standards, and source specific performance standards. Trucks, ships (ocean going vessels), rail, harbor craft, and cargo handling equipment are targeted for various control measure and initiatives, including:

- Improvements to engine performance standards, alternate fuels and power, and emission reductions
- Technology Advancement Program
- Infrastructure and operational efficiency improvements
- Tracking and monitoring

Several implementation strategies are outlined in the CAAP:

- Lease requirements
- Tariff charges
- CEQA mitigations
- Incentives
- Voluntary measures
- Credit trading
- Capital lease backs
- Government-backed loan guarantees for trucks

The CAAP targets the annual reduction of specific pollutants. For example, the plan anticipates a reduction in NOx by 13,090 tons per year (TPY), diesel particulate matter by 1,242 TPY, and SOx by 2,721 TPY. To accomplish these goals, the CAAP encompasses a 5-year program at an estimated cost of $1.98 billion.[11] Initially committed funding to be provided by the ports and SCAQMD totals $394.4 million, resulting in a potential shortfall of approximately $1.6 billion. This shortfall may be addressed in part by the state's trade corridor improvement fund component of Prop 1B.

Chapter 6 – Projects and Strategies to Improve the Movement of Goods

This chapter summarizes the work done under Task 6 to build the Action Plan, that is described further in Tech Memos 6a (Evaluation of Initial Goods Movement Strategies) and 6b (Evaluations of Detailed Goods Movement Strategies). Task 6 included substantial qualitative evaluations and limited modeling to explore a wide range of transportation options that may address the issues and challenges described in Chapters 3, 4 and 5. This chapter provides an analysis of the growth scenarios defined in Chapter 4 and outlines the screening and evaluation process for a broad range of projects and strategies that are under consideration throughout the study region. This chapter also offers insight into the feasibility of dedicated freight facilities and the potential of revenue sources with the understanding that a more detailed analysis of corridors and local community impacts, beyond the scope of this effort, is required.

As defined in Chapter 4, four growth scenarios- Scenario 1: High Growth - Current Investment Level, Scenario 2: Low Growth – Current Investment Levels, Scenario 3: Moderate Growth - Current Investment Levels and Scenario 4: High Growth - Full Investment Levels were analyzed to determine mobility and economic impacts throughout the region. The "current investment levels" specified under Scenarios 1, 2, and 3 represent committed funding plans of the project partners. Under the four scenarios, the study region's infrastructure and goods movement system would perform differently. When the existing system performance is reviewed, it performs at constrained levels under significant daily and peak hour congestion. If "current investment levels" are maintained, any additional growth in highway and rail volumes will further degrade the system and increase existing environmental and community impacts. Also, if the significant growth in international container cargo is diverted to other Ports or offset by other factors (e.g., changes in trade policy, global unrest), there would still be demand for goods in Southern California given the region's population and the fact that it is one of the largest consumer markets in the nation..

As discussed in Chapter 3, the volume of containers moving through the Ports of Los Angeles and Long Beach, as well as domestic trade within the region, affects traffic, the economy, the environment, and the overall quality of life of residents throughout the study region. A change to any one component of the supply chain causes a ripple effect that may impact mobility, the economy, and the environment within the study region. For example, Figure 39 provides a summary of the employment impacts of each scenario. As shown, there is a clear relationship between the volume of goods through the ports to the number or jobs created in the region. Therefore, a reduction in trade volume through the ports results in a reduction in jobs created. As noted in Tech Memo 5a, each logistics sector job creates 2.2 new jobs. Therefore, the reduction in employment due to a reduced volume of goods through the port would have indirect and induced impacts on other jobs in the region. Other effects of changes in container volumes through the Ports are more difficult to quantify, given the limitations of existing analytical tools. For instance, goods carried in forty-foot international containers may be brought from the Ports to inland warehousing and/or distribution centers (transloaded intermodal goods) to be separated and moved through the supply chain by rail, truck, or a combination of the two. Trips leaving warehouses or distribution centers can also be called secondary or tertiary truck trips. The exact number and relationship of these "secondary" and "tertiary" trips for each international container is not quantifiable given the current modeling tools. Therefore, there is no way to analyze the full ripple effect caused by changes to Port trade forecasts. For the purposes of this study, the travel demand model used to analyze the impacts of goods movement on the regional transportation system is based on the Port's growth forecast of 42.5 million TEUs by the Year 2030 (as defined by Scenarios 1 and 4). The model results for Scenarios 1 and 4 are presented later in this chapter.

Figure 39
Freight Growth Scenarios

Scenario	Assumptions	2030 Employment impact (number of jobs)	Change relative to Scenario 1
1	San Pedro Bay port growth of 42.5 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation	1,601,476	-
2	San Pedro Bay port growth of 24 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation	1,013,101	-36.7%
3	San Pedro Bay port growth of 33 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation	1,303,490	-18.6%
4	San Pedro Bay port growth of 42.5 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation supplemented by additional projects and private investment sources and fees	1,601,476	0.0%

Evaluation of Goods Movement Projects and Strategies

A qualitative evaluation of goods movement projects/strategies was initially conducted. It was assumed that the projects and strategies set forth in this chapter would require applicable (1) environmental mitigation measures, (2) local support through an EIR/EIS and community participation process, and (3) detailed feasibility studies, as the projects and strategies are in various stages in the project development process.

An initial list of high priority goods movement projects and strategies obtained from the project partners was expanded to include railroad and port projects, intermodal connectors and other short- and near-term projects included in county and regional planning and programming documents, and other projects contained in the California Marine Intermodal Transportation System Advisory Council (CALMITSAC) and the State's Goods Movement Action Plan. This resulted in a broad list of financially unconstrained projects and strategies.

Using the following screening criteria, this list was reduced to a comprehensive list of 249 projects and strategies, shown in Table 7 of Appendix B:

1. Is the project or strategy related to goods movement?
   a. Does it address a direct or indirect component of the goods movement system?
2. Is the project or strategy fully funded and programmed for short- or near-term implementation?
3. Is the project or strategy duplicated or a part of a similar project or strategy?

The comprehensive list of 249 projects and strategies was grouped into 15 categories of projects ranging from increased highway and rail capacity improvements to changes in operational and institutional practices, as shown below.

1. On-Dock Rail Improvements at Ports (projects outside of terminals)
2. Intermodal Facilities / Yards (includes Ports and rail yards)
3. Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals
4. Mainline Rail Capacity Improvements
5. Modification of Port Hours of Operation
6. Modification of Delivery Hours
7. Construction of Dedicated Truck Lanes/Facilities

8. Use of Longer Combination Vehicles (LCVs) on Dedicated Facilities
9. Rail Grade Separations and Grade Crossing Safety Upgrades
10. Application of ITS Technology for Vehicle Management and Routing
11. Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel
12. Data and Analytical Methods
13. Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
14. Construction of Additional Freeway Lanes/Capacity
15. Freeway Operational/Safety Improvements

Data availability and analytical methods is not a specific type of project, but is included in this evaluation to document the need for more data related to the supply chain and the diverse impacts associated with all aspects of goods movement. As stated earlier, the ripple effect of changes in the volume of international goods moving through the Ports of Los Angeles and Long Beach cannot be fully analyzed until there is more data collected for secondary and tertiary trips resulting from each forty-foot international container.

An evaluation criterion was developed for the 15 categories of projects to provide decision-makers with enough information to compare different levels of desired transportation benefits and other relevant factors (e.g., mitigation measures, cost, economic opportunities, etc.). However, this evaluation process was not intended to produce results or draw conclusions about project-specific environmental impacts or cost-benefit analyses.

The 15 categories of projects and strategies were evaluated based on the following 26 criteria:

1. Modal Diversion
2. Highway Congestion/Delay
3. Rail Congestion/Delay
4. Travel Time/Reliability
5. Freight Trip Times - Specific Trade Lanes/Corridors
6. Truck Trips - Transport Corridors
7. Truck Trips - Ports/Intermodal/Warehouse Facilities
8. Truck Traffic Peak/Off-Peak Shares - Transport Corridors
9. Truck Traffic Peak/Off-Peak Shares - Ports/Intermodal/Warehouse Facilities
10. Regional Vehicle Miles of Travel
11. Regional Vehicle Hours of Travel
12. Impact on Adjacent Corridors/Regional Balance
13. Overall Emissions - Transport Corridors:
14. Overall Emissions - Ports/Intermodal/Warehouse Facilities
15. PM Emissions - Transport Corridors
16. PM Emissions - Ports/Intermodal/Warehouse Facilities
17. Health Effects - Transport Corridors
18. Health Effects - Ports/Intermodal/Warehouse Facilities
19. Community Impacts - Transport Corridors
20. Community Impacts - Ports/Intermodal/Warehouse Facilities
21. Land Use Impacts - Transport Corridors
22. Land Use Impacts - Ports/Intermodal/Warehouse Facilities
23. Project Revenue/User Fees:
24. Regional Economic Output/Competitiveness
25. Jobs/Economic Opportunity
26. Cost

To compare how well the categories of projects meet the criteria, a consumer report evaluation was used to differentiate between the categories. In the analysis, circles denoting a range from “least” likely to “most” likely were used to indicate the degree by which the criteria were attained. Table 21 contains a summary of this qualitative evaluation and a description of each evaluation criteria, including a discussion of the “least” and “most” rated projects or strategies.

Each project category was evaluated individually and was assumed to be independent of other categories. Since many of the projects or strategies within the categories complement each other, the cumulative effects of various categories is not shown.

Table 21

Summary of Qualitative Evaluations (Chart 1 of 5)

○ ◔ ◑ ◕ ●

Least ⟷ Most

Project Category	Modal Diversion	Reduction of Highway Congestion / Delay	Reduction of Rail Congestion / Delay	Improvement of Travel Time / Reliability	Improvement of Freight Trip Times - Specific Trade Lanes / Corridors	Change in Truck Trips - Transport Corridors
On-Dock Rail Improvements at Ports (projects outside of terminals)	●	◑	◑	◔	◕	◔
Intermodal Facilities / Yards	◑	◔	◑	◔	◕	◔
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	◑	◑	◑	◔	●	◔
Mainline Rail Capacity Improvements	◔	◔	●	◕	●	◔
Modification of Port Hours of Operation	○	◔	◔	◔	◔	◔
Modification of Delivery Hours	○	◔	◔	◔	◔	◔
Truck Lanes/Facilities	◔	◑	○	◑	●	●
Use of LCVs on Dedicated Facilities	◔	◑	◔	◔	◔	◔
Rail Grade Separations and Grade Crossing Safety Upgrades	○	◑	○	◔	◔	◔
Application of ITS Technology for Vehicle Management and Routing	○	◔	○	◔	○	◔
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	◑	◔	○	◔	◔	◔
Data and Analytical Methods	○	○	○	◔	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◑	◕	◕	◑	◑	◕
Construction of Additional Freeway Lanes/Capacity	○	◑	○	◔	◕	◕
Freeway Operational/Safety Improvements	○	◔	○	◔	◑	◑

Table 21

Summary of Qualitative Evaluations (Chart 2 of 5)

○ ◔ ◑ ◕ ● Least ⟷ Most

Project Category	Change in Truck Trips - Ports / Intermodal / Warehouse Facilities	Change in Truck Traffic Peak / Off-Peak Shares - Transport Corridors	Change in Truck Traffic Peak / Off-Peak Shares - Ports / Intermodal / Warehouse Facilities	Reduction of Regional Vehicle Miles of Travel	Reduction of Regional Vehicle Hours of Travel
On-Dock Rail Improvements at Ports (projects outside of terminals)	◑	○	○	◔	◔
Intermodal Facilities / Yards	◕	○	○	◔	◔
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	◔	○	○	◑	◑
Mainline Rail Capacity Improvements	◔	○	○	◔	◔
Modification of Port Hours of Operation	◔	◑	◑	◔	◔
Modification of Delivery Hours	◔	◑	◑	◔	◔
Truck Lanes/Facilities	●	●	●	●	●
Use of LCVs on Dedicated Facilities	◔	◕	◕	◕	◕
Rail Grade Separations and Grade Crossing Safety Upgrades	◔	○	○	○	○
Application of ITS Technology for Vehicle Management and Routing	◔	◔	◔	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	◔	◔	◔	○	○
Data and Analytical Methods	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	○	○	◕	◕
Construction of Additional Freeway Lanes/Capacity	◕	◔	◔	◕	◕
Freeway Operational/Safety Improvements	◑	◔	◔	◑	◑

Table 21
Summary of Qualitative Evaluations (Chart 3 of 5)

○ ◔ ◑ ◕ ● Least ← → Most

Project Category	Impact on Adjacent Corridors / Regional Balance	Reduction of Overall Emissions - Transport Corridors	Reduction of Overall Emissions - Ports / Intermodal / Warehouse Facilities	Reduction of PM Emissions - Transport Corridors	Reduction of PM Emissions - Ports / Intermodal / Warehouse Facilities	Improved Health Effects - Transport Corridors
On-Dock Rail Improvements at Ports (projects outside of terminals)	◔	◑	◕	◑	◕	◑
Intermodal Facilities / Yards	◔	◔	◕	◔	◕	◔
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	◕	●	●	●	●
Mainline Rail Capacity Improvements	◔	◕	◑	●	◑	●
Modification of Port Hours of Operation	◔	◔	◔	◔	◔	◔
Modification of Delivery Hours	◔	◔	◔	◔	◔	◔
Truck Lanes/Facilities	●	◕	◕	◕	◕	◕
Use of LCVs on Dedicated Facilities	◕	◕	◕	◕	◕	◕
Rail Grade Separations and Grade Crossing Safety Upgrades	○	◔	◔	◔	◔	◔
Application of ITS Technology for Vehicle Management and Routing	◔	○	○	○	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	○	○	○	○	○
Data and Analytical Methods	○	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	◕	◕	◕	◕	◕
Construction of Additional Freeway Lanes/Capacity	◑	◑	◔	◑	◔	◑
Freeway Operational/Safety Improvements	◑	◑	◔	◑	◔	◑

Table 21
Summary of Qualitative Evaluations (Chart 4 of 5)

○ ◔ ◑ ◕ ● Least ⟷ Most

Project Category	Improved Health Effects - Ports / Intermodal / Warehouse Facilities	Reduction of Community Impacts - Transport Corridors	Reduction of Community Impacts - Ports / Intermodal / Warehouse Facilities	Reduction of Land Use Impacts - Transport Corridors	Reduction of Land Use Impacts - Ports / Intermodal / Warehouse Facilities
On-Dock Rail Improvements at Ports (projects outside of terminals)	◕	◑	◕	◑	◕
Intermodal Facilities / Yards	◕	◔	◕	◔	◕
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	●	●	●	●
Mainline Rail Capacity Improvements	◑	●	◑	●	◑
Modification of Port Hours of Operation	◔	◔	◔	◔	◔
Modification of Delivery Hours	◔	◔	◔	◔	◔
Truck Lanes/Facilities	◕	◕	◕	◕	◕
Use of LCVs on Dedicated Facilities	◕	◕	◕	◕	◕
Rail Grade Separations and Grade Crossing Safety Upgrades	◔	◔	◔	◔	◔
Application of ITS Technology for Vehicle Management and Routing	○	○	○	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	○	○	○	○
Data and Analytical Methods	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	◕	◕	◕	◕
Construction of Additional Freeway Lanes/Capacity	◔	◑	◔	◑	◔
Freeway Operational/Safety Improvements	◔	◑	◔	◑	◔

Table 21

Summary of Qualitative Evaluations (Chart 5 of 5)

○ ◔ ◑ ◕ ●

Least ⟷ Most

Project Category	Maximization of Project Revenue / User Fees	Improvement of Regional Economic Output / Competitiveness	Increase in Jobs / Economic Opportunity	Cost
On-Dock Rail Improvements at Ports (projects outside of terminals)	◔	◕	◕	●
Intermodal Facilities / Yards	◔	◕	◕	●
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	◕	◕	●
Mainline Rail Capacity Improvements	◕	◕	◕	●
Modification of Port Hours of Operation	●	◑	◑	○
Modification of Delivery Hours	●	◑	◑	○
Truck Lanes/Facilities	◕	◕	◕	●
Use of LCVs on Dedicated Facilities	◑	◕	◕	◔
Rail Grade Separations and Grade Crossing Safety Upgrades	◔	◕	◕	●
Application of ITS Technology for Vehicle Management and Routing	◔	◔	◔	◔
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	◕	◕	○
Data and Analytical Methods	○	◕	◕	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	◕	◕	○
Construction of Additional Freeway Lanes/Capacity	◔	◑	◑	●
Freeway Operational/Safety Improvements	◔	◑	◑	◑

SUMMARY OF QUALITATIVE EVALUATION

1. **Modal Diversion:** How much does the project or strategy shift freight from truck to rail?
    a. The **most** significant modal diversion would occur with increased on-dock rail at the ports, with additional potential to increase modal diversion from improvements linking intermodal and freight yards through capital or operational improvements.
    b. The **least** significant modal diversion would occur with projects focused on improving the movement of trucks and passenger vehicles.
        i. The biggest constraint to the movement of goods is intermodal lift capacity. Shifting freight from trucks to rail will require increased capacities and systems to allow more goods to quickly transfer from various modes (intermodal lifts); thereby minimizing the interim drayage truck movements.

2. **Highway Congestion/Delay:** How much will the project or strategy reduce highway congestion and delay for both passenger and freight movement?
    a. The **most** significant reduction in highway congestion/delay would result from large scale/mega projects (such as a regional dedicated freight guideway system) to link the primary origins and destinations in the goods movement system and separate movements between those locations from other regional travel. Therefore, the institutional changes to allow for large scale/mega projects are shown to have the most reduction.
        i. It is important to note that these institutional changes alone would not affect highway congestion or delay; however, for the purposes of this study it is assumed that these institutional changes are the necessary first-step towards implementation of these large scale/mega projects. The planning, design, construction, and operation of such large scale/mega projects would not occur without the required institutional changes.
    b. Minimal reductions in highway congestion/delay would result from smaller scale improvements to the regional highway system (e.g., "spot" fixes instead of a large scale regional system).
        i. The regional highway system is currently at capacity and is forecast to continue to be capacity constrained. The passenger and freight traffic on the existing system is diffuse and extensive; solutions with the greatest benefit must be large scale and separate the traffic that travels through or leaves the region from the traffic within the region.
        ii. Truck lanes would provide a medium reduction in highway congestion and delay, with the greatest change evident to the trucks themselves. The changes to congestion and delay for vehicles traveling in the mixed-flow lanes adjacent to the truck lanes would be minimal, as the excess capacity created by the removal of truck traffic would be quickly absorbed by the significant additional vehicle demand along corridors. In addition, the reduction to highway congestion and delays would be limited to areas on or surrounding the designated truck lane corridors; within the MCGMAP region, highway congestion and delay would remain significant due to overwhelming demand.

3. **Rail Congestion/Delay:** How much will the project or strategy reduce rail congestion and delay for both passenger and freight movement?
    a. The **most** significant reduction in rail congestion/delay would result from mainline rail capacity increases, with additional reduction from large scale/mega projects.
    b. The **least** significant reduction in rail congestion/delay would result from those projects and strategies that do not affect rail travel.
        i. Rail capacity is the second largest constraint to the goods movement system. Additional mainline rail is necessary to improve capacity.

4. **Travel Time/Reliability:** How much will the project or strategy improve travel time and reliability for both passenger and freight movement?
    a. The **most** significant improvement in travel time/reliability would result from additional mainline rail capacity; both for passenger and goods movement.
    b. The **least** significant improvement in travel time/reliability would result from improvements to the regional highway system or modifications to operational systems.
        i. The goods movement network in the region shares capacity with passenger and freight traffic. The sheer demand for passenger service results in a highly constrained system. Although improvements to the regional network would improve travel time and reliability, the improvements may not be as substantial as desired due to the demand on the system from both passengers and freight.

5. **Freight Trip Times - Specific Trade Lanes/Corridors:** How much will the project or strategy improve trip time for freight movement?
    a. The **most** significant improvement in freight trip times along specific trade lanes/corridors would result from direct capacity enhancements to the specific trade lanes/corridors; with rail representing the area for maximum benefit.
    b. Limited benefit in freight trip times along specific trade lanes/corridors would result from projects and strategies not directly adding capacity.
        i. Since the majority of the goods movement within the region moves on a broad and diverse system, the most benefit would occur when improvements are made to specific goods movement corridors. (e.g., rail lines).
        ii. Corridor improvements will reduce freight trip times along specific corridors, but regionwide changes will be negligible, as corridor improvements also allow for a greater number of vehicle volumes to be served, further constraining capacity and reducing travel times.
6. **Truck Trips - Transport Corridors:** How much will the project or strategy increase truck trips along transport corridors?
    a. The **most** significant change in truck trips along transport corridors would result from the addition of truck lanes or facilities; with additional potential from the construction of additional mainline freeway capacity.
    b. Limited change in truck trips along transport corridors would result from projects and strategies not directly adding capacity or those that focus on rail goods movement.
        i. The region's highway system serves local, regional, and national goods movement via trucks; therefore, improvements to the region's highway system will change truck trips, and the most change would result from a dedicated system serving trucks. The best solutions will most likely require a large scale / mega project.

7. **Truck Trips - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy increase truck trips between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant increase in truck trips between ports, intermodal yards, and warehouse facilities would result from the addition of truck lanes or facilities; with additional potential from the construction of additional mainline freeway capacity as well as improvements and increases to intermodal facilities and yards.
    b. Limited increase in truck trips between ports, intermodal yards, and warehouse facilities would result from projects and strategies not directly adding capacity or those that focus on rail goods movement.
        i. Similar to transport corridors, the most change to truck trips between ports, intermodal yards, and warehouse facilities would result from a dedicated system serving trucks; improvements to on-dock rail and increases to intermodal facilities and yards would also change truck trips, specifically drayage truck trips associated with transloaded intermodal cargo.

8. **Truck Traffic Peak/Off-Peak Shares - Transport Corridors:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times along transport corridors?
    a. The **most** significant shift in the share of truck traffic from peak to off-peak times along transport corridors would result from the addition of truck lanes or facilities; with additional potential benefits from the use of LCVs on dedicated facilities.
    b. The **least** significant shift in the share of truck traffic from peak to off-peak times along transport corridors would result from any improvements to rail capacity.
        i. The greatest shift in peak and off-peak truck travel along transport corridors would result from increased opportunities for trucks to either travel during peak hours, congestion on dedicated facilities with limited congestion (e.g., truck lanes), or to allow increased volumes to travel during off-peak times (e.g., changes to operating hours).

9. **Truck Traffic Peak/Off-Peak Shares - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant shift in the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities would result from the addition of truck lanes or facilities; with additional potential benefits from the use of LCVs on dedicated facilities.
    b. The **least** significant shift in the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities would result from any improvements to rail capacity.
        i. The greatest shift in peak and off-peak truck travel between ports, intermodal yards, and warehouse facilities would result from increased opportunities for trucks to either travel during peak hours of congestion on dedicated facilities with limited congestion (e.g., truck lanes) or to allow increased volumes to travel during off-peak times (e.g., changes to operating hours).

10. **Regional Vehicle Miles of Travel:** How much will the project or strategy reduce regional vehicle miles of travel?
    a. The **most** significant reduction in regional VMT would result from the addition of truck lanes or facilities; with additional potential benefit from the addition of mainline freeway capacity.
    b. Limited reduction in regional VMT would result from any improvements to rail capacity.
        i. By concentrating truck travel along specific corridors, total congestion could be reduced resulting in changes to travel routes and an overall reduction in VMT; this would occur through capacity enhancements to the region's highway system.
        ii. Note that the MCGMAP Region's overall VMT will maintain a relatively constant level with any assumed highway or rail projects described in this chapter or Tech Memo 6a. As a function of total lane-miles of roadway and total vehicle volumes on the regional system, total VMT will show minimal changes when considering projects and strategies located along specific routes or corridors. The qualitative evaluations presented above reflect nominal differences between the least and most reduction. The key point of this qualitative evaluation is that the greatest reduction in VMT would occur through enhancements to the highway system that allow for vehicles to utilize the most direct routes between destinations, without selecting routes based on reduced congestion levels (thereby reducing overall miles traveled). Rail capacity improvements would serve a specific segment of the MCGMAP Region's goods moved by truck; however, a greater share of the Region's trucks would not be affected by rail capacity improvements and therefore the reduction in VMT would be limited.

11. **Regional Vehicle Hours of Travel:** How much will the project or strategy reduce regional vehicle hours of travel?
    a. The **most** significant reduction in regional VHT would result from the addition of truck lanes or facilities; with additional potential benefit from the addition of mainline freeway capacity.
    b. The **least** significant reduction in regional VHT would result from any improvements to rail capacity.
        i. By concentrating truck travel along specific corridors, total congestion could be reduced resulting in an overall reduction in VHT; this would occur through capacity enhancements to the region's highway system.

12. **Impact on Adjacent Corridors/Regional Balance:** How much will the project or strategy impact adjacent corridors or change the regional balance of passenger and goods movement?
    a. The **most** significant impact on adjacent corridors or regional balance would result from projects and strategies that enhance specific goods movement routes or corridors (such as dedicated truck facilities or advanced technologies).
    b. Limited impact on adjacent corridors or regional balance would result from operational improvements or location-specific improvements.
        i. By providing enhanced capacity along specific goods movement corridors or routes, goods movement traffic would be more likely to shift from adjacent corridors, while non-goods movement traffic may shift to the adjacent corridors; the net result would be noticeable changes to regional balance.

13. **Overall Emissions - Transport Corridors:** How much will the project or strategy reduce overall emissions along transport corridors?
    a. The **most** significant reduction to overall emissions along transport corridors would result from alternative technologies (e.g., low- or zero-emission technologies) and improvements to the speed and congestion of goods movement throughout the region.
    b. The **least** significant reduction to overall emissions along transport corridors would result from those improvements not enhancing capacity, congestion, and travel speeds.
        i. The key to reducing overall emissions along transport corridors is either maximizing the volume of low- or zero-emission vehicles (e.g., maximize the volume of goods carried by rail or "clean" emerging technologies) or by reducing congestion and delays throughout the regional system for both passenger and freight travel.
        ii. Note that the changes to overall emissions would be centered along the specific corridors utilized by the specific project or strategy; within the MCGMAP Region there would still be significant overall emissions related to both goods movement and other sources (e.g., automobiles, stationary sources).

14. **Overall Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce overall emissions between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant reduction to overall emissions between ports, intermodal yards, and warehouse facilities would result from alternative technologies (e.g., non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **least** significant reduction to overall emissions between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. Similar to transport corridors, the most reduction to overall emissions between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional

benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g., reducing wait times and bottlenecks at intermodal yards).

ii. Also similar to transport corridors, the changes to overall emissions between ports, intermodal yards, and warehouse facilities would be centered on the facilities accessed by the specific project or strategy; within the MCGMAP Region there would still be significant overall emissions related to both goods movement and other sources (e.g., automobiles, stationary sources).

15. **PM Emissions - Transport Corridors:** How much will the project or strategy reduce diesel particulate matter emissions along transport corridors?
    a. The **most** significant reduction to PM emissions along transport corridors would result from alternative technologies (e.g., non-diesel sources) and a shift from truck to rail.
    b. The **least** significant reduction to PM emissions along transport corridors would result from those improvements not enhancing capacity, congestion, and travel speeds.
        i. The key to reducing PM emissions along transport corridors is maximizing non-diesel technologies (e.g., maximize the volume of goods carried by rail or "clean" emerging technologies).
        ii. Note that the changes to PM emissions would be centered along the specific corridors utilized by the specific project or strategy; within the MCGMAP region there would still be significant PM emissions related to goods movement along other routes.

16. **PM Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce diesel particulate matter emissions between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant reduction to PM emissions between ports, intermodal yards, and warehouse facilities would result from the use of alternative technologies (e.g., non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **least** significant reduction to PM emissions between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. Similar to transport corridors, the most reduction to PM emissions between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g., reducing wait times and bottlenecks at intermodal yards).
        ii. Also similar to transport corridors, the changes to PM emissions between ports, intermodal yards, and warehouse facilities would be centered on the facilities accessed by the specific project or strategy; within the MCGMAP Region there would still be significant PM emissions related to goods movement along other routes.

17. **Health Effects - Transport Corridors:** How much will the project or strategy improve health effects (or reduce the current negative health effects) of goods movement along transport corridors?
    a. The **most** significant improvement in health effects (or reduction in current negative health effects) of goods movement along transport corridors would result from the use of alternative technologies (e.g., non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **least** significant improvement in health effects (or reduction in current negative health effects) of goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.

i. By reducing the volume or congestion of truck traffic along transport corridors, alternative "clean" technologies can be implemented to improve health effects.

18. **Health Effects - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy improve health effects (or reduce the current health effects) of goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant improvement in health effects (or reduction in current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **least** significant improvement in health effects (or reduction in current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. The most improvement in health effects between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g., reducing wait times and bottlenecks at intermodal yards).

19. **Community Impacts - Transport Corridors:** How much will the project or strategy reduce community impacts associated with goods movement along transport corridors?
    a. The **most** significant reduction in community impacts associated with goods movement along transport corridors would result from those projects that allow for more goods to move on systems separated from communities.
    b. The **least** significant reduction in community impacts associated with goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By increasing rail mainline capacity, more trucks could be removed from local communities; also, dedicated truck facilities can separate truck traffic from passenger traffic and direct truck traffic to specific routes to separate from local traffic.
        ii. The evaluation assumes that the benefits of increased rail mainline capacity will offset the impacts; for example, the benefits due to reduced truck volumes, noise, congestion, and emissions would offset (or outweigh) community impacts associated with increased rail mainline capacity, such as increased noise and need for additional right-of-way.
        iii. In addition, the community impacts of goods movement occur along entire routes and are not unique to transport corridors. Therefore, improvements to a transport corridor may lessen community impacts in one designated segment, while having no effect on, or increasing, community impacts at the end- or mid-points of the corridor. Increased freight volumes along improved separated corridors could also lead to increased community impacts at the end- or mid-points where loading and transloading occur.

20. **Community Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.

b. The **least** significant reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
    i. The most significant reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would be through the clear separation of goods movement systems and the local system, thereby reducing truck trips and/or truck congestion.
    ii. The evaluation assumes that the benefits of separating the goods movement system from the local system will offset the impacts; for example, the benefits due to reduced truck volumes, noise, congestion, and emissions would offset (or outweigh) community impacts associated with separated facilities, such as increased noise and need for additional right-of-way.
    iii. In addition, the community impacts of goods movement occur along entire routes and are not unique to ports, intermodal yards, and warehouse facilities. Therefore, improvements to the ports, intermodal yards, and warehouse facilities may lessen community impacts in one designated area, while having no effect on, or increasing, community impacts along the corridor. Increased freight volumes along improved separated corridors could also lead to increased community impacts at the end- or mid-points where loading and transloading occur.

21. **Land Use Impacts - Transport Corridors:** How much will the project or strategy reduce land use impacts associated with goods movement along transport corridors?
    a. The **most** significant reduction in land use impacts associated with goods movement along transport corridors would result from those projects that allow for more goods to move on systems separated from communities.
    b. The **least** significant reduction in land use impacts associated with goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By increasing rail mainline capacity coupled with grade separations, more trucks could be removed from local communities; also, dedicated truck facilities can separate truck traffic from passenger traffic and direct truck traffic to specific routes to separate from local traffic.

22. **Land Use Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant reduction in land use impacts between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **least** significant reduction in land use impacts between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. The most significant reduction in land use impacts between ports, intermodal yards, and warehouse facilities would be through the clear separation of goods movement systems and the local system, thereby reducing truck trips and/or truck congestion.

23. **Project Revenue/User Fees:** How much will the project or strategy maximize project revenue or user fee generating potential?
    a. The **most** significant project revenue or user fee generating potential would result from those projects and strategies that target specific market segments of the goods movement system (e.g., national distribution).
    b. The **least** significant project revenue or user fee generating potential would result from those projects and strategies that do not serve a specific market segment or need.

i. In order to maximize project revenues and user fees, the users must see a direct benefit in terms of productivity, reliability, efficiency, or another metric of performance.

24. **Regional Economic Output/Competitiveness:** How much will the project or strategy improve the economic output and competitiveness of the region?
    a. The **most** significant improvement to the economic output and competitiveness of the region would result from projects and strategies that maintain the system for the movement of goods and associated industries throughout the region and state, as well as nationally and internationally.
    b. The **least** significant improvement to the economic output and competitiveness of the region would result from projects and strategies that do not specifically maintain or enhance the goods movement system.
        i. In general, the region will maintain its competitive economic edge due to a number of factors (e.g., access to Asian trade, role as international gateway, large manufacturing base, large population base).

25. **Cost:** What is the overall cost of the project or strategy?
    a. The **most** costly projects and strategies are those that would require large capital expenditures (e.g., right-of-way acquisition, structures) as well as those projects and strategies requiring extensive regional environmental mitigation.
    b. The **least** costly projects and strategies are those that would not require new capital expenditures.
        i. The costs for any projects and strategies will be substantial; however, the cost can be offset by improvements in the other 25 categories mentioned above.
        ii. Note that it is difficult to prepare an equitable assessment of costs between all evaluated projects and strategies. For the purposes of this evaluation, any project or strategy that would require right-of-way acquisition (e.g., along specific transport corridors, around existing facilities) was assumed to have the most cost. Although specific costs will vary between the projects and strategies, and some projects and strategies will be substantially less cost than others or could present opportunities for cost savings (e.g., using existing utility easements for new corridor alignments), all projects or strategies requiring right-of-way acquisition will have high costs.

26. **Jobs/Economic Opportunity:** How much will the project or strategy increase the number of jobs and economic opportunity associated with goods movement in the region?
    a. The **most** significant increase in the number of jobs and economic opportunity associated with goods movement in the region would result from projects and strategies that maintain the system for the movement of goods and associated industries throughout the region and state, as well as nationally, and internationally.
    b. The **least** significant increase in the number of jobs and economic opportunity associated with goods movement in the region would result from projects and strategies that do not specifically maintain or enhance the goods movement system.
        i. In general, the region will maintain its competitive economic edge due to a number of factors (e.g., access to Asian trade, role as international gateway, large manufacturing base, large population base). This will ensure an increase in jobs and economic opportunity; however, the region must ensure that appropriate training and opportunity is continually provided.

Detailed Evaluation of Goods Movement Strategies

In addition to the qualitative evaluations set forth in this chapter, a more detailed analysis was conducted for four of the 15 categories of projects and strategies: 1) construction of dedicated truck lanes/facilities with or without tolls 2) shuttle trains / alternative technologies to additional intermodal terminals, 3) construction of additional freeway lanes, HOV lanes/capacity, and 4) freeway operational/safety improvements. This analysis focused on projects and strategies that would result in changes to regional vehicle and truck travel characteristics. Also, the projects and strategies would have to be quantified and evaluated using analytical tools (such as regional travel demand models, economic models, and GIS tools). In addition, estimates of potential revenue generation from tolls and container fees were developed, and cost estimates were prepared for the construction of dedicated truck lanes. The projects described in this section have not undergone detailed environmental clearance.

Projects and strategies that could be modeled using SCAG's regional travel demand model were grouped into "bundles and summarized below:

1. Lowest investment, consisting of strategic freeway widening, bottleneck relief, auxiliary lanes, interchange improvements on freeways carrying heavy flows of truck traffic.
    a. Note that the projects included in Bundle 1 are primarily taken from SCAG's 2004 RTP and represent non-truck lane improvements not included under existing committed funding plans. For the purposes of this project, no additional non-truck lane improvements are included in this bundle. Therefore, this bundle is classified as strategic improvements, as they address already identified areas of concern.
2. I-710 (Ports to SR-60), SR-60 (I-710 to I-15), and I-15 (SR-60 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
3. I-710 (Ports to I-10), I-10 (I-710 to I-15), and I-15 (I-10 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
4. I-710 (Ports to SR-91), SR-91 (I-710 to I-15), and I-15 (SR-91 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
5. I-710 (Ports to I-10), two Westbound truck lanes I-10 (I-710 to I-15), two Eastbound truck lanes SR-60 (I-710 to I-15), two Northbound truck lanes I-15 (SR-60 to I-10), I-15 (I-10 to Victorville) dedicated truck lanes (2 lanes in each direction, unless otherwise noted) without tolls.
6. I-710 (Ports to SR-91), SR-91 (I-710 to SR-57), SR-57 (SR-91 to SR-60), SR-60 (SR-57 to I-15), and I-15 (SR-91 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
7. I-710 (Ports to SR-91), SR-91 (I-710 to I-605), I-605 (SR-91 to I-10), I-10 (I-605 to I-15), and I-15 (I-10 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
8. I-5 (I-710 to Kern County) dedicated truck lanes (2 lanes in each direction) without tolls.
9. I-5 (U.S./Mexico Border to Kern County) dedicated truck lanes (2 lanes in each direction) without tolls.
10. Mixed-flow toll expressways (2 lanes in each direction) for autos and light trucks.
11. Alternative technologies (e.g., Shuttle Trains, Maglev) to move goods between POLA/POLB and inland destinations.
12. I-15 (U.S./Mexico Border to Victorville) without tolls.

Model Results

TRAVEL MODEL- Given the congestion of the regional transportation network under Year 2030 baseline conditions, any additional capacity would improve mobility along any route or freeway segment. The application of the travel demand model is consistent with this understanding. For each of the 12 bundles, network improvements were made to the Year 2030 baseline network (representing projects included under the

committed funding plans of MCGMAP project partners, or Scenarios 1, 2, and 3) consistent with the specific bundles. The SCAG travel demand forecasting model was then used to evaluate system performance under each of the bundles. This included an iterative process of running the travel demand model vehicle assignment mode a number of times.

The truck and vehicle volumes shown in Figures 40 through 51, represent one component of future systems performance under the project bundles. For the purposes of this project, volume data is used as the primary source for comparison of bundles. The travel demand model allocates vehicle and truck volumes along routes based on available capacity and documented regional travel patterns between origins and destinations; changes in volumes are indicative of changes in congestion level and system performance. As shown in Figure 52, each bundle would result in changes to daily hours of delay for all users of the region's transportation network.

LAND USE- A strong link between proximity of schools and residences to goods movement transportation corridors, facilities and operations, and public health has been documented. Therefore, the bundles were evaluated based on (1) the number of schools and amount of residential land uses, (2) the connectivity to regional centers of goods movement activity (e.g., ports, warehouses, and distribution centers), and (3) the amount of warehouse/distribution land uses adjacent to bundle routes.

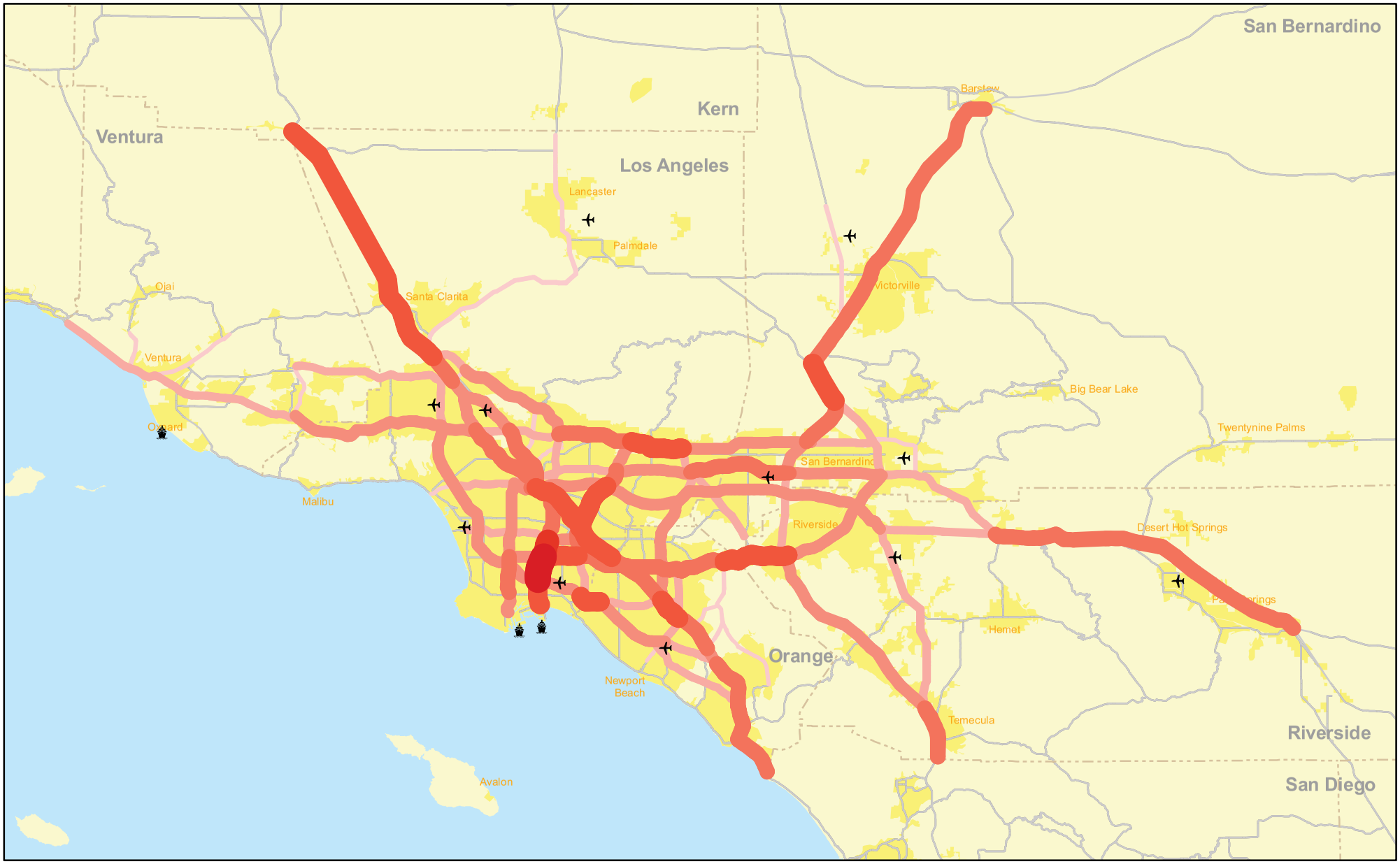
The land use analysis was performed using GIS tools based on existing land use data for the study region compiled by SCAG. The land use analysis focused on:

Proximity to schools and residential land uses-

- Number of schools within one third mile (radial) of the bundle route.
- Acreage of residential land use within one half mile (radius) of the bundle route.
    - These distances are based on recent studies showing increased risk of health effects due to residents and schools adjacent to goods movement corridors.

Connectivity to warehouse/distribution land uses.

- Acreage of warehouse/distribution land use within one mile (radial) of the bundle route.
    - For the purposes of this analysis, one mile was selected as a reasonable distance for developing direct or limited access routes to the proposed facilities.



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 1

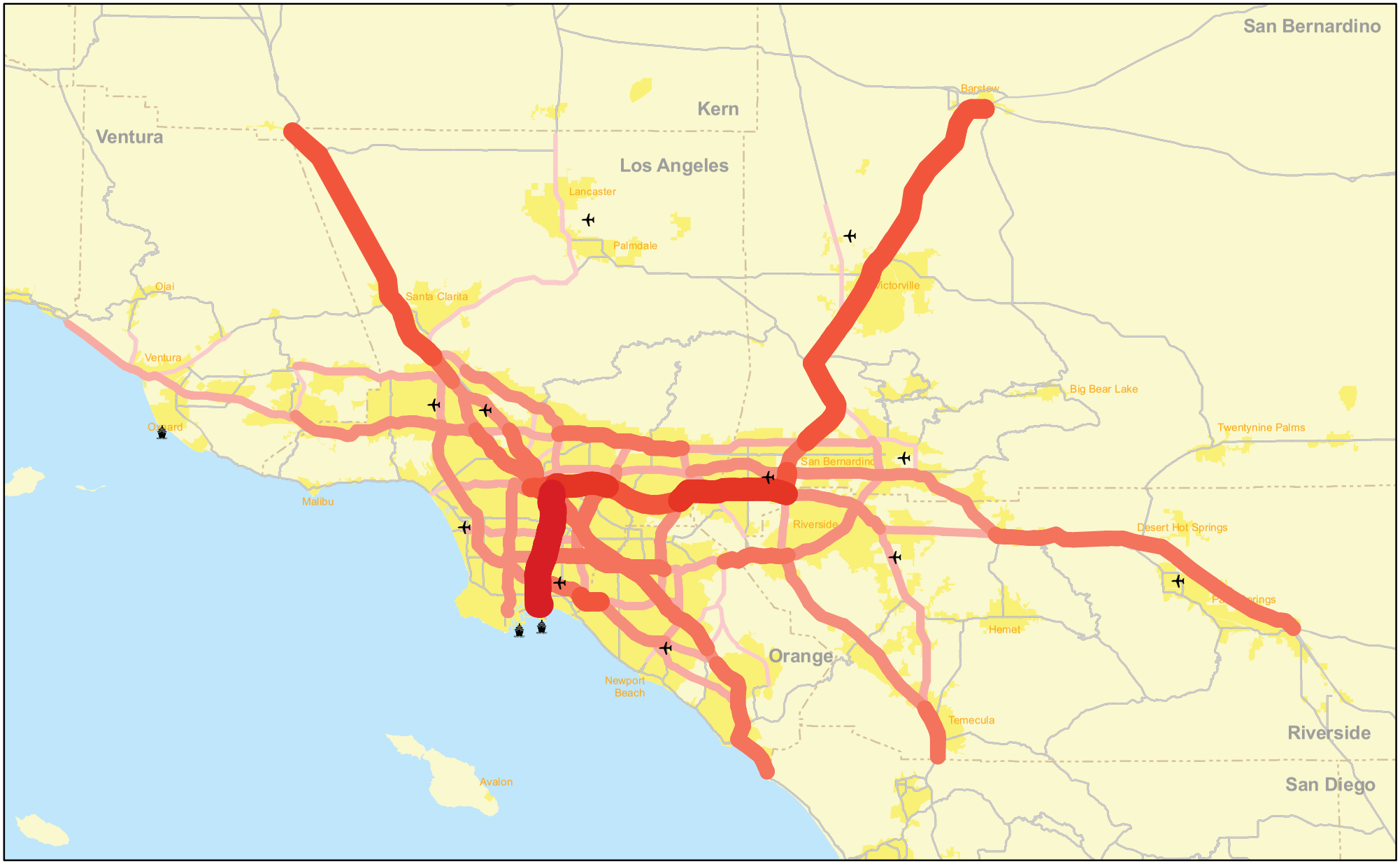
Lowest Investment/Strategic Improvements

0 5 10 20 30 40 Miles

Figure 40

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 2 Truck Lanes

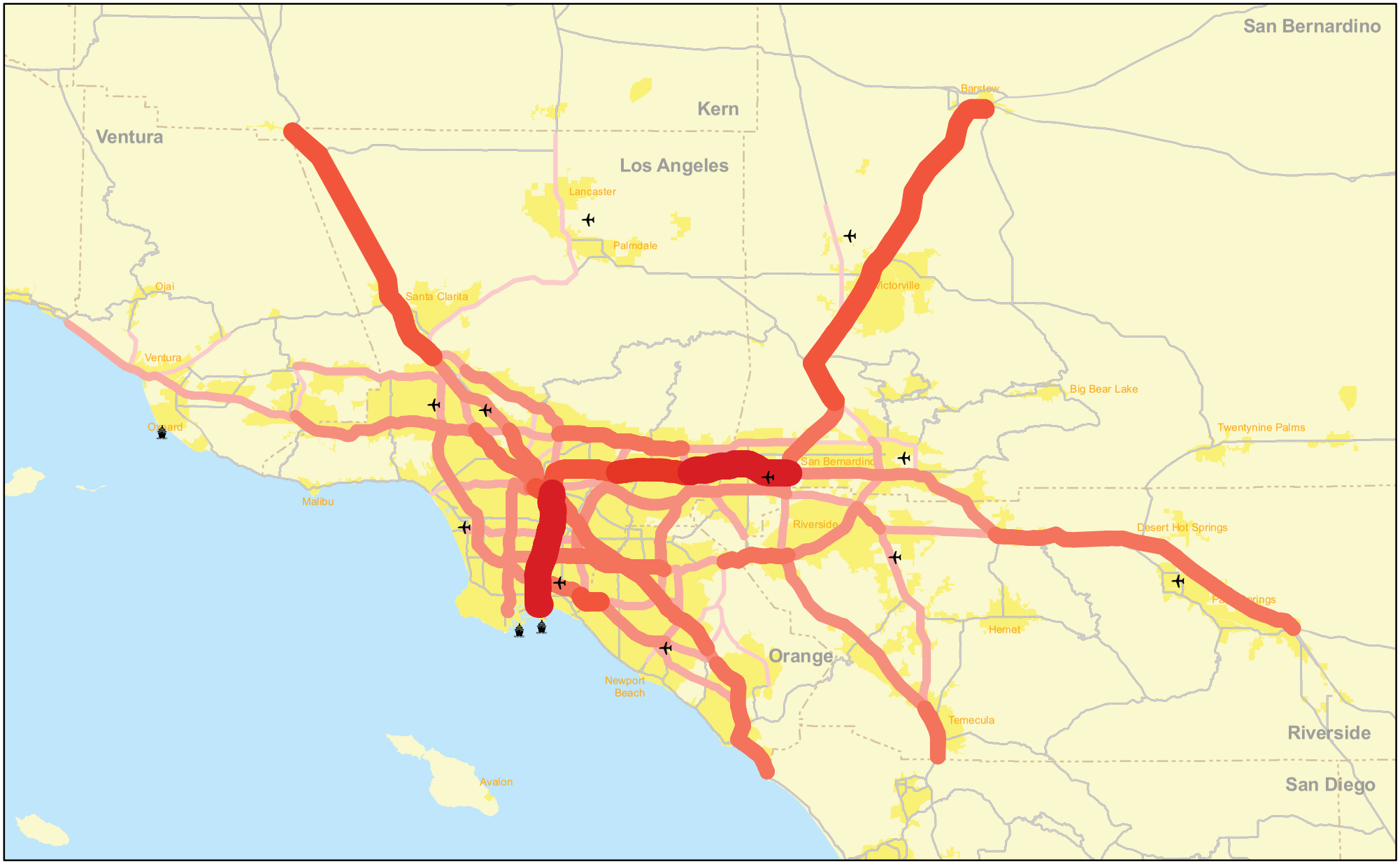
710 > 60 > 15

0 5 10 20 30 40 Miles

Figure 41

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 3 Truck Lanes

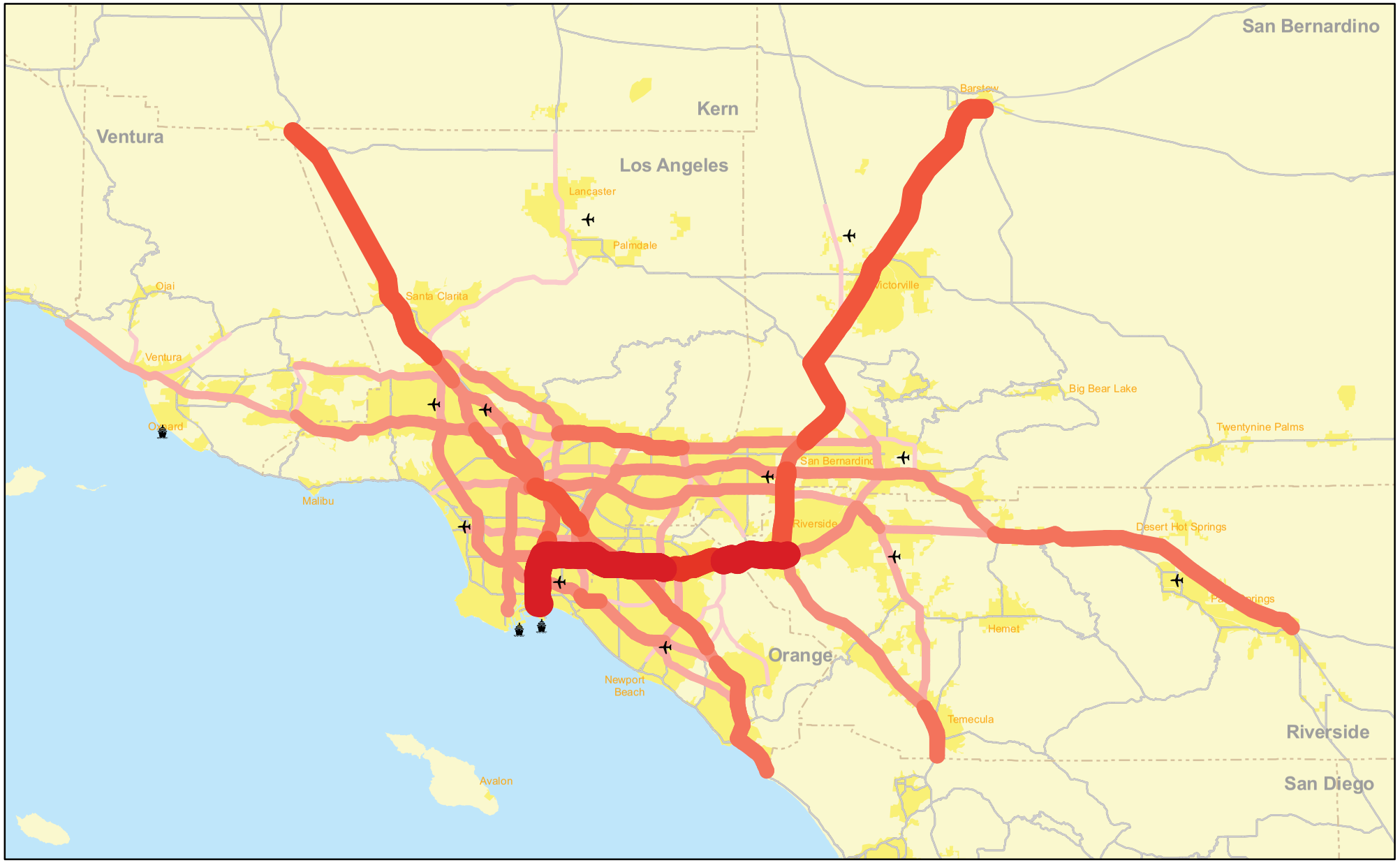
710 > 10 > 15

0 5 10 20 30 40 Miles

Figure 42

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 4 Truck Lanes

710 > 91 > 15

0 5 10 20 30 40 Miles

Figure 43

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 5 Truck Lanes

710 > 60 EB > 10 WB > 15

0 5 10 20 30 40 Miles

Figure 44

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 6 Truck Lanes

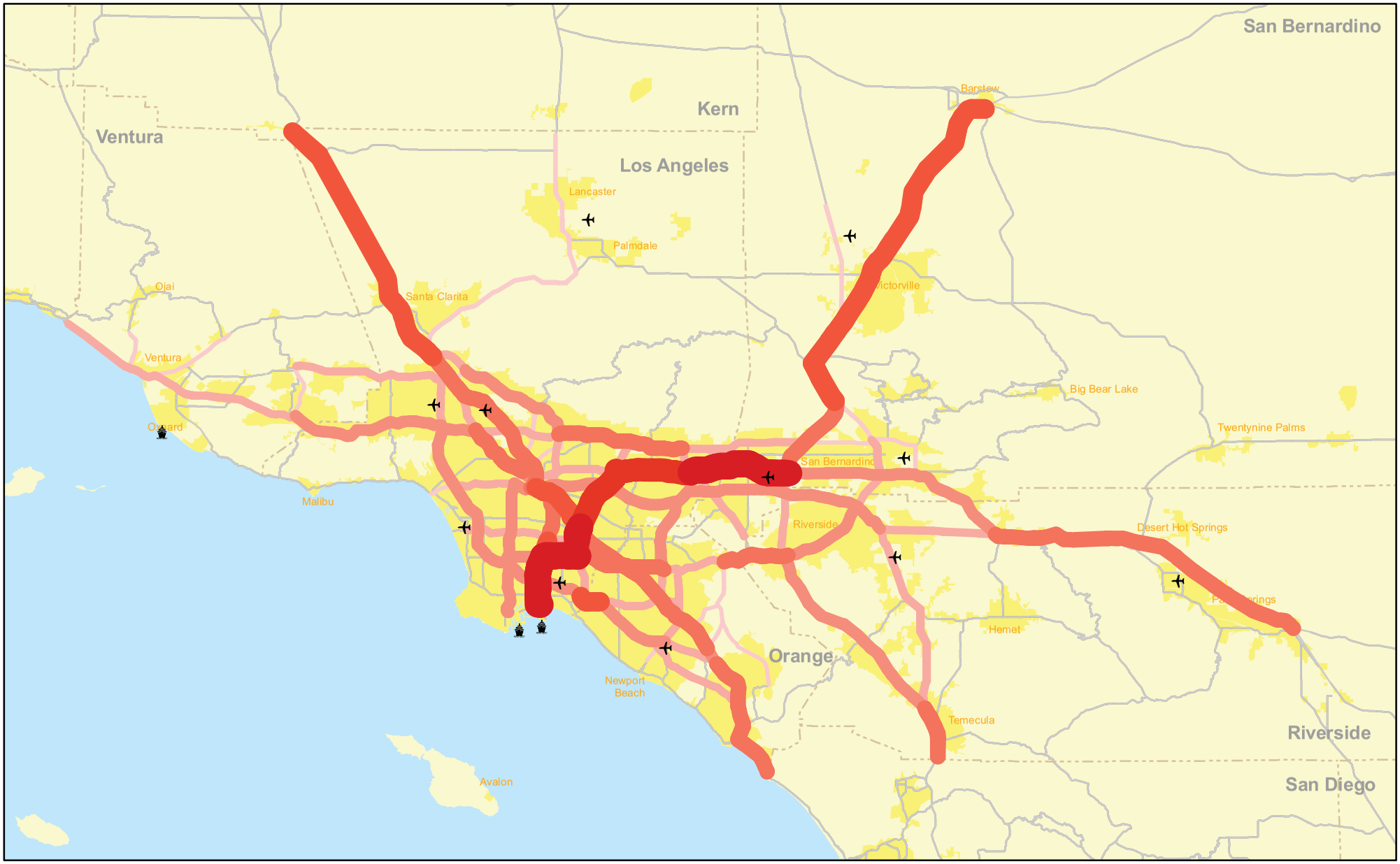
710 > 91 > 57 > 60 > 15

0 5 10 20 30 40 Miles

Figure 45

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 7 Truck Lanes

710 > 91 > 605 > 10 > 15

0 5 10 20 30 40 Miles

Figure 46

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 8 Truck Lanes

5 I-710 to Kern County

0 5 10 20 30 40 Miles

Figure 47

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 9 Truck Lanes

5 Mexico to Kern County

0 5 10 20 30 40 Miles

Figure 48

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 10 Mixed Flow Toll

710 > 60 > 15

0 5 10 20 30 40 Miles

Figure 49

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 11 Advanced Technology

Reducing Port Truck Related Volumes

0 5 10 20 30 40 Miles

Figure 50

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 12 Truck Lanes

15 Mexico to Victorville

0 5 10 20 30 40 Miles

Figure 51

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

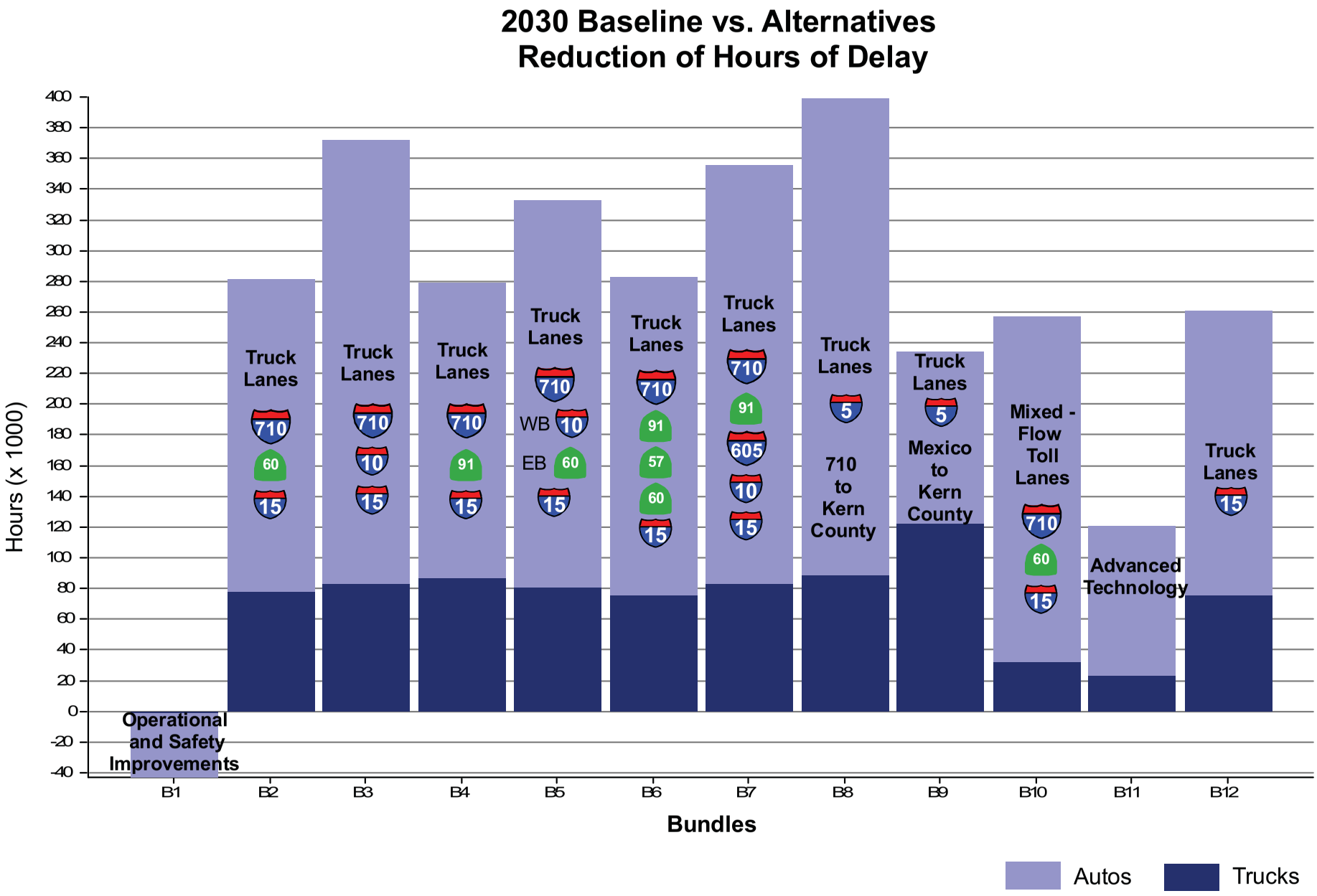

2030 Baseline vs. Alternatives
Reduction of Hours of Delay
Hours (x 1000)
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
Operational and Safety Improvements
Truck Lanes
710
60
15
Truck Lanes
710
10
15
Truck Lanes
710
91
15
Truck Lanes
710
WB 10
EB 60
15
Truck Lanes
710
91
57
60
15
Truck Lanes
710
91
605
10
15
Truck Lanes
5
710 to Kern County
Truck Lanes
5
Mexico to Kern County
Mixed - Flow Toll Lanes
710
60
15
Advanced Technology
Truck Lanes
15
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
Bundles
Autos
Trucks

Figure 52

A summary of the results of the bundle analysis is shown in Table 22. When interpreting this table the following items are worth noting again:

- All bundles were modeled using a container forecast volume of 42.5 million TEUs by 2030, due to the limitations of the analytical tools available,
- All analyses were completed on a regional scale and future detailed corridor-specific analyses and outreach to affected communities and stakeholders is required prior to project implementation,
- Future detailed analysis should quantify factors not included in this analysis such as local economic impacts (e.g., related health care costs, lost revenue or tax base), design, right-of-way (e.g., number of displaced properties, impact on commercial properties adjacent to corridors, other incompatible landuse impacts, etc.),
- The macro-level analysis of dedicated truck lane systems/freight systems, advanced technology and other bundles rendered preliminary information that warrant further investigation and study.

Table 22
MCGMAP Bundle Analysis Results

Bundle	Description	Distance (mi)	Reduction of Daily Hours of Delay (vs. 2030 Baseline)		Schools*	Residential* (Acres)	Warehouse* (Acres)
			Autos	Trucks			
1	Operational and safety improvements	N/A	-42,000	-1,000	N/A	N/A	N/A
2	I-710 to SR-60 to I-15	101.5	203,000	78,000	35	9,933	6,290
3	I-710 to I-10 to I-15	98.7	289,000	83,000	60	11,329	3,135
4	I-710 to SR-91 to I-15	87.5	192,000	87,000	48	8,684	4,716
5	I-710 to I-10 (WB) / SR-60 (EB) to I-15	100.1	252,000	81,000	77	16,702	6,767
6	I-710 to SR-91 to SR-57 to SR-60 to I-15	110	207,000	76,000	41	10,533	5,057
7	I-710 to SR-91 to I-605 to I-10 to I-15	96.1	273,000	83,000	57	11,177	2,691
8	I-5 (I-710 to Kern County)	74.6	347,000	89,000	31	4,979	579
9	I-5 (U.S./Mexico Border to Kern County)	204.6	112,000	122,000	78	12,806	3,054
10	Mixed-flow toll expressways: I-710 > SR-60 > I-15	101.5	225,000	32,000	35	9,933	6,290
11	Alternative technologies (e.g., Shuttle Trains, Maglev) between POLA/POLB and inland destinations	N/A	98,000	23,000	N/A	N/A	N/A
12	I-15 (U.S./Mexico Border to Victorville)	161.7	185,000	76,000	23	5,500	3,151

Note: Negative values indicate an increase in hours of delay.
*Data does not include San Diego County information.

Potential Revenue

TOLLING- An analysis of revenue generation potential of a truck lane system that includes an east-west connection between I-710 and I-15 under tolling scenarios was performed. The bundles containing this east-west connection between I-710 and I-15 were selected based on a clear linkage between origins (the Ports) and destinations (Inland warehousing/distribution centers). National experience with tolling systems indicate tolling operations may succeed if there are distinct origins and destinations for toll facility users, and users experience improved operations and system performance. All tolling analyses were performed external to SCAG's travel demand model, so the analysis was not able to evaluate changes in vehicle volumes and trip characteristics (e.g., the output of the tolling analysis could not be input into SCAG's travel demand model and then reevaluated under SCAG's model). As shown on Table 23, the greatest potential for revenue occurs when a toll rate of $0.20, $0.40, and $0.60 per mile is applied to light- (LHDT), medium- (MHDT), and heavy-duty trucks (HHDT), respectively.

Table 23
Potential Toll Revenue Generation Year 2030
for a Truck Lane System that Includes an East-West Connection between I-710 and I-15

Toll Rate ($LHDT / $MHDT / $HHDT)	Annual Revenue ($millions)					
	Bundle 2	Bundle 3	Bundle 4	Bundle 5	Bundle 6	Bundle 7
.10/.20/.30	199.5	197.8	177.0	199.7	177.9	185.0
.15/.30/.45	240.4	239.4	215.3	241.3	213.6	224.1
.20/.40/.60	255.0	254.3	231.1	256.5	226.5	239.4
.25/.50/.75	253.1	250.5	230.1	253.5	222.3	236.5
.30/.60/.90	245.1	242.6	223.9	242.7	213.5	225.3

An evaluation of the use of longer combination vehicles (LCV) was also conducted as a subset of the toll revenue analysis. The FHWA defines two particular types of LCV configurations: A "Triple Short" and a "Double Long" that could carry 50 percent and 100 percent more tonnage, respectively, than standard truck units. A Triple Short LCV combination consists of a tractor and three trailers in tow, typically three 28 to 28.5 foot trailers. The Double Short (also known as the Turnpike Double) consists of a truck-tractor towing two long trailers of equal length, typically two 48 or 53 foot trailers. A total of 14 states have provisions for LCV use and are included in this study: Alaska, Arizona, Colorado, Idaho, Montana, Nebraska, Nevada, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming[1]. LCVs are not permitted in California. There is also significant local opposition to the use of LCV's on local roadways in the study area[2]. This opposition creates barriers for the integration of LCVs on the state highway system, as staging areas would be required to avoid local roads if local opposition or resolutions forbade the use of LCVs on local roadways. Therefore, a potential LCV system would likely require direct dedicated access to staging areas where trucks could be converted to and from LCV configurations.

The purpose of this evaluation is to determine whether toll revenue can be enhanced through productivity gains by allowing LCVs on dedicated facilities to offset the cost of a toll. Two different methods were used to evaluate this potential market. The first approach, which is similar to the approach utilized for the *I-15 Comprehensive Corridor Study* prepared for SCAG, SANBAG and Caltrans (December, 2005), evaluates commodity-specific information to determine the potential LCV market on the premise that only specific commodities would benefit from a longer vehicle combination. The commodity-specific approach is used to identify trips of more than 100

miles to and from the study area and primarily trips defined as domestic, as well as secondary trips in and out of the region. The second approach evaluates the international container market through the ports of Long Beach and Los Angeles, and focuses specifically on the portion of trips that stay within the region, specifically first order trips between the port and staging areas.

CONTAINER FEES- The revenue generation potential of container fees was also investigated. For the purposes of this study, two scenarios for potential bonding capacity were evaluated, each based on container fees per Forty-Foot Equivalent Unit (FEU). The two scenarios evaluated were:

1. Revenue bonding capacity based on container fees levied for all container movement through the San Pedro Bay ports.
2. Bonding capacity based on container fees levied for only those containers that would travel on a separate facility using an alternative technology.

For the first scenario, three forecasts (low or 12.25 million FEUs, medium or 16.65 million FEUs, and high or 21.25 million FEUs) of container cargo through the San Pedro Bay ports were used, along with a series of container fee levels (per FEU) to calculate potential revenue bonding capacity. Container fees of $10, $20, $30, $40, $50, $100, and $200 per FEU were used.

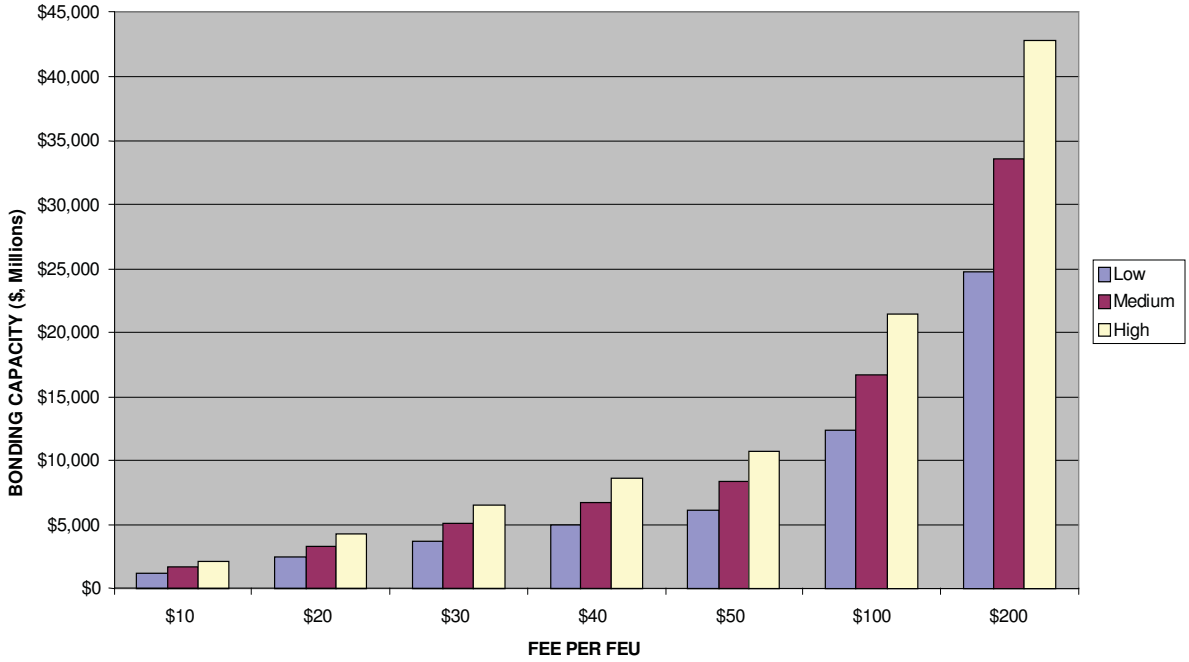
Key assumptions in the estimates of container fees and associated revenue bonding capacity were:

- A debt coverage rate of 1.4 for all projects;
- Bonds were issued at an interest rate of 5.75 percent with a 30 year repayment schedule;
- Transaction fees, debt service costs and debt service reserves were excluded (but would be included in future financial strategy development);
- The level of bond proceeds that could be issued under the truck toll projects was estimated to be roughly equal to 14 times the net revenue available for payment of debt service, with a 1.4 coverage ratio;
- In the absence of a real cost or schedule, the analysis was done in constant dollars. Any future financial strategy development would be based on refined project cost estimates and a proposed project implementation schedule and would be based on year of expenditure dollars.

Using the highest container cargo forecast (42.5 million TEUs, or 21.25 million FEUs) and the highest container fee ($200 per FEU), a bonding capacity of $42.8 billion was estimated. Using the lowest container cargo forecast (24.5 million TEUs, or 12.25 million FEUs) and the lowest container fee ($10 per FEU), a bonding capacity of $1.2 billion was estimated. Figure 53 presents a summary of potential revenue bonding levels and container fees.

Figure 53
POTENTIAL BONDING CAPACITY FROM CONTAINER FEES
RANGE OF CONTAINER (FEU) FEE: $10 - $200 PER FEU
2030 PROJECTION OF TOTAL FEU'S TRAVELING THROUGH PORTS OF LOS ANGELES AND LONG BEACH: LOW, MEDIUM, AND HIGH

(in Millions)

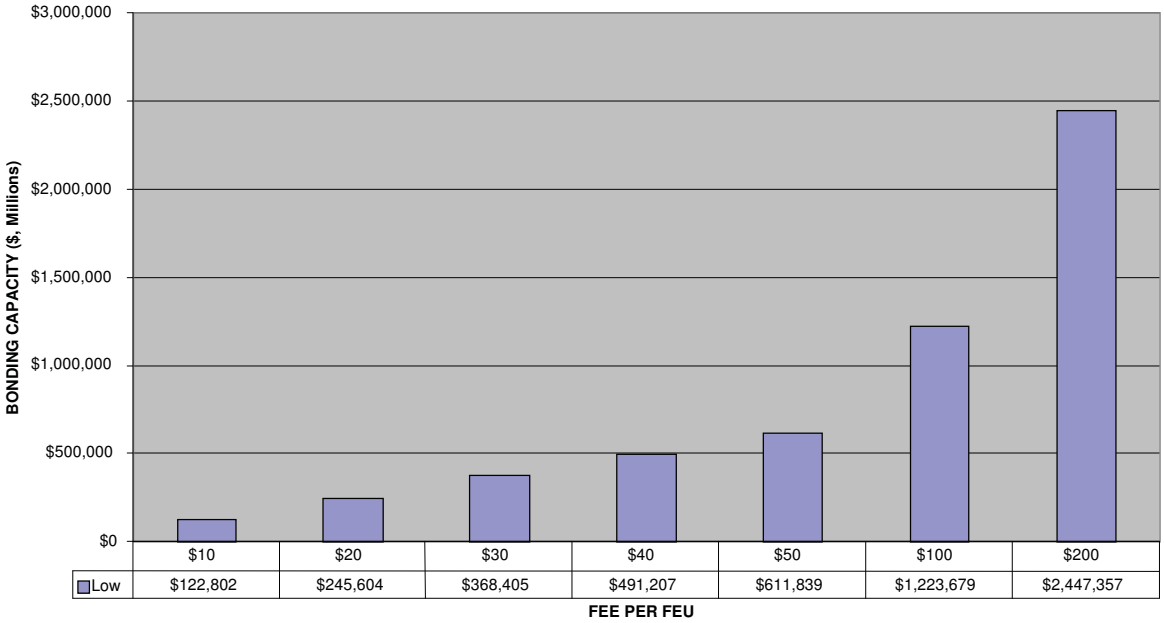


Source: Sharon Greene Associates, 2007

For the second scenario, an alternative technology system connecting the San Pedro Bay ports and an inland staging yard, as described under the modeling of Bundle 11, was used to calculate potential bonding capacity. It was assumed that the alternative technology system would accommodate approximately 1,215,000 FEUs per year (equivalent to the existing Hobart yard). Container fees of $10, $20, $30, $40, $50, $100, and $200 per FEU were used. The analysis showed a potential bonding capacity between $122 million and $2.45 billion, depending on the container fee. Figure 54 presents a summary of bonding capacities and container fees.

Figure 54

POTENTIAL BONDING CAPACITY FROM CONTAINER FEES
RANGE OF FEE PER FEU: $10 - $200 PER FEU
PROJECTED FEU'S USING ALTERNATIVE TECHNOLOGY SYSTEM: 1,215,000
($, 000)



	$10	$20	$30	$40	$50	$100	$200
Low	$122,802	$245,604	$368,405	$491,207	$611,839	$1,223,679	$2,447,357

Source: Sharon Greene Associates, 2007

Note that the current fee program proposed by the San Pedro Bay Ports of Los Angeles and Long Beach involves a "pay-as-you-go" program without the need for borrowing. The advantage of this approach is two-fold. First, the project owner/sponsor can avoid substantial borrowing costs such as interest and other financing fees. Second, the term of the fee is reduced, reducing the burden on the project owner/sponsor and on the fee contributors. This approach is especially possible in this specific port area because of the high volumes of container traffic.

Truck Toll Revenue Conclusions

Based on the evaluation of potential revenue generation by truck lane bundles, the following conclusions are made:

- The **greatest toll revenue generation potential** (in terms of truck tolls) would result from a truck lane system that includes both SR-60 (in the eastbound direction) and I-10 (in the westbound direction) as an east-west connection between I-710 and I-15 (approximately $257 million annual toll revenue) allowing for a potential bonding capacity of approximately $3.5 billion; truck lane systems that include SR-60 or I-10 as an east-west connection between I-710 and I-15 provide nearly an equal amount of revenue generating potential (approximately $255 million annual toll revenue) allowing for a potential bonding capacity of approximately $3.5 billion.
- The use of LCVs on dedicated facilities could increase annual revenue generation to $308 million, allowing for a potential bonding capacity of more than $4 billion. Moreover, allowing standard trucks to use the LCV facility will further increase revenues to as much as $500 million annually. (Note that the modeling

methodology used to calculate LCV toll revenue potential did not allow for an accurate analysis of additional revenue potential from non-LCVs using the dedicated facilities.) Developing the LCV facilities from the port to as far as Victorville will maximize its revenue potential by optimally targeting three market segments:

- The long haul LCV market.
- The port container LCV market.
- The remaining standard truck market willing to pay tolls.

Container Fee Conclusions

- Container fees levied on all containers through the San Pedro Bay Ports could allow for a bonding capacity between $1.2 billion and $42.8 billion, depending on the volume of containers and the amount of fee.
- An alternative technology system could impose container fees for those containers using the facility and generate between $122 million and $2.45 billion, depending on the amount of fee.

Truck Lane Cost Estimates

The cost of truck lane systems is required to determine if it could be offset by user financing, and to determine the additional revenues or funding sources that would be needed to support dedicated truck lanes. The cost estimates presented in this chapter were prepared on a macro-level and are for comparison only. Detailed engineering cost estimates of specific facilities could show great variation, particularly in terms of right-of-way acquisition costs between urban and suburban/rural areas. In addition, utility relocation costs or other location-specific costs (e.g., environmental or cultural resource impacts) could substantially impact facility costs.

Based on previous studies, a per lane mile cost for new facility construction is estimated to be between $6.43 million and $32.44 million, as summarized below. The following costs assume new construction, preliminary studies and right-of-way acquisition:

- An evaluation of current planned truck lane projects (excluding preliminary cost estimates for truck lanes on I-710), shows an average cost of $6.43 million per lane-mile.
- An evaluation of all project costs (including truck lanes and mainline additions) shows an average cost of $32.44 million per lane-mile.
- Based on the cost data presented in the Briefing Paper - User-Supported Regional Truckways in Southern California (SCAG, 2004), an average cost of $28.45 million per lane mile was calculated for the regional truck lane system evaluated along I-710, SR-60, and I-15 (from the San Pedro Bay Ports to Barstow).
- It is assumed that given current right-of-way acquisition costs in the urban areas of Southern California, costs of $40 million to $50 million per lane-mile of a new facility would not be unreasonable; therefore, a cost of $45 million per lane-mile is taken as a “theoretical maximum” for truck lane construction.

Based on the cost estimates for truck lane systems, the following conclusions are made:

- The **least costly** truck lane system - I-5 extending from I-710 (near downtown Los Angeles) to the Kern County line.
- The **most costly** truck lane system- I-5 extending from the U.S./Mexico Border to the Kern County line.
    - For the routes extending from the San Pedro Bay Ports to Victorville, the **least costly** would be a truck lane system that includes SR-91 as an east-west connection between I-710 and I-15.
    - For the routes extending from the San Pedro Bay Ports to Victorville, the **most costly** would be a truck lane system that includes SR-91, SR-57, and SR-60 as east-west connections between I-710 and I-15.

Results of Detailed Evaluation

The results of the detailed evaluations will help indicate whether dedicated freight facilities/truck lanes would make a viable transportation option for the study area. Given that there has been strong opposition to plans for implementing dedicated truck lanes, it is recommended that there be a more detailed assessment of the corridors, community and economic impacts, project costs, right-of-way costs and other environmental impacts. Also, it is recommended that alternate non-highway corridors, utility easements, etc., be examined, in addition to the use of clean advanced technologies to transport goods (all of which are presented in the recommended actions in Chapter 7). As such, the following questions and answers are offered to provide more insight on a very controversial topic, as opposed to drawing conclusions on final route selections, cost effectiveness, etc.

- To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? Would it be a cost-effective investment?
    - In terms of economic benefits, it is clear that additional investment in the transportation system beyond current levels will be required in order to accommodate the forecast growth in container cargo volumes through the San Pedro Bay Ports; otherwise, the system will be constrained and will perform at less than optimal levels. The forecast growth in container cargo will result in increased truck traffic on the MCGMAP Region's highway system. Therefore, not accommodating the additional truck traffic could lead to less than expected growth in container cargo, which could lead to the reduced job creation forecasts discussed above and a related economic impact; conversely, accommodating truck traffic will lead to economic benefits.
    - Truck lanes offer sufficient benefits to be a preferable alternative (in terms of system performance) to operational and safety improvements (including mixed-flow lanes).
    - More detailed information and analyses would be required in order to accurately respond to the question, particularly in the area of air quality improvements and associated costs.
        - Therefore, dedicated truck lanes could offer sufficient economic and efficiency (system performance) benefits, however, subject to demonstration of cost-effectiveness and financial feasibility.

- What portion of dedicated truck lane costs could be offset by user financing, and what additional revenues or funding sources would be needed to support dedicated truck lanes?
    - The response assumes the recommendation of a truck lane system comprised of dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to SR-60), SR-60 (I-710 to I-15), and I-15 (SR-60 to Victorville).
        - Approximately 33 percent to 58 percent of the project cost could be offset by user financing. Container fees could serve as an additional revenue source.

- What policy changes would facilitate or enhance truck lane feasibility? (e.g., LCVs, mandatory use, etc.)?
    - LCV provisions would increase revenue generation potential and would enhance truck lane feasibility; however, a number of concerns regarding safety, legality, etc. would need to be addressed:
        - California does not allow LCVs on its highways.
        - There is local community resistance to the use of LCVs.
        - A separate truck highway facility will need to be constructed with requisite staging areas to allow trucks to build and breakdown the configurations in order to comply with standards on the general purpose system.

        - The port container LCV market will need further innovation to improve the operations of standard container chassis to operate safely as LCV's.

- Can dedicated truck lanes offer sufficient benefits to be a preferable alternative to other ways of accommodating increased freight traffic (such as adding mixed-flow lanes, adding rail capacity, etc.)?
    - Operational and safety improvements (including mixed-flow lanes) would not affect a change in truck travel patterns or volumes.
    - Operational and safety improvements (including mixed-flow lanes) tend to accommodate demand rather than induce increased volumes.
    - Approximately 48 percent of containerized goods move through the region on trucks. Even if rail freight is maximized, a large portion of regional goods will move by truck. Therefore, a means to accommodate truck freight is required.
        - Truck lanes offer sufficient benefits to be a preferable alternative to accommodating increased freight traffic (when focusing on the market segment of freight that travels on the regions roadways), as they would affect the most substantial change on truck travel patterns and volumes on the roadways within the MCGMAP region.
    - An advanced technology corridor could be a viable alternative if land use guidelines and policies are strengthened to encourage warehouse clustering near inland staging areas. (It would also be preferred in terms of minimal environmental impacts.)

- What may be the differential effects of the construction of truck lanes on different freeway segments (i.e. the specific types of benefits and impacts that may occur on different freeway segments, depending on facility location)?
    - The truck lane concepts that include an east-west connection between I-710 and I-15 are the most varied in terms of potential affects on different freeway segments.
    - When examined in terms of some preliminary specific factors (truck volumes, vehicle volumes, changes to congested hours of delay, proximity to schools and residential land uses, and connectivity to warehouse/distribution land uses), a dedicated truck lane system that included SR -60 as an east-west connection between I-710 and I-15 would :
        - Carry the highest truck volumes.
        - Carry very high vehicle volumes
        - Affect the least number of schools
        - Affect the least number of residential land acres
        - Provide the most connectivity to warehouse/distribution land uses.
    - However, no conclusions or recommendations can be drawn regarding a specific route until further analysis that comprehensively evaluates all appropriate factors is conducted.

Note that the analyses and results described in this section were carried out at a regional level. Additional detailed technical analyses at a corridor-level will be required under any formal environmental clearance processes. Therefore, ultimate route selections will depend on subsequent detailed analyses.

Chapter 7 – Recommended Action Plan

The purpose of this chapter is to present the recommended actions developed following the completion of the multi-county goods movement outreach efforts and the project tasks described in Chapter 1 (and summarized in Chapters 2 through 6). The actions presented in this chapter are based on the premise that simultaneous and continuous investment and improvement in the region's infrastructure and the environment are needed to support the region's goods movement system and economic base. Further, it is intended that the actions and strategies contained is this MCGMAP establish a framework for more in-depth analysis of goods movement infrastructure improvements and mitigation measures throughout the study region.

The following sections in this chapter contain information about the simultaneous and continuous plan premise, a market segmentation approach to improving goods movement, recommended action sets and potential barriers to implementing the plan, environmental strategies that support the plan and the potential future goods movement systems map and proposed improvements, potential fund sources, and the next steps. The Next Steps section is followed by Appendices A, B, C and D. Appendix A contains the financial framework for the plan. Appendix B contains information about other agencies efforts underway. In addition, Appendix B contains tables, charts, and short, mid and long term detailed actions and preliminary regional and county specific infrastructure improvements and mitigation measures that support the Action Plan. Appendix C contains a compendium of stakeholder comments on the final Draft Action Plan. Appendix D contains a list of goods movement infrastructure improvements that were recommended for funding under the Trade Corridor Improvement Fund (TCIF) Program. Lastly, this Action Plan concludes with county goods movement action plan chapters for Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura Counties.

Simultaneous and Continuous Implementation

As stated previously, the movement of goods generates significant economic gains for the region as well as disproportionate impacts on many local communities, the environment, and key transportation corridors. The underlying premise of the MCGMAP, similar to that of the State of California's Goods Movement Plan (the "State's GMAP"), suggests that simultaneous and continuous improvement of the region's goods movement system and the environment is necessary. This MCGMAP premise was adopted after extensive outreach indicated that environmental impacts must be mitigated, and macro–level analyses revealed the existing goods movement system is near capacity and that further strain on the system will likely result in more adverse impacts on the environment and local communities. Moreover, some affected communities have stated that mitigation of existing environmental and community impacts should occur prior to making any further investments in the infrastructure, yet funding for mitigation is not readily available. Also, infrastructure improvements cannot be done without investing in the system to maintain gateways that are used to serve markets throughout the nation, state, and region and to preserve jobs and other economic gains associated with the logistics industry.

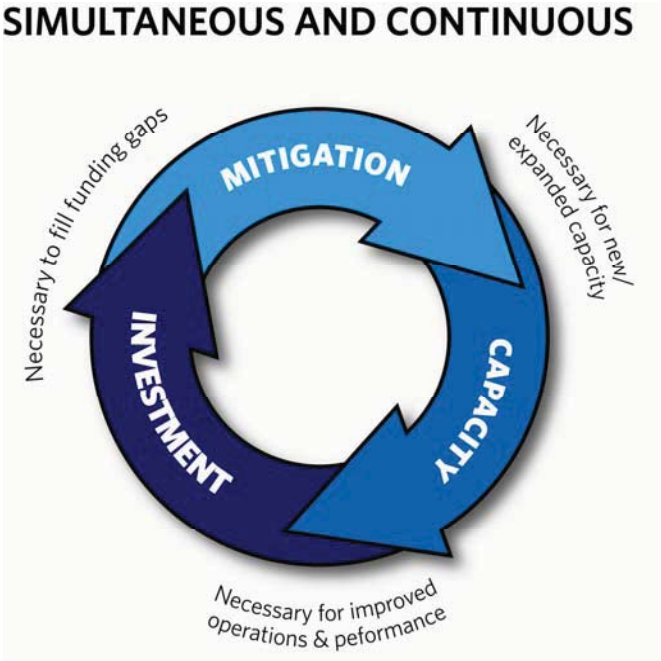
Unfortunately, local impacts cannot be attributed to one single source, which makes it particularly difficult to assign the responsibility to mitigate impacts to those that benefit from goods movement utilizing the regions system. Furthermore, the combined overall effect of the goods movement system and its various components (e.g., modes of transport, distribution facilities, transloading facilities) cause an impact on the region's environment and community that cannot be directly attributed to a single source which also makes it difficult to assign responsibility to mitigate impacts.

Lastly, the actions identified in this plan are consistent with the approach presented in the State's Goods Movement Action Plan (January of 2007) which cites the following: "Right now there are significant challenges requiring action. California's own anticipated population increase, let alone its geographic position as a gateway to the Pacific Rim, are inevitable drivers of goods movement growth. The expansion of trade in California is not a matter of choice. Ignoring this reality is irresponsible. What is responsible is meeting this growing need for infrastructure investment in a manner that addresses critical system improvements and public health and environmental mitigation in a simultaneous and continuous manner."[1] The project description and associated costs contained in this Action Plan are consistent with the State of California's statement that "the total cost of a goods movement related infrastructure project should include the cost of required project-specific mitigation and the combined cost should be funded as the cost of the project".

Figure 55 highlights the cyclical nature of the premise of simultaneous and continuous improvement premise that is summarized and described below in terms of mitigation measures, capacity enhancements, and investments:

1. Mitigation (or reduction/avoidance) of impacts on the environmental and community is necessary to continue to obtain local support for new or expanded capacity of the goods movement system. This includes both project specific (e.g., soundwalls or wetlands mitigation) and broader regional (e.g., air and water quality, public health) mitigation measures.
2. New or expanded capacity infrastructure improvements are needed to maintain Southern California's premier goods movement system of highways and railways as well as the economic vitality of the region. Operational improvements and capacity enhancements that optimize system performance may provide the leverage needed to negotiate shared-funding agreements with the private sector and/or justify additional state and federal funding for the region.
3. Investments from public and private sector fund sources are needed to help pay for mitigation measures and the proposed improvements that are recommended in this Action Plan. The private sector may be more willing to contribute funding if discrete operational and/or performance improvements can be identified.

Figure 55



Market-Segmented Implementation Approach

The study area's goods movement system is a complex multimodal system that contains elements or market segments that can be targeted for specific improvements and/or fair share funding opportunities. By segmenting the goods movement market (defined as the modal-market, or mode of transport), improvements necessary to enhance the movement of goods for specific markets can result in improved operations and system performance that may generate interest on the part of the private sector to contribute funds for these improvements.

Modal Market Segments

As referenced in Chapter 3, the study region consists of six broad modal segments, as illustrated in the diagram in Figure 56. Each modal market segment presents strategic opportunities for applying specific actions set forth in this chapter. Intermodal rail shipments depicted on the bottom portion of Figure 56 are loaded directly on-dock at the ports without involving trucks on local and regional highways. This mode of transport is indicative of long distance container movements to other parts of the U.S. In contrast, local and regional distribution and delivery shipments, shown on the upper portions of Figure 56, are transported exclusively by trucks on local and regional highways, arterials, and roads. This mode of transport is indicative of how domestic cargo and some local and regional international cargo shipments are typically handled. The market segments in between, on Figure 56, represent cargo that is moved using multiple modes that require staging activities and multiple trips on regional highways before reaching their final destination, which is typically outside of the MCGMAP Region. The following can be concluded from Figure 56:

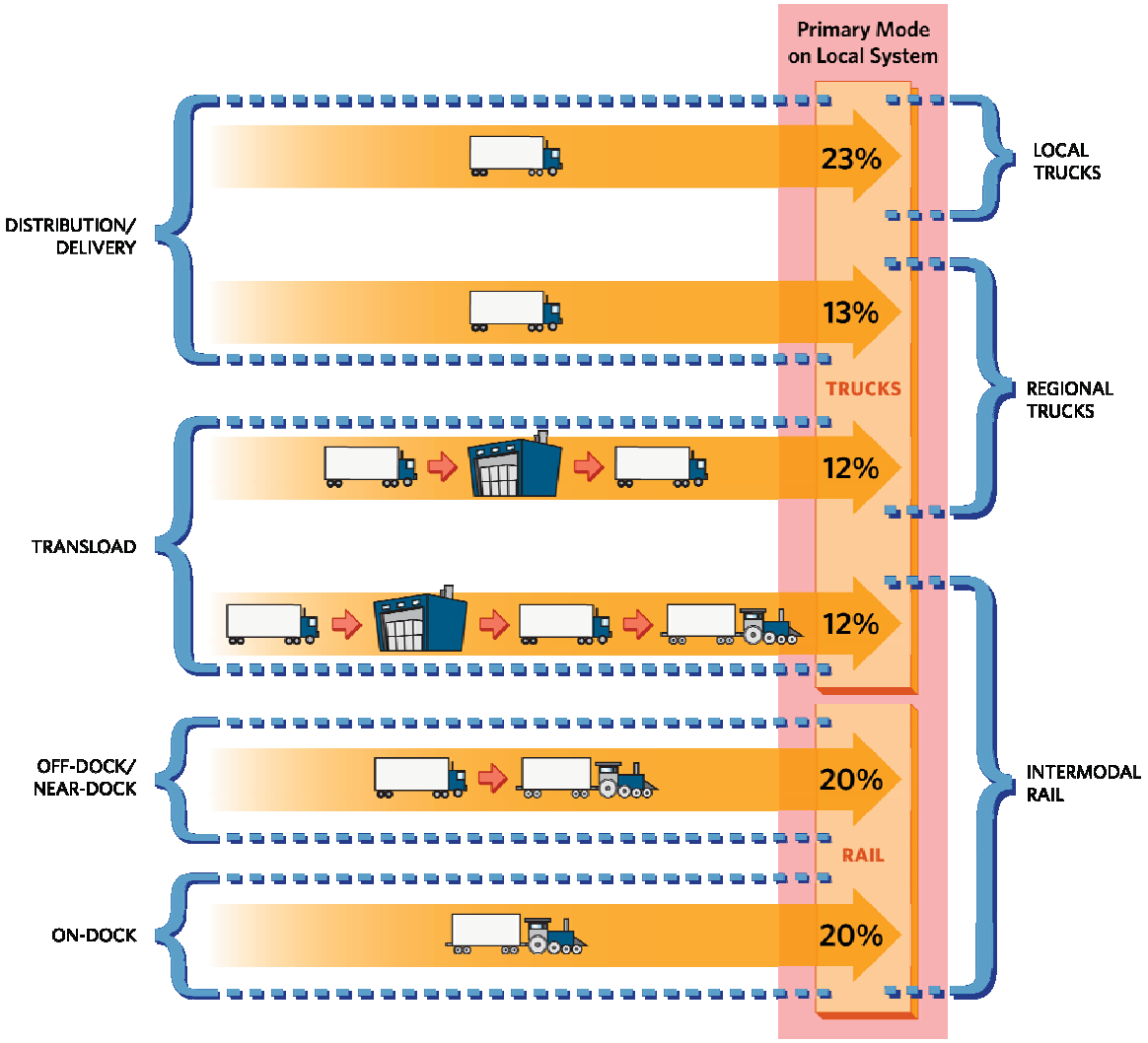
Direct Shipment from on-dock and off-dock/near dock - Approximately **40 percent of containers** passing through the Ports of Los Angeles and Long Beach leave the region by train utilizing either on-dock rail at marine terminals or off-dock/near-dock rail intermodal facilities. These goods, destined for areas outside the MCGMAP region, include the central and eastern parts of the U.S. As a result, funding sources for goods movement can be better targeted since the direct benefits to shippers and the nation can be clearly shown. This includes additional state and federal goods movement funding, as well as container fees levied on shippers who receive direct benefits from improved efficiency of the goods movement system.

Transload - Approximately **37 percent of containers** passing through the Ports of Los Angeles and Long Beach are either trucked directly out of the region or leave the region by truck after an intermediate stop at a warehouse or distribution center. These goods may arrive at the ports in a single container that is transported to an inland distribution center by truck, and broken down into smaller units at a warehouse or distribution center, and then loaded onto either a truck or a train to be moved to their final destinations. Such goods use more specific routes through the MCGMAP region and provide better opportunities for targeting of specific routes, users, or impacts relative to local distribution/delivery. This includes truck replacement/retrofit programs, the development of separated corridors that move between clustered warehouse and distribution centers, and concepts such as inland ports and virtual container yards (yard operations to reduce the number of unproductive container truck trips). Since the routes and/or destinations of some of the carriers within this market segment can be clearly identified, specific improvements and associated funding sources can be targeted.

Distribution/Delivery – Approximately **23 percent of containers** passing through the Ports of Los Angeles and Long Beach stay within the Southern California region. Because the origins and destinations for these goods are as dispersed as the people and communities that rely on them, the trucks transporting these goods use various roadways and routes for travel and blend into all other vehicular traffic within the region. Domestic goods that are moved locally, such as local delivery trucks, construction, manufacturing, and service/utility trucks exhibit similar travel patterns. Because the users and shippers of this modal market are so widely varied, it is difficult to target individual users for funding without ignoring other users. Traditional funding sources for roadway improvements and alternative funding approaches for roadway tolling or congestion pricing will be needed to address this market segment.

However, it is important to note the role of the domestic market. While the region is a major gateway for international container movements, the local and domestic component is dominant and the most intrusive to local residents. The region is the third largest manufacturing center in the United States and is home to almost 20 million residents, all of which results in a high level of demand for local and domestically generated goods movement. The domestic goods movement market segment presents fewer strategic opportunities given its broad and diverse user base that is spread throughout the region. Moreover, the domestic goods movement market utilizes a more dispersed transportation network, compared to the international container market segment which utilizes a more defined transportation network. It is for that reason the international container market presents the greatest strategic opportunity for developing actions that target specific users and beneficiaries of the region's system. Additional data will be required to target specific domestic carriers/users.

Figure 56
International Container Movement Market Segments



* All percentages estimated based on 2005 figures.

Strategic Approach for Improving Goods Movement & Reducing Truck Trips

Trucks and the associated impacts of trucks on the highway system contribute to congestion, diminished air quality due to diesel emissions, and incompatible land uses. These impacts are at the forefront of the goods movement discussions. As referenced earlier, with the exception of on-dock intermodal rail shipments, every other international container shipment involves at least one truck movement. Therefore, the following is proposed to help reduce truck trips:

- Maximize on-dock rail capacity as well as mainline rail capacity for the international container cargo market.
- Develop inland staging areas (inland ports) with a dedicated and separated facility connecting the staging areas to the ports (truck only lanes, rail, maglev or other shuttle technologies), utilizing clean fuel and efficient vehicles (LNG trucks, maglev, LNG locomotives) for international and regional transload container cargo markets. Also, establish land use provisions and strategies that facilitate clustering warehouse activities around inland staging areas that are remote from residential and sensitive land uses.

Implementing the proposals described above would affect approximately 75 percent of all truck movements related to the international container market. As the international container market consists of a known quantity of players (shippers) and users, it offers the greatest opportunity to target improvements on the system to obtain better performance thereby creating the potential to leverage additional funding.

Strategic Approach for Mitigating, Reducing, or Avoiding Environmental and Community Impacts

Various modal market segments present opportunities to implement environmental mitigation measures in a simultaneous and continuous manner as described below:

- Maximizing on-dock rail capacity results in fewer emissions from local truck trips between the ports and off-dock and near-dock intermodal facilities.
- Developing near-dock intermodal facilities which effectively reduce emissions by reducing the amount of vehicle miles for trucks traveling to more distant off-dock facilities. Near-dock yards create their own set of environmental impacts by increasing truck trips in and around communities located near the ports, requiring a different set of environmental mitigation strategies.
- Developing separate facilities (low-emission high-tech solutions) to accommodate truck movements associated with transload activities provides opportunities for reducing emissions by utilizing cleaner and more efficient vehicles, as well as reducing congestion on the general purpose highway facilities. However, these separate facilities require their own set of specific mitigating strategies.

By segmenting modal markets in the goods movement supply chain through the study region, the improvements to the goods movement system can be targeted to specific modal markets and the associated environmental and community mitigation measures can be identified by the corresponding modal markets.

Strategic Approach for Investment

The discussions in the previous sections show how a strategic approach for improving goods movement can be applied to mitigating the impact on the environment and community, from a modal-market perspective. In order to achieve the premise of simultaneous and continuous improvement, additional investment and funding is required. This element can also be identified through an evaluation of the modal markets. For example:

- The maximization of on-dock and near-dock rail is specific to the international container cargo market; therefore, the private sector involved in that market (shippers, terminal operators, railroads) offers a potential source for financing the required projects.
- Market segmentation also improves the region's chances for competing for state and federal resources, by allowing projects and mitigation measures to be specifically targeted to the international modal market that uses the region's goods movement system to serve out-of-state jurisdictions.

By linking the projects to improve goods movement and the required environmental and community mitigation measures, the strategic approach allows for a clear assignment of responsibility and operational improvement by modal market. This allows for specific modal markets to be isolated in order to contribute their fair share. Further, actions described in the following section target the region's modal market segments. While the region has a broad range of goods movement market segments (e.g., domestic manufacturing, agriculture, and construction), international containers passing through the region's ports and border crossings are the most visible and present the greatest opportunity to achieve desired results (e.g., reduction in truck trips, potential fair share funding sources) when specific actions are applied.

Proposed Goods Movement Action Plan & Recommended Action Sets

The Action Plan is structured around four sets of actions that are related to a component or segment of the goods movement modal market in the study area as described in Figure 56 This approach allows for a more targeted and equitable means of transferring some of the economic and environmental costs associated with goods movement to users and/or consumer markets that are outside of the study area and/or have benefited from the region's extensive goods movement infrastructure (e.g. network of highways and railways and warehouses and distribution centers).

The action sets listed below support the premise of simultaneous and continuous improvement that has been adopted by the project partners. Within these broad action sets are more specific recommendations which outline the steps necessary to assure a balanced approach to resolving goods movement issues.

- Action Set 1 – Accelerate Regional Environmental Mitigation
- Action Set 2 – Relieve Congestion and Improve Mobility
- Action Set 3 – Improve Operational Efficiency
- Action Set 4 – Develop Equitable Public/Private Funding Strategy

Table 24 describes the action sets in relation to specific modal markets and contains examples of the specific actions that target each modal market. This table is followed by a detailed description of the four action sets. Appendix B, Table 8, contains a list of agency roles and responsibilities sorted by action. Also, a broader list of detailed actions (or tasks) and implementation schedules sorted by action sets and can be found in Appendix B, Table 9.

Table 24
Example Actions Targeted by Market Segment

FREIGHT MODAL MARKET SEGMENTS	ACTION 1 -Accelerate Regional Environmental Mitigation	ACTION 2 - Relieve Congestion and Increase Mobility	ACTION 3 - Improve Operational Efficiency	ACTION 4 – Develop Equitable Public/ Private Funding Strategy
Freight moves destined outside of Southern California (~52%) - No Stops within Region –" Intermodal Rail"				
Freight loaded onto trains at the dock (~20%) Freight transported to near dock facility then onto a train (~20%) Freight transported directly out of the region by truck (~12%)	• Accelerate emission reduction measures in CAAP, AQMD, and state plans • Use clean technology shuttle to intermodal facilities • Use low emission train engines or electrification • Construct grade separations in ACE corridor	• Construct rail mainline capacity improvements • Construct Colton Crossing • Use clean technology shuttle to intermodal facilities	• Increase on-dock loading • Expand hours of port operation (PierPass) and intermodal terminals operation	• Railroad (private) funding and public funding proportional to benefit • User fees (e.g., container fees) • Increase federal participation
Freight moves destined outside of Southern California (~25%) – With at Least One Stop within Region – "Regional Trucks"				
Freight trucked to a warehouse, an intermodal facility and then loaded onto a train (12%) Freight trucked to warehouse, then trucked to a final destination outside of the region (13%)	• Accelerate emission reduction measures in CAAP, AQMD, and state plans • Use clean technology shuttle to inland ports • Use low emission train engines or electrification • Coordinate community impact mitigation and land use planning • Adopt incentive programs for turnover of truck fleet to clean technology	• Construct highway capacity improvements • Study feasibility of dedicated freight guideway(s) • Use clean technology shuttle to inland ports	• Adopt flexible hours of operation (warehouse/ distribution centers) • Study feasibility of virtual container yards • Expand use and integration of Intelligent Transportation Systems for highways and vehicles	• Railroad funding (private) and public funding proportional to benefit • Traditional highway funding • Possible truck tolling on dedicated facilities • Container fees • Increase federal and state participation • Conditions of approval and development fees for community mitigation
Local freight moves within Southern California (~23%) – Multiple Stops within Region – "Local Trucks"				
Freight trucked to numerous locations within the region	• Accelerate emission reduction measures in CAAP, AQMD, and state plans • Continue project-specific impact analysis and mitigation measures	• Construct highway capacity improvements • Study dedicated freight guideway(s) on freeways and roadways	• Adopt flexible hours of operation (delivery) • Expand use and integration of Intelligent Transportation Systems for highways and vehicles • Alleviate physical factors and conditions that may constrain operations of trucks(i.e., lane widths, vertical and horizontal constraints and curvature, shoulders, pavement)	• Traditional highway funding • Possible truck tolling on dedicated facilities • Conditions of approval and development fees for community mitigation

Action Set 1 - Accelerate Environmental Mitigation

Goods movement imposes significant costs on community livability and the environment. Therefore, the MCGMAP partners consider air quality improvements and regional environmental mitigation an intrinsic part of a regional goods movement system.

The Action Plan recognizes that a regional approach is necessary, with the focus on cleaning up emissions at the source (i.e., the powertrains of ships, locomotives, trucks, and harbor equipment) not one based simply on project-by-project mitigation. The simultaneous and continuous implementation of environmental mitigation strategies is a leading imperative for this Action Plan and will require action at two levels: (1) region-wide approaches and (2) project-specific mitigation measures.

Region-wide Approaches

A systems approach is required to reduce the air quality, community and environmental impacts of goods movement flowing into and through the region. This approach has three components – acceleration of the funding and implementation of air quality plans already prepared, strengthening of fuel and engine standards, and institutional policies.

- **Acceleration of funding and implementation of air quality plans** - Some of the nation's most aggressive clean air improvement plans are now in place in Southern California: the San Pedro Bay Ports Clean Air Action Plan (CAAP), the 2007 South Coast Air Quality Management Plan (AQMP), and the California Air Resources Board (CARB) Emission Reduction Plan. The MCGMAP supports these plans and proposes to accelerate the implementation of the strategies in those plans. Accelerating the environmental cleanup from goods movement sources is one of the principle themes of the environmental actions in the MCGMAP.
- **Strengthening of fuel and engine standards** - Regulations that promote the use of clean fuels and engine standards/technologies should be strengthened beyond those currently proposed. This will need to be supported by accelerated research and development of cleaner technologies by private industry, and by implementation assistance from state and federal regulatory agencies. These actions by private industry and regulatory agencies will allow regional and local strategies and incentive programs in the CAAP and AQMD to have greater effect.
- **Institutional policies** – Cooperative and coordinated institutional and development policies enacted by local jurisdictions and the development industry could result in environmental and community benefits. Such policies could include: 1) Designating quiet zones for rail corridors; 2) Amending zoning and land use regulations to better avoid non-compatible land uses (separating goods movement activities from residential areas; buffering); and 3) Establishing mitigation banking and/or development of pooled funds for mitigation (i.e., land use changes, purchasing green space along freight corridors, diesel truck retrofits, funds for health clinics, etc.). The partner agencies have embarked on a collaborative effort with community stakeholders and the private sector to develop such guidelines, as will be explained later.

Project Specific Mitigation Measures

While the proposed broader regional strategies will result in significant reductions in emissions for the study area as a whole, project specific mitigation measures are often most effective at the local level, resulting in more tangible benefits for local neighborhoods and communities. Therefore, the Action Plan supports the use of project-specific revenue mechanisms to help fund mitigation efforts. Examples include:

- Use of best available technology and best practices for project construction and operational impacts.
- Compliance with natural resource statutes (e.g., federal and state Endangered Species Acts and Clean Water Acts, Migratory Bird Treaty Act).
- Inclusion of "smart" design and good planning principles, such as landscaped buffering, noise barriers, exterior light shielding and positioning, separation of incompatible land uses, and wetlands protection.

SPECIFIC ACTIONS

- Develop guidelines for local jurisdictions to use in siting and designing goods movement related land uses and transportation facilities (Consultant activity is underway).
- Encourage federal participation in developing guidelines and international agreements that regulate vessels (and other stationary sources of diesel emissions) used for transporting goods to and through U.S. ports.
- Support clean lease arrangements made by the ports for reducing ship emissions.
- Initiate a follow-on effort to identify more aggressive goods movement initiatives to achieve regional air quality attainment, including the identification of sources of funding to accelerate the environmental cleanup.

CHALLENGES

- Maintaining dialogue and coordinated planning efforts between MCGMAP project partners, stakeholders, state, and federal agencies to identify impacts and mitigation measures, specifically for broader mitigation measures that involve multiple agencies and jurisdictions.
- Ensuring the public and private sectors, stakeholders and environmental experts are involved in the project planning process from the outset.
- Funding constraints.

Action Set 2 - Relieve Congestion and Improve Mobility

Region-wide congestion relief and increased mobility cannot be achieved without significant investment in infrastructure, coupled with improvements in efficiency and productivity. Utilizing the market segmentation approach, various crucial capital improvements were identified for each of the modes involved in the movement of goods.

Increased Intermodal and Mainline Rail Capacity

Increases in mainline rail capacity and on-dock rail improvements at the ports are critical to the efficient transport of intermodal freight bound for destinations outside the region. The Action Plan recommends implementation of rail improvements in accordance with the San Pedro Bay Ports Master Plans as well as triple tracking the BNSF mainline from Los Angeles to San Bernardino and double tracking the two Union

Pacific corridors. These improvements must be done in concert with the grade separations and safety improvements outlined in the multi-county Alameda Corridor East Trade Corridor program. Implementing the mainline rail capacity enhancements together with the grade separation of railroad crossings can maximize efficiency and cost-effectiveness while also providing an opportunity to maximize funding from federal and state sources and accelerate the delivery of the needed improvements. Grade separation of the rail-to-rail Colton crossing as well as other rail-roadway grade separations near the Port of Hueneme, the Port of San Diego and at other key Los Angeles County locations are also critical.

Improved Highways/Roadways

For the purposes of segregating the region's diverse highway and roadway system needs, the Plan recommends three tiers of highway/roadway actions. The first tier includes major improvements on roadways and bridges in close proximity to the ports/border crossings and other major freight activity centers (examples include the Gerald Desmond Bridge replacement project, the SR-47 Expressway, I-110 connectors, High Desert Corridor, SR-78 Brawley Bypass, and the San Diego Border Corridors). Tier two is comprised of corridor-level investigation of alternative technologies, separated mass flow applications (i.e., the I-710 Corridor Improvements) as well as dedicated freight guideways/truck lanes with the use of clean engine trucks and/or clean Long Combination Vehicles (LCVs), if such vehicles could be authorized to operate on dedicated facilities in California safely with minimal impacts on surrounding communities. Further consideration of LCVs will require a detailed analysis of potential capital and operational impacts. This tier focuses on new technologies as well as new application of methods not widely used in California. Consequently, these projects will require additional detailed analysis before they can proceed. Tier three projects encompass capital and operational improvements that in addition to assisting with the efficient movement of goods, are also beneficial to mixed flow traffic. Such improvements include modification of key freeway to freeway interchanges to alleviate operational and geometric bottlenecks, addition of auxiliary lanes, shoulder improvements and other safety and operational improvements on roadways heavily used by trucks.

SPECIFIC ACTIONS:

- Complete the Alameda Corridor East (ACE) Trade Corridor railroad grade crossing improvement program in Los Angeles, Orange, Riverside, and San Bernardino Counties.
- Continue with analysis and planning of I-710 dedicated freight guideway facility.
- Further investigate the feasibility of inland port and concentrate inland warehouse and distribution locations.
- Increase border trade capacity and efficiency.
- Implement key highway projects listed as regional and county-specific found in Tables 5 and 6 in the Executive Summary (with expanded descriptions in Tables 5 and 6 found in Appendix B).
- Participate with the railroads in eliminating key bottlenecks and increasing capacity along the mainline rail system as outlined in the Los Angeles-Inland Empire Railroad Mainline Advanced Planning Study.
- Develop the appropriate institutional arrangements and negotiating framework to provide simultaneous and continuous improvement to mainline track improvements, the Colton Crossing grade separation, highway-rail grade separations, locomotive emission reductions, and other rail corridor related mitigations.
- Initiate a Regionally Significant Transportation Investment Study (RSTIS) to evaluate the feasibility of implementing a Dedicated Freight Guideway System/Regional Truck Lanes (I-710 from Port of Long Beach to SR-60; East-West Corridor between the I-710 and to I-15; and I-15 to Victorville) inclusive of potential non-freeway implementation.

CHALLENGES

- Funding constraints.
- Overcoming perceptions that improving mobility and reducing congestion will result in increased environmental and community impacts.
- Maintaining and adhering to the simultaneous and continuous premise.

Action Set 3 - Improve Operational Efficiency

Any comprehensive strategy to address mobility, improve predictability, and enhance safety needs to address system and corridor capacity. This includes improvements to the operational efficiency of the region's goods movement system. The operational efficiency of various segments of the goods movement system can be improved based on specific modal market segments.

Improve Marine Terminal Productivity, Truck Turn Times, and Intermodal Operations

In order to meet the future demand, the Ports of Los Angeles and Long Beach will increase their operational productivity from the existing level of 4,700 TEUs per acre per year to almost 11,000 TEUs per acre per year. The current focus is on increasing on-dock rail use and extending hours of operation to off-peak time periods (PierPass). Additional strategies include the transport of unsorted containers from the ports to inland railyards separated from residential areas for the creation of destination trains, as well as introducing new technologies such as optical character recognition (OCR) and radio frequency identification tags (RFID), and the evaluation of the feasibility of a virtual container yard to reduce the number of unproductive empty container truck trips.

Improve Highway Operations

Increased implementation of Intelligent Transportation Systems (ITS), weigh-in-motion (WIM) systems, highway pricing such as Open Road Tolling (ORT) collection systems, improved incident management, and enforcement of driver and operating restrictions can improve highway operations. ITS solutions allow for truck routing, traffic control during construction or maintenance, as well as the shifting of truck movement to off-peak times. WIM bypass systems are an effective means of traffic management in the proximity of weigh stations. The system helps maintain normal traffic flow and prevents traffic backup onto the mainline freeway resulting from commercial vehicles entering and exiting weigh stations. Open Road Tolling allows users to travel at highway speeds on the mainline while their tolls are collected electronically overhead, reducing congestion and travel times for passenger and commercial vehicles. California has established a statewide standard for use at all toll roads and bridges utilizing the "FasTrak" device.

SPECIFIC ACTIONS

- Implement efficiency improvements contained in the San Pedro Bay Ports Master Plans that reduce impacts from trucks and containers on the transportation system and community.
- Improve terminal productivity, truck turn times, and inter-modal operations.
- Implement the highway operational improvements (listed in Table 6 in the Executive Summary and Table 6 in Appendix B).
- Develop partnerships between public and private entities to research and develop advances in goods movement transportation technologies.

CHALLENGES

- Barriers within various segments of the goods movement industry.
- Competition for physical space, labor and other institutional barriers and practices make it difficult to streamline operations.
- Exploring the use of new and clean advanced transportation technologies for long-term solutions.
- Tracking goods through the supply chain using real time data.

Action Set 4 - Develop Equitable Public/Private Funding Strategy

Funding and implementation of the recommended actions, projects, and programs and their associated mitigations will require a coordinated effort by the private sector and public sector at all levels of government. It is critical that all beneficiaries of goods movement participate in funding infrastructure improvements as well as environmental mitigation. Beyond its value to the regional economy, the existing border crossings and commercial trade with Mexico are also critical to the regional and bi-national economies. Cross-border goods have origins and destinations to California/regional retail markets and manufacturers to shipping beyond California through the San Pedro Bay Ports and the Inland Empire Rail/Intermodal distribution centers.

To illustrate the shortfall in public funding, the Alameda Corridor-East Trade Corridor, which would provide much needed grade-separation projects to reduce congestion and emissions throughout the region, has an 83 percent funding shortfall ($3.8 billion out of the $4.4 billion total).

Maximize the Study Area's Fair Share of State and Federal Funds

Federal assistance is essential to compensate for the disproportionate local and regional costs for the goods movement services provided to the rest of the nation. The next national transportation funding reauthorization legislation must recognize the importance of funding a national goods movement system, establish appropriate levels of federal funding support, and provide further opportunity for flexibility in the use of federal funds. The four freight-related programs of key relevance are 1) Projects of National and Regional Significance, 2) National Corridor Infrastructure Improvement Program, 3) Freight Intermodal Distribution Pilot Program, and 4) Truck Parking Facilities Program. Though state and federal funds are needed, any funding for private infrastructure to increase capacity and facilitate the throughput of goods must ensure that public dollars are used in return for public benefits, not merely for benefits to the private logistics system. The development of public-private benefit assessments among the private beneficiaries and public agencies is one method to address this issue.

Private Sector Contribution

Recognizing funding shortfalls for infrastructure projects and the fact that private industry benefits from an improved goods movement system, the MCGMAP recommends efforts to secure private revenue sources including user fees. This could be done through pending legislative efforts or by other means such as ongoing efforts by the San Pedro Bay ports to negotiate cargo fees for infrastructure and environmental mitigation projects. The types of user fees that should be considered include congestion pricing, port-assessed cargo or container fees, industry-supported programs similar to PierPass, and VMT-based taxes or gas taxes for trucks. The Action Plan addresses the need to convert the value of improvements to the study area's goods movement system into revenue for improving infrastructure and mitigating impacts.

Federal and state funds require local/private matching funds, thus private sector contributions will add strength to applications for leveraging federal and state funds.

Stakeholders in San Diego and Baja California, Mexico are investigating the potential for use of public funds together with private financing and toll fees for a new border crossing, highways, and federal inspection staffing at Otay Mesa East, California / Mesa de Otay II, Baja California. Similar pursuits for new border crossings or expansions are also projected along the Imperial County, California / Mexicali, Baja California border.

SPECIFIC ACTIONS

- Maximize Southern California's fair share of state and federal funds through ongoing and coordinated legislative efforts.
- Provide input to legislation focused on user fees and to any ongoing efforts to negotiate user fees with industry that can be included in a specific plan of finance for goods movement and air quality improvements.
- Pursue public-private funding arrangements for specific facilities, where appropriate.
- Implement the Cooperation Agreement among regional, state, and federal agencies to facilitate the actions contained in the MCGMAP.
- Develop structure for managing user fees and revenue.

CHALLENGES

- Overcoming institutional barriers to user fee program and reaching consensus on whether a fee structure is appropriate, the type of fee structure, and who should pay.
- Reaching consensus on projects with known benefits to the private sector as an incentive to introduce fees with a "sunset".
- Establishing firewalls to assure funds will be used only on designated projects.

Preliminary Regional and County Specific Goods Movement Projects

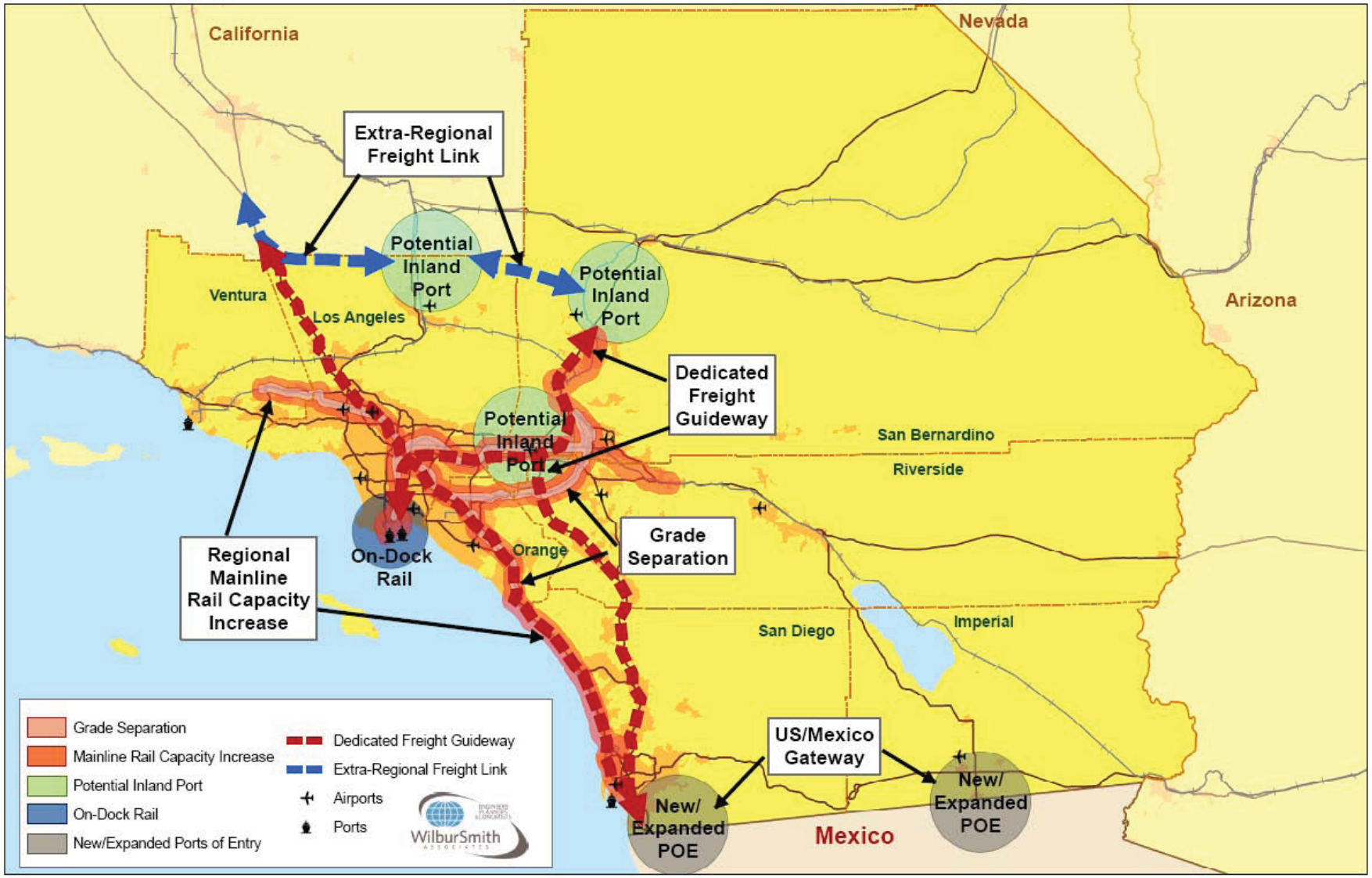
The partner agencies identified preliminary regional and county-specific projects and strategies that support the vision for the region and the actions set forth in this plan. Many of the infrastructure projects contained in Tables 5 and 6 in the Executive Summary (with expanded descriptions on Tables 5 and 6 in Appendix B) can be implemented in the short-term while others require additional planning and project development. While the projects on both lists are considered essential, neither list should be viewed as taking precedence over the other but rather as complementary efforts that address the effects of goods movement throughout the region. Also, given the multi-county nature of this study, the majority of the regional and county goods movement projects and strategies will require coordination among the multiple counties, jurisdictions, and stakeholders before full implementation.

Based on the two project lists, an investment of more $50 billion over the next 25 years is necessary to accommodate the projected growth of freight within the region and to mitigate related impacts. This will require funding commitments from all levels of government as well as the private sector. Further, Appendix D contains a list of goods movement infrastructure projects, totaling more than $2 billion for the study area, that were recommended for funding by the California Transportation Commission under the state Trade Corridor Improvement Fund Program (TCIF). The projects recommended for TCIF funding are a subset of the regional and county-specific project lists.

The "Preliminary Regional Goods Movement Projects/Strategies" contained in Table 5 of Appendix B represent a short-term to long-term vision for improving the system that is primarily focused on region-wide projects that provide environmental mitigation and/or ground access (e.g., rail, highway, and intermodal) improvements to and from international gateways, ports of entry, multi-county goods movement distribution centers and corridors (existing and proposed) throughout the study region. This system is graphically depicted and further described in the "Potential Future System" map in Figure 57.

The "Preliminary County-Specific Goods Movement System Projects/Strategies" contained in Table 6 of Appendix B include improvements that are located within a single county that connect to a regional goods movement system of corridors and distribution centers, that are part of the statewide goods movement system that has been identified by Caltrans. Table 9 also comprises a list of improvements that (1) support the regional projects in Table 8, (2) mitigate environmental and/or community impacts in a shorter horizon, (3) correct short-term system deficiencies, and (4) are recommended in advance or in conjunction with the regional projects based on local needs and project readiness. The county-specific list of improvements will fill in the gaps in the existing goods movement network.

In addition, both Tables contain improvements and mitigation measures that help the region move closer to the vision depicted in the potential future goods movement system map (Figure 57). The strategy for implementing the projects and strategies referenced in Tables 8 and 9 in the short, medium, and long- term are described in the next sections. Lastly, Table 7 of Appendix B contains a comprehensive list of the universe of goods movement project which is in various planning stages throughout the study region. This list includes the regional and county specific projects included on Tables 5 and 6 of Appendix B. In addition, the county action plan chapters contain additional projects and strategies that address local needs.



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Wilbur Smith Associates

Figure 57
Potential Future System

Timeframe for Improvements

In the short term (2008-2015), strategies must rely upon the completion of existing infrastructure projects with secure funding streams aimed at eliminating transportation bottlenecks (e.g., Gerald Desmond Bridge replacement; the ports' on-dock rail developments; BNSF's proposed near-dock yard and Victorville intermodal yard; truck lanes through Cajon and San Gorgonio Passes; Ontario International Airport's air cargo cross dock). The use of pricing to reallocate activity can also be used (e.g., PierPass' OffPeak program; LAX fees encouraging dedicated air cargo carriers to use inland airports; waiving port dockage fees for reduced ship speeds or use of low sulfur fuel). State or federal policies aimed at speeding the construction process (e.g., design-build) or encouraging private sector infrastructure funding (e.g., new market tax credits) can be useful. So can the increased availability of bond funding (e.g., Proposition 1B) and the development of public-private projects (e.g., San Diego County's I-15 HOT lanes). Public-private funding sources (e.g., port-assessed cargo fees and/or gate fees; additional bonds) should be in place to fund specific infrastructure and environmental projects. Legislative mandates (e.g., speeding adoption of Tier III engines), proposed port agreements (e.g., cold ironing, truck replacement and retrofit), and subsidies (e.g., ARB's Carl Moyer Program) also have roles to play. In this period, institutional arrangements and negotiations for longer term public-private funding sources for specific projects can take place, plus the beginning of the approval processes and engineering to ready them for construction. Local and regional planners should be able to set aside specific areas for concentrations of goods handling activities with buffers from population centers.

In the medium term (2015-2025), efforts will still largely be constrained to known technologies. In this time frame, legislatively mandated infrastructure project time frames (e.g., CEQA, NEPA) will have had the time to be met for projects proposed during the short term (e.g., expand mainline track; Colton Crossing; Alameda Corridor-East; dedicated freight guideways; improved airport access). Medium term deadlines for environmental mandates will have to be met. To the extent the state subsidizes the purchase of new equipment to meet these mandates, pricing preferences should be given to local producers (e.g., clean trucks, yard or mainline railroad engines). State tax policy should be used to encourage firms that are developing and producing equipment to meet existing and future environmental mandates (e.g., electric warehouse tools; "green goat" yard engines). Given the advances in technology, workforce training efforts will likely be needed to ensure a trained labor force for both the logistics and infrastructure construction sectors.

In the long term (2025-2035), strategies should be able to rely upon mature public-private funding and operation of infrastructure systems. The legal structure should be available for tapping private investment in projects and accelerating project time frames. Some major infrastructure projects will be completed while others will be ready for construction. Congestion pricing would be available to regulate goods movement along these dedicated public-private corridors. Research and negotiations should be making progress on ways to move goods from the ports to warehouses by methods other than using trucks (e.g., inland rail ports, short haul rail, and possibly maglev trains). Cleaner vehicles should be available for the truck, rail, and aircraft fleet. Governmental purchasing and tax policy should retain its preference for state based producers of equipment and development of technologies to further the expansion and greening of the goods movement system. Workforce training efforts should continue to evolve and commensurate with the technical needs of firms active in the sector.

Environmental Mitigation Strategies

Without the appropriate environmental and community mitigation measures the future system that is envisioned for the region is not likely to occur. This section identifies a set of good or "best" practices and action steps for mitigating the impacts of goods movement. In addition to identifying known practices that have positive results, new approaches (described in Technical Memorandum 7) are encouraged that include early involvement with the private sector to coordinate mitigation banking efforts, establish land use buffers, and use research grants to identify new technologies that will help address local and broader impacts.

While specific costs or budgets for implementation of mitigation measures (e.g., cost-benefit analyses, environmental assessments) were not a part of the project scope, a detailed discussion of the costs associated with specific environmental and community impact mitigation can be found within the recent study conducted by the Southern California Association of Governments (SCAG) entitled Analysis of Goods Movement Emission Reduction Strategies. In addition, the Clean Air Action Plan (CAAP) provides a number of measures to mitigate environmental and community impacts in and around the San Pedro Bay Ports of Los Angeles and Long Beach.

Types of Mitigation

In general, the current mechanisms for identifying, avoiding, reducing and mitigating environmental impacts should be improved and expanded. Most environmental impacts are identified and mitigated on a project specific basis pursuant to state and federal regulations. In some instances this is viewed by stakeholders as applying a "band aid" approach to solving the problem without adequately addressing broader regional concerns and local concern. Regional agencies and authorities try to develop plans and identify appropriate mitigation or avoidance measures; yet these measures are typically linked to projects or specific sectors. Therefore, mitigation measures for goods movement should focus on two issues- (1) Project Specific and (2) Broader Regional.

Project Specific

For project specific mitigation, the California Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA) regulations require identification of mitigation strategies as part of the project analysis. The project lead agency (for example, Caltrans for a highway project, ACE for the Alameda Corridor, the port of Los Angeles for a port project, etc.) is required to identify mitigation measures as part of the environmental document (EA, EIR, EIS, etc.) If these lead agencies don't identify mitigation measures that are deemed appropriate by a myriad of responsible agencies, trustee agencies, and other public agencies that have jurisdiction by law with respect to the project (reviewing agencies), then the lead agencies will not get the needed permits to do the project and risk potential lawsuits. Once a lead agency adopts/certifies the environmental document and mitigation measures are identified, the agency must also (under CEQA) adopt a Mitigation Monitoring & Report Program, which sometimes involves different agencies for monitoring and enforcement. These agencies are required to fulfill their duty and implement those measures at their own cost as part of the project development process.

Fulfilling the CEQA and NEPA processes is legally binding. The public can pursue legal recourse if the processes are not adhered to correctly. CEQA and NEPA are public disclosure tools. Each time a project is considered, CEQA and NEPA regulation requires disclosure to the public. For EIRs/EISs, public scoping meetings are required, sponsored by the lead agency. Public circulation/comments periods are prescribed per CEQA and NEPA requirements.

In some cases (such as the I-710 / Major Corridor Study Tier 2 Advisory Committee) stakeholder and community members are brought together to identify solutions to address environmental, community, and health impacts with the lead agency and design team. This type of process can be folded into the CEQA/NEPA process to identify project specific mitigation measures. It can also serve as a successful framework for addressing the broader cumulative concerns of a community or region. Also, in some instances, a project does not require any mitigation if there are no significant impacts.

Broader Regional Issues

Under the Clean Air Act, regional planning officials must consider both public mobility and air quality in their transportation improvement plans. The United States Environmental Protection Agency has established National Ambient Air Quality Standards (NAAQS) for specific pollutants (ozone and its precursors, carbon monoxide, and particulate matter). Regions that do not meet the NAAQS are considered "nonattainment" and have developed plans known as the State Implementation Plan (or the "SIP") to work towards reaching attainment. While there have been some improvements made in improving air quality in the region, over the past 30 years, the study area is in nonattainment for ozone and particulate matter as described in Chapter 5. The emission reduction strategies for regional goods movement that is listed in Table 25 helps to achieve the emissions budgets in the SIP.

The project partners and others have also worked toward developing new approaches to solving the environmental challenges facing the region. During the development of the Action Plan, the project partners convened Environmental Working Group meetings that consisted of agency staff with environmental expertise to share information and to help identify the project partners' role in developing environmental and community impact mitigation measures beyond project-specific mitigation. This type of coordination will be crucial to move broad regional approaches forward**.**

Also, the Southern California National Freight Gateway Cooperation Agreement Strategy (SCNFG) was established to broaden the collective efforts of the project partners to address goods movement issues. This effort involves bringing a group of principal conveners from local, state, and federal agencies together to develop preliminary scoping for topics that include[2]:

- Streamlining processes and approaches for the coordination of environmental reviews and, more specifically, the addressing of cumulative and systemic environmental and community impacts and effects (e.g., those related to environmental justice) under NEPA and CEQA.
- Funding principles and alternatives (including fees and tolls; and, possible institution(s) to hold, disburse and monitor combined funds).

Implementing and Funding Mitigation

Mitigation and avoidance measures are often tied to available funding. Discrete projects with discrete mitigation or avoidance measures have the highest likelihood of funding (both from a public and private sector perspective). Therefore, in the development and identification of broader strategies to mitigate regional or cumulative impacts, it will be critical to identify a nexus between projects or market segments and specific impacts. It will also be critical to bring all affected groups (stakeholders, community members, public agencies, private industry) together early in the process.

Mitigation Strategies

Numerous mitigation strategies are available to reduce the effects of goods movement on the community and the environment. Goods movement emissions, primarily mobile source, are a significant source of pollution in the study area. The effects are especially egregious due to the potential direct health impacts resulting from pollutants. The goods movement industry is heavily dependent upon diesel fuel for mobility and operations. As discussed in Chapter 5 (and in Technical Memorandum 5B), diesel fuel results in the emissions of diesel particulate matter (DPM), which has been identified as a toxic air contaminant (TAC) by the state's Office of Environmental Health Hazard Assessment (OEHHA). Diesel fuel is also a significant contributor of nitrogen oxides (NOx), the primary pollutant for ozone formation. Both DPM and NOx are linked to various health issues especially in susceptible populations (the young and the elderly), including cancer, asthma, and preterm and low birth weight babies. Due to the current dependency of the goods movement industry on diesel fuel and the associated environmental and health impacts of diesel emissions, a major focus of this Action Plan is emission reduction. The following sections include emission reduction strategies, general mitigation measures, and institutional policies that are proposed, and in some instances currently underway, to protect public health and to address the environmental impacts in the region.

Emission Reduction

The goods movement mobile sources targeted for emission reduction include ocean going vessels (or ships), on-road heavy-duty vehicles (or trucks), cargo handling equipment, harbor craft, and railroad locomotives. Aircraft, a goods movement mobile source, generally have not yet been targeted for emission reductions efforts primarily because emissions reporting do not identify aircraft as a significant source of pollutants in comparison to other mobile sources. However, according to the South Coast Air Quality Management District (SCAQMD), "Aircraft will soon be in the top ten NOx categories. Other categories in the top ten are relatively well controlled with the notable exceptions of locomotives and marine vessels. Aircraft emit quantities of NOx comparable to locomotives and all sources of the 'RECLAIM' program – the 320 stationary sources of NOx, including all refineries and power plants." The SCAQMD 2003 AQMP estimated that the 2005 annual average aircraft emissions in the SCAB contributed less than 3 percent NOx, 1.6 percent SOx and 0.6 percent PM2.5 of the total emissions from all sources in the Basin.

Many emission reduction strategies can be applied to goods movement, regardless of mode. Such strategies focus on fuel and engine technologies, as well as congestion reduction and operational approaches. Fuels and engine technologies concentrate on the reduction of PM, NOx, and sulfur oxides (SOx) at the source. Congestion reduction and operational strategies can be considered to mitigate the negative effects of goods movement such as corridor congestion, safety concerns for mixed-use traffic, and truck traffic diversion into neighborhoods, in addition to emission reductions. Table 25 presents various emission reduction strategies that have been aggregated from multiple sources, including but not limited to: California Air Resource Board (CARB) Emission Reduction Plan for Ports and Goods Movement in California, San Pedro Bay Ports Clean Air Action Plan (CAAP), and SCAQMD Draft 2007 AQMP.

General Mitigation Measures

The effects of goods movement on local communities are largely a result of the proximity of goods movement corridors and facilities to the places where people live, work, and recreate. This proximity is unintended; most corridors and facilities were initially constructed in areas with sparse population. Over time, however, the dramatic growth in both population and trade has resulted in encroaching land uses that produce undesirable effects. In addition to the air quality impacts addressed in the previous section, undesirable community effects include noise and vibration, aesthetics, safety, natural resources, land use strategies, and cultural resource impacts. Table 26 identifies various general strategies that may be considered for mitigating the general effects of goods movement. These strategies come from various public agency studies and guidelines including the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and U.S. Department of Transportation. Industry best practices and resource agency mandates are also sources.

Institutional Policies

Agencies that have regulatory and/or funding purview for goods movement related activities can influence, either directly or indirectly, the environmental and community effects resulting from the goods movement industry. Table 27 provides a listing of institutional policies that may be considered for mitigating the effects of goods movement. Many of these strategies have already been implemented or are suggested by various sources, including but not limited to: CARB's Emission Reduction Plan and the Ports' CAAP and SCAQMD Draft 2007 AQMP.

Community/Stakeholder Input on Mitigation Measures

Stakeholders within the MCGMAP region voiced strong concern over the impacts of goods movement on the environment, their communities, and their overall quality of life. Due to the serious environmental, public health, and traffic congestion issues, communities and policy makers have begun to demand mitigation and to challenge proposals for infrastructure capacity enhancement. The stakeholders within the affected communities are opposing key infrastructure improvement projects that could improve current circumstances through additional mitigation and/or funding for mitigation improvements; they are calling for slower growth and mitigation of existing impacts.

The stakeholder outreach process has highlighted the critical need to address community and stakeholder concerns regarding the environmental and community impacts of goods movement while pursuing infrastructure improvements. The mitigation of direct and indirect impacts of specific goods movement projects or related activities must become a part of the process from the start.

Table 25
EMISSION REDUCTION STRATEGIES

FUELS & ENGINE TECHNOLOGIES
Ships
Low-Sulfur Diesel Fuels
Emulsified Diesel
Shore-based Electrical Power (Cold Ironing)
Dedication of Cleanest Fuels to California Service
Diesel oxidation catalyst retrofit
Diesel particulate filter (DPF) retrofit
Improved Original Equipment Manufacturer (OEM) Engines – main & auxiliary
Speed Reduction
Harbor Craft
Cleaner Engines
Biodiesel Fuel
Liquefied Natural Gas (LNG)
Liquefied Petroleum Gas (LPG)
Ethanol
Diesel oxidation catalyst retrofit
DPF retrofit
Selective catalytic reduction (SCR) systems
Cold Ironing
Cargo Handling Equipment
Fleet modernization with improved OEM Engines
Biodiesel Fuel
LNG
LPG
Fuel-cell
Electrification
Fischer-Tropsch fuel
Emulsified diesel
Diesel-electric
Diesel oxidation catalyst retrofit
DPF retrofit
Rail
Biodiesel Fuel
LNG
Compressed Natural Gas (CNG)
Fuel-cell
Electrification
Fischer-Tropsch fuel
Emulsified diesel
Diesel-electric hybrid (e.g., Green Goat)
Fleet modernization with improved OEM Engines

Table 25
EMISSION REDUCTION STRATEGIES

FUELS & ENGINE TECHNOLOGIES
On-board engine diagnostics
Trucks
Fleet modernization with improved OEM Engines
Biodiesel Fuel
LNG
CNG
Emulsified diesel
Propane fuel
Diesel-electric hybrid
Transport Refrigeration Unit (TRU) engine improvements
CONGESTION REDUCTION/OPERATIONS
Electronic cargo manifest
Grade separations at highway-rail crossings
Dedicated lanes, including possibility for automobile and truck tolls
Rail capacity expansion
Extended port and/or distribution gate hours (e.g., PierPass)
Shift operations to other ports
Modal shift from truck to rail
Shuttle trains in lieu of trucks between ports and warehouses (short-haul)
Virtual container yard
Increased on-dock rail
Creation of near-dock rail terminal
Engine idling restrictions for rail and trucks
Maglev technology
Efficiency through facility planning and design
Near-dock rail
Traffic Management Plan (TMP) – during project construction

Source: Jones & Stokes. 2006. Additional information is available in CAAP.

Table 26
GENERAL MITIGATION MEASURES

Noise & Vibration
Railroad Quiet Zones
Grade Separations – reduce noise from train horns & tire/rail interaction
Noise barriers (e.g., sound walls, berms)
Rubberized asphalt on highways
Exhaust mufflers on trucks
Tunneling of corridors
Building and window insulation
Prohibition of truck Jake brake usage
Siting/orientation of amplification systems
Noise control policy implementation during construction activities
Aesthetics
Landscaping – avoid non-native or invasive vegetation.
Barriers – landscaped berms; walls with possible artistic elements
Below-grade facilities – prevent visual perception of rail or truck corridors
Matte or diffuse building materials in locations of external lighting to prevent glare
Property acquisition land use buffering
Façade illumination from fixed downlight sources
Shielding & aiming of light fixtures
Low-level wattage lighting for landscaping and plazas
Low-height pedestrian poles, bollards, and steplights
Lighting design for minimum necessary illumination generation
Safety
Grade separation
Pedestrian crossing improvements
Natural Resources
New, replaced, or replanted vegetation removed shall be native vegetation appropriate to the setting.
On a project specific basis, develop a Stormwater Pollution Prevention Plan (SWPPP) if required.
Comply with Section 404 of the Clean Water Act concerning activities that result in discharge of dredged, fill, or excavated material in waters of the U.S.
Comply with Section 402 of the Clean Water Act and National Pollutant Discharge Elimination System (NPDES) standards during and following construction to ensure that dirt, construction materials, pollutants, or other human-associated materials are not discharged from the project area.
Comply with California Department of Fish & Game Section 1600 et seq.
Comply with the Migratory Bird Treaty Act.
Comply with any locally adopted tree protection ordinances as required
Comply with Federal and State Endangered Species Acts
Comply with Federal and State Clean Water Acts
Comply with Coastal Zone Management Act
Comply with Natural Community Conservation Planning (NCCP) Act by coordinating with NCCP/Habitat Conservation Plan (HCP) organizations where applicable.

Table 26
GENERAL MITIGATION MEASURES

Recycled water usage for project construction activities and irrigation
Design facility elements to accommodate the natural filtration/attenuation of runoff to the maximum extent possible in order to prevent erosion and to preserve more stable soil conditions.
Cultural Resources
Verify the presence of existing or eligible historic resources. Any historic materials removed shall be replaced with materials that are consistent with the original historic design.
A certified archaeologist shall monitor project-related ground disturbing activities in areas of archeological sensitivity.
Excavation shall be monitored by a qualified paleontologic monitor in areas identified as likely to contain paleontologic resources.

Source: Jones & Stokes. 2006

Table 27
Institutional Policy Listing

POLICY
Dedication of Cleanest Fuels to California Service
Implement Sulfur Emission Control Area (SECA)
Monetary incentives/disincentives for vehicle replacements, engine upgrades, and other technology retrofits
Regulatory engine idling reduction
Mandatory engine performance standards
Mandatory emissions controls
Anti-idling training & awareness programs
Zoning and land use regulations for land use compatibility
Community reporting of engine idling violators
Enforcement of emissions control requirements
Environmental justice considerations & public outreach requirements
Establish public-private partnerships for practical and innovative strategies

Source: Jones & Stokes. 2006.

Potential Fund Sources

Opportunities for Project-Specific User Fees

As federal grant funds will be insufficient to address the extensive needs within this region, and state and local traditional fund sources are steadily shrinking, more programs are needed to encourage private sector investment in essential infrastructure improvements. Included among such programs are investment tax credits, loans, and expansion of tax-exempt bonding to projects of both public and private benefit. Similar to the REACH program and the Carl Moyer Program, more market-based approaches should also be encouraged.

Fees negotiated with industry can be an important component of a project-specific plan of finance. To attract private financing it will be important to quantify the costs and benefits to all stakeholders and to establish various safeguards such as firewalls and sunset provisions. It will be important initially to focus on a short list of high priority projects in order to initiate a process for establishing user fees. Once the process is established and the private sector realizes the benefits of the initial key projects, it will likely facilitate implementation of future projects. In addition to financing specific projects, a negotiated user fee approach should also be considered for collecting and banking resources for implementing broader or regional environmental mitigations.

The types of user fees that should be considered include,

- Tolling of regional highways and major bridges, including congestion pricing
- Port-assessed cargo or container fees
- Industry-supported programs similar to the PierPass
- VMT-based gas tax (e.g., Oregon DOT pilot study)

In Southern California, there are two notable examples of successful public-private partnerships: the Alameda Corridor and the PierPass extended gates program. The Alameda Corridor Transportation Authority (ACTA) negotiated a system of railroad user fees to help fund the project. These fees are used to retire debt on revenue bonds and a federal loan. The loan has already been paid back. With PierPass, importers and exporters pay a fee of $50 per TEU to enter the terminals during daytime hours. There is no charge to cargo that enters the terminals at night and on weekends. Since its inception in July 2005, the PierPass program has successfully increased off-peak use of the ports from about 15 percent to about 40 percent.

The Ports of Los Angeles and Long Beach are currently developing a new system of proposed fees to help pay for new trucks and for diesel particulate filters (DPF) for older trucks, as well as user fees to pay for selected infrastructure projects. As proposed, the truck fee would be paid by Licensed Motor Carriers (LMCs), not owner-operators. The fee would be paid for every inbound gate move. The 2007 model year, and newer trucks, and trucks retrofitted with a CARB-approved DPF would be exempt from the fee. The fee would pay for about $1.2 billion of the $1.8 billion clean trucks program. The adopted Clean Air Action Plan calls for 16,000 trucks to be replaced or retrofitted within five years. This means that before major infrastructure projects such as the Gerald Desmond Bridge replacement project are complete, clean trucks will be serving the ports.

A separate proposed fee, not yet formally adopted by the ports, called the Infrastructure and Environmental Cargo Fee (IECF), would be paid by importers and exporters to help pay for selected infrastructure projects,

including on-dock rail improvements, grade separations along the Alameda Corridor-East, the Colton Crossing rail-to-rail grade separation, the Gerald Desmond Bridge, the I-110 Connectors, the Navy Way interchange, and the SR-47 Expressway. Ultimately the fee program may be expanded to help pay for the I-710 truck lanes and other projects that have a clear nexus to the ports in terms of facilitating port cargo movement and/or mitigating the impacts of port-related goods movement. Industry funds are needed to provide the required match to federal grants and to state bond funds. One of the principal objectives of the proposed fee is to "leverage" Proposition 1B bond funds as well as future federal funds through the reauthorization of SAFETEA-LU in 2009.

If the fee program is adopted, the ports may engage a third party to be the actual collection agent which would turn over the proceeds to the ports. The ports would then allocate the funds to the selected projects such as the Alameda Corridor-East and Colton Crossing.

The current fee program being proposed by the ports of Los Angeles and Long Beach involves a "pay-as-you-go" program without the need for borrowing. The advantage of this approach is two-fold. First, the project owner/sponsor can avoid substantial borrowing costs such as interest and other financing fees. Second, the term of the fee is reduced, reducing the burden on the project owner/sponsor and on the fee contributors. This approach is especially attractive to the San Pedro Bay ports because of the high volume of container traffic.

Establish Institutional Structure for Managing User Fees and Revenue.

Successful programs for obtaining user fees and revenues, ACTA for example, have developed specific institutional structures to collect, manage, and allocate fees in a manner that is acceptable to all involved parties. Therefore, negotiations for user fees needs to include a discussion of institutional arrangements for revenue collection and allocation to implementing agencies. The collection and distribution of funds must be transparent and viewed as fair to all parties involved. As proposed by the ports, the ports would lead the effort to collect user fees from licensed motor carriers for the clean trucks program and from cargo owners (importers and exporters) for selected infrastructure projects. A third party may be used as the collection agent.

Entities involved in ongoing discussions with industry, including the ports, may want to consider forming key stakeholder agencies, similar to the composition and structure of the Alameda Corridor Transportation Authority (ACTA), to administer the fee collection and fund disbursement program on a project by project basis. An alternative approach would be to expand the role of the committee recently created to develop a Southern California consensus position on the Trade Corridor Improvement Fund (TCIF). The committee currently consists of the CEOs of the County Transportation Commissions, ACTA, the Alameda Corridor-East Construction Authority, and the Ports of Los Angeles and Long Beach. This committee, if expanded to include private sector representatives, could be used to discuss project priorities and to develop a fair allocation of user fee funds.

Traditional Fund Sources

The state will receive $23.4 billion in federal funds from SAFETEA-LU between 2005 and 2009, according to the January 2006 report from the California Legislative Office entitled - Funding for Transportation: What the New Federal Act Means for California. This represents 9.7 percent of SAFETEA-LU's $241 billion total funding level.

The majority of projects recommended as a part of the MCGMAP will likely seek earmarks from a number of discretionary programs in future transportation bill reauthorizations. The four freight-related programs of key relevance are 1) Projects of National and Regional Significance, 2) National Corridor Infrastructure Improvement Program, 3) Freight Intermodal Distribution Pilot Program, and 4) Truck Parking Facilities Program. Over the 2005-2009 SAFETEA-LU authorization period, the total funding available through these programs is $3.75 billion. Of the $3.75 billion in earmarks, the Southern California region received approximately $280 million in earmarks representing 7.5 percent of the total, for the following goods movement projects:

- Inland Empire Goods Movement: $55 million
- Alameda Corridor East: $125 million
- Gerald Desmond Bridge: $100 million

In addition to earmarks for these four freight-related programs, SAFETEA-LU provided additional discretionary funding for goods movement projects through the Transportation Improvements discretionary program. Of the $2.56 billion in earmarks through this program, the Southern California region received an additional $30 million representing 1.2 percent of the total, for the Alameda Corridor East project.

Table 28 summarizes the total earmarks for Southern California goods movement projects. Within SAFETEA-LU, there were more than 6,000 projects nationwide that received earmarks totaling $26 billion. As shown on the table below, the four key goods movement projects within the northern study area counties received a total of $330 million, or 1.3 percent of all SAFETEA-LU earmarks. In addition San Diego County and Imperial County received $94.4 million in earmarks for Coordinated Border Infrastructure and High Priority Projects related to the San Diego Port.

Table 28
Summary of SAFETEA-LU Authorizations by Program

Project	SAFETEA-LU Earmark (In millions)	Discretionary Program
Alameda Corridor East	$125	Projects of National and Regional Significance
Gerald Desmond Bridge	$100	Projects of National and Regional Significance
Inland Empire Goods Movement Gateway	$55	Projects of National and Regional Significance
Alameda Corridor East	$30	Transportation Improvements
Inland Empire Goods Movement Gateway	$20	High Priority Projects
Subtotal	**$330**	
State Route 905 Six-Lane Freeway, San Diego (from Otay Mesa Border Crossing to I-805)	$80	Coordinated Border Infrastructure Program
State Route 11 Four-lane Freeway, San Diego (from SR-905 to Mexico Border)	$0.8	Coordinated Border Infrastructure Program
State Route 78/ Brawley Bypass, Four-Lane Highway, Imperial County (Calexico East Border Crossing-Trade Corridor)	$10	Coordinated Border Infrastructure Program
Grade Separations at 32nd Street and Cesar Chavez Parkway / Harbor Drive, San Diego (10th Avenue Marine Terminal – Truck Access Project)	$1.2	High Priority Projects
Construct Truck Ramp Linking I-5 to the National City Marine Cargo Terminal, National City, San Diego	$2.4	High Priority Projects
Subtotal	**$94.4**	
TOTAL	**$424.4**	

Federal assistance is essential to compensate for the disproportionate local and regional costs for the goods movement services provided to the rest of the nation. The next national transportation funding reauthorization legislation must recognize the importance of funding a national goods movement system, establish appropriate levels of federal funding support, and provide further opportunity for flexibility in the use of federal funds.

At the state level, the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B), approved by voters on November 7, 2006, provides for $19.925 billion in General Obligation bond funds to fund transportation investments statewide. Of this total, $3.1 billion will be set aside in a Ports Infrastructure, Security, and Air Quality Improvement Account to fund goods movement-related infrastructure, emission reductions strategies, and homeland security improvements:

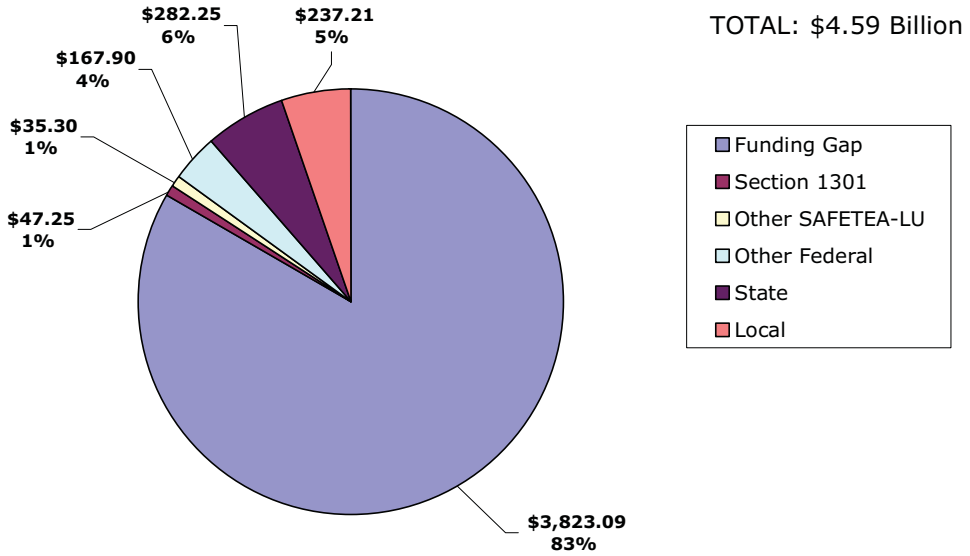
- The Trade Corridor Improvement Fund (TCIF), to be allocated by the California Transportation Commission (CTC), will provide $2 billion for improvements along trade corridors of national significance.
- An additional $1 billion will be allocated by the California Air Resources Board (CARB) for emission reductions from activities related to goods movement.
- $100 million will be allocated to ports for security improvements.

Other components of the infrastructure bond program could potentially fund goods movement-related projects that involve congestion mitigation, intercity passenger rail, and highway-railroad crossing safety.

Despite these new funding resources, there will not be enough funding to pay for all of the necessary infrastructure and mitigation projects recommended for the region. Since many of the projects listed in the Action Plan will provide benefits to the general public, such as highway capacity and operational improvements, it is likely that traditional federal, state, regional, and local funding sources will be part of these individual project financing scenarios. Other freight specific projects affording benefits to industry and generating a revenue stream from user charges may be able to take advantage of more innovative approaches by including private participation as a key revenue source. All levels of government as well as private industry must participate and pay a share to help reduce the funding gap.

While the region has had some success at securing state and federal funds for its most significant projects, the level of funding received has fallen short of its fair share (as described in previous sections). Moreover, many of the projects which present regional and national benefits have significant funding gaps. For example, the Alameda Corridor-East Trade Corridor (as shown in Figure 58) which would provide much needed grade separation projects to reduce congestion and emissions throughout the region has an 83 percent funding gap totaling over $3.8 billion, despite receiving state and federal funding. It is important to stress that the grade separation projects to be funded are intended to mitigate the impact (on local communities) from increased rail intermodal traffic, existing and forecasted. All of this intermodal traffic serves national markets, not local markets. Yet, the impacts are local, and if no action is taken, funding may also become a local burden.

Figure 58
FUNDING SOURCES FOR COMPLETION OF ALAMEDA CORRIDOR EAST TRADE PLAN (2006 Dollars, Millions)



Source: Alameda Corridor East Trade Corridor FHWA Funding Application, 2006

Local entities should not have to bear the costs of projects that mitigate the impacts of international trade that benefits the entire nation. Effective communication of regional needs will require a coordinated effort, with participants working together to achieve their common objectives. For this reason, the program of projects advanced in the Action Plan should reflect consensus, with goals, anticipated benefits, and strategies for achievements clearly defined.

Of the major investment market segments identified for improvements in the Action Plan, components providing for increasing intermodal lift capacity, increasing mainline rail and specialized truck capacity, and corridor-wide grade separations are considered to have the greatest potential for obtaining federal and state funding as well as having potential for private sector involvement. Other program elements including highway capacity additions and general-purpose lane investments will likely continue to be dependent on formula-based funding from regional and local agencies. Although funding is scarce on all levels, it is even more challenging on the regional and local levels.

Financial Framework

An examination was conducted of potential fund sources for the projects and strategies described in Chapter 6. This analysis included a review of both traditional fund sources that include existing local, state and federal fund sources, as well as non traditional fund sources such as tolling and/or container fees. Appendix B Table 10 lists various fund sources considered and their applicability to fund various potential goods movement projects by category.

As described previously, the MCGMAP includes 249 projects[3] for the region to improve goods movements. These projects fall into the following three project cost/funding categories:

1. Projects identified without cost estimates: 102 projects;
2. Projects identified with cost estimates and a preliminary funding plan: 50 projects; and
3. Projects identified with cost estimates but without a preliminary funding plan: 97 projects.
    a. Projects identified with cost estimates, 147 projects total

The total cost estimate for the 147 projects with cost estimates is almost $40 billion, while the 50 projects with preliminary funding plans have identified $2.5 billion for these projects. The resulting shortfall for projects with cost estimates is approximately $37.5 billion.

To date the project team has been able to identify project cost estimates for 154 of the 249 projects totaling over $83 billion. However, based on a request to funding partners for individual funding plan details, potential funding sources have not been identified for the large majority of these projects.

A range of funding sources has been identified for a sample of projects. Detailed information is included in Table 10 of Appendix B:

- The Alameda Corridor East Trade Plan, which has a funding shortfall of $3.78 billion dollars. To date the largest funding sources identified are the state ($282.3 million), the four counties ($143,245 million combined) and a SAFETEA-LU earmark ($118,172.3 million). However, only $82.6 million of the SAFETEA-LU earmarks are currently considered fully funded.
- Five infrastructure projects in the San Pedro Bay Ports of Los Angeles and Long Beach area total $2.16 billion of which 22 percent is committed from federal sources and 19 percent is committed from state sources. However, the State General Obligation funds (25 percent of the total) represents the level of funding the San Pedro Bay Ports of Los Angeles and Long Beach would like to receive from Proposition 1B ($2 billion Trade Corridor Infrastructure Fund). Please note that the State's Goods Movement Action Plan only recommended this source for two of the projects (Gerald Desmond Bridge and SR-47 Express) at lower funding levels. Finally, the San Pedro Bay Ports of Los Angeles and Long Beach have proposed that private industry should share in funding these projects which would be through a fee on loaded containers collected from Beneficial Cargo Owners (importers and exporters).
    - The funding plan for the Gerald Desmond Bridge has identified funding sources for the entire $800 million project. The majority of project funding will be provided from federal sources (40 percent - committed), private industry (28 percent) and State G.O. Bonds (25 percent).
    - Funding for the $557 million SR-47 Expressway project has been identified with the largest shares provided by the ports (52 percent), State G.O. Bonds (22 percent) and private industry (22 percent).

  - Funding for the $40 million Navy Way/Seaside Avenue project has been identified with the largest shares provided by private industry (44 percent), State G.O. Bonds (39 percent), and the San Pedro Bay Ports of Los Angeles and Long Beach (17 percent).
  - Funding for the $134 million I-110 Connectors project has been identified with the largest shares provided by State G.O. Bonds (38 percent), private industry (38 percent), and 28 percent from the ports.
  - Industry has been identified as the primary funding source (61 percent) for the $631 million ports Rail Systems project with the remainder to be funded by State G.O. Bonds (39 percent).
- The only identified funding source to add auxiliary lanes on I-10 from I-15 to Ford Street is Measure I funds (68 percent of total costs).
- For San Bernardino's Goods Movement Interchange Program there are 27 interchange projects identified totaling $971 million. Identified funding sources include Measure I funds (52 percent) and Developer Fees (39 percent).

A substantial level of funding, from a variety of sources will be needed to incrementally implement the projects identified in this study. Since many of the projects listed in the Action Plan will provide benefits to the general public, such as highway improvements, it's likely that traditional federal, state, regional, and local funding sources will be part of these individual project financing scenarios. While other freight specific projects may be able to take advantage of more innovative approaches by including private participation as a key revenue source.

As referenced earlier, Table 10 of Appendix B, provides a menu of 45 potential funding sources that could be used to assist in filling identified funding gaps. As shown in the referenced table, the funding sources are divided into six categories and represent a mixture of traditional funding sources and innovative sources: 1) Federal program; 2) State programs; 3) Regional programs; 4) Local programs; 5) User fees; and 6) Innovative Finance, Management of Funds, and Project Delivery Systems. Additionally, the project team has indicated which types of projects would likely be eligible for each source.

Finally, due the scarcity and competition for funding (as individual projects move forward from the regional and county specific lists of projects contained in Appendix B, Tables 5 and 6 and the improvement proposed in the county action plan chapters), it will be important for project sponsors (e.g., project partners, the ports, railroads and others) to evaluate the strengths and weaknesses of a variety of funding sources. This will allow sponsors to target their efforts on those funding sources that will have the highest probability of success.

Next Steps

This Action Plan should not be viewed as an end point, but rather the beginning of a more comprehensive regional approach to keep freight moving within and through the region and to reduce the environmental and community impacts caused by the movement of that freight. Going forward, stakeholders will play an integral role in the implementing the next steps. Based on feedback from stakeholders and Action Plan recommendations, the MCGMAP project partners are committed to taking the following next steps, in terms of (1) partnership and advocacy, (2) addressing environmental and community impacts, (3) improving mobility, and (4) securing funding:

Partnership and Advocacy

- Execute and implement the Southern California National Freight Gateway (SCNFG) Cooperation Agreement among federal, state, regional, and other implementing agencies to maintain dialogue to address the challenges outlined in MCGMAP.
- Request the incorporation of MCGMAP strategies and actions into other state, regional and local plans.
- Continue to convene multi-county meetings to monitor the progress on the Action Plan and provide annual reports to the CEOs and to the boards of the partner agencies.
- Support and propose legislation that (1) provides funding mechanisms for goods movement projects/strategies, and (2) improves mobility and facilitates regional multi-county goods movement goals without undermining local community priorities and quality of life.
- Support groups such as Mobility 21 and the Coalition for America's Gateways and Trade Corridors in developing dedicated federal and state goods movement funding sources.
- Continue to work closely with all stakeholders including the Councils of Governments, community groups, environmental regulatory agencies and academia.
- Seek good movement and logistics industry involvement throughout planning and project development phases.

Environmental and Community Impacts

- Through the SCNFG Cooperation Agreement and other related activities, develop a specific set of feasible actions to accelerate implementation of the strategies contained in the various air quality and emission reduction plans that are within the scope of responsibility of the project partners.
- In partnership with CARB, air districts, the logistics industry, and local governments, initiate an activity to generate public and/or private funds to accelerate implementation of air quality improvement strategies being undertaken by these and other entities, including strategies. Examples may include: container fees that provide a revenue stream to fund emissions reduction projects, impact fees paid by entities contributing to the goods-related air quality problem, supplemental transportation infrastructure project mitigation (to add to an air quality funding pool), mitigation banking, market-based strategies, and other vehicle-based fees commensurate with the impacts attributed to those vehicles.
- Complete the Environmental Justice Analysis and Outreach Study for the MCGMAP in Fall 2008. This effort will develop a guidebook for local jurisdictions and the private sector to use in avoiding, minimizing, and mitigating the effects of goods movement infrastructure and to assist local jurisdictions make informed land use decisions.

Mobility

- Initiate a study to investigate the linkage between industry supply chain trends and port and trade related transportation patterns and movements.
- Continue project development efforts, including planning, design, funding, and implementation of the regional and county-specific projects listed in the Action Plan, including the mitigation of the impacts of those projects.
- Initiate a Regionally Significant Transportation Investment Study (RSTIS) to evaluate the feasibility of implementing a Dedicated Freight Guideway System/Regional Truck Lanes (I-710 From Port of Long Beach to SR-60; East-West Corridor between the I-710 and to I-15; and I-15 to Victorville) inclusive of potential non-freeway implementation.
- Initiate localized studies, as appropriate.

Funding

- Pursue new avenues of goods movement funding for projects, including the region's fair share of state appropriations, federal funds and reauthorization, and private sector contributions consistent with the impacts of the benefits they derive from the use of the transportation system.
- Continue fair share and user fee discussions with private sector stakeholders to seek their support in addressing goods movement impacts and filling funding gaps. Develop a clear and concise message on this subject and communicate this to the public and policy and funding decision makers at all levels of government.
- Establish structures to manage user fees and revenue that are acceptable to both public and private sector stakeholders.

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AADT	Annual Average Daily Traffic
ACE	Alameda Corridor East
ACTA	Alameda Corridor Transportation Authority
AF	United States Air Force
ARB	See "CARB"
ARZC	Arizona and California Railroad
BNSF	Burlington Northern and Santa Fe Railway
BUR	Burbank Airport
Caltrans	California State Department of Transportation
CARB (or ARB)	California Air Resources Board
CBRE	C.B. Richard Ellis
CEQA	California Environmental Quality Act
CofI	City of Industry
CTA	Central Terminal Area at LAX
CTC	California Transportation Commission or County Transportation Commission
CY	Calendar Year
CZRY	Carrizo Gorge Railway – the Desert Line
EIR	Environmental Impact Report
ELA	East Los Angeles
EPA	Environmental Protection Agency
ERP	Enterprise Resource Planning
FAF	Freight Analysis Framework
FedEx	Federal Express
FERC	Federal Energy Regulatory Commission
FEU	Full Equivalent Unit
FHWA	Federal Highway Administration
FPN	Ferrocarriles Peninsulares del Noroeste
FTZ	Foreign Trade Zone
FY	Fiscal Year
GIS	Geographic Information Systems
GPS	Global Positioning System
HHDT	Heavy Heavy Duty Truck Classification
HOV	High Occupancy Vehicle
ICTF	Intermodal Container Transfer Facility
ILWU	International Longshoreman and Warehouse Union
ITS	Intelligent Transportation Systems
IVAG	Imperial Valley Association of Governments

JIC	Just in Case [delivery]
JIT	Just in Time [delivery]
LACSD	County Sanitation Districts of Los Angeles County
LAJ	Los Angeles Junction Railway
LATC	Los Angeles Transportation Center
LAWA	Los Angeles World Airports
LAX	Los Angeles International Airport
LCL	Less-Than-Container-Loads
LGB	Long Beach Airport
LHDT	Light Heavy Duty Truck Classification
LNG	Liquefied Natural Gas
LOS	Level of Service
LOSSAN	Los Angeles to San Diego Rail Corridor
LRTP	Long Range Transportation Plan
LTL	Less Than Truckload
MAT	Millions Annual Tons
MCGMAP	Multi-County Goods Movement Action Plan
Metro	Los Angeles County Metropolitan Transportation Authority
MHDT	Medium Heavy Duty Truck Classification
MPO	Metropolitan Planning Organization
MRL	Mesquite Regional Landfill
MRT	Metric Revenue Tons
MSF	Million Square Feet
MT	Metric Tons
NAFTA	North American Free Trade Agreement
NAICS	North American Industry Classification System
NAIOP	National Association of Industrial and Office Properties
NISC	National Infrastructure Security Committee
NOP	Notice of Preparation
NRA	Net Rentable Area
NRDC	Natural Resources Defense Council
NVOCC	Non-Vessel Owning Common Carriers
OCTA	Orange County Transportation Authority
OJT	On-the-job training
ONT	Ontario International Airport
PCH	Pacific Coast Highway
PDS	Position Detection System
PHL	Pacific Harbor Line

POE	Port of Entry (US / Mexico)
POLA	Port of Los Angeles
POLB	Port of Long Beach
PMD	Palmdale Regional Airport
PNW	Pacific Northwest
RCTC	Riverside County Transportation Commission
RFID	Radio Frequency Identification
RO/RO	Roll On/Roll Off
RTP	Regional Transportation Plan
RTIP	Regional Transportation Improvement Program
RTW	Round-the-World
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act - A Legacy for Users
SANBAG	San Bernardino Associated Governments
SANDAG	San Diego Association of Governments
SBD	San Bernardino International Airport
SCAG	Southern California Association of Governments
SCIG	Southern California International Gateway
SCM	Supply Chain Management
SCRRA	Southern California Regional Rail Authority
SDIY	San Diego and Imperial Valley Railroad
SF	Square Feet
SIP	State Implementation Plan
SNA	John Wayne/Santa Ana Airport
SPB	San Pedro Bay
3PL	Third Party Logistics
TEU	Twenty-Foot Equivalent Units
TOS	Terminal Operating System
UP	Union Pacific Railroad
UPS	United Parcel Service
USPS	US Postal Services
VCRR	Ventura County Railroad
VCTC	Ventura County Transportation Commission
VMT	Vehicle Miles Traveled
VNY	Van Nuys Airport
YTD	Year to date

Assembly Bill (AB) 2650 - A law passed in the state of California that fines terminal operators if trucks idle outside the terminal gate for more than 30 minutes.

Air Cargo - Freight that is moved by air transportation.

Air Carrier - An enterprise offering transportation service via air.

All-Cargo Carrier - An air carrier transporting cargo only.

Arterial - A moderate- or high-capacity highway that is just below an expressway classification. Much like a biological artery, an arterial road carries large volumes of traffic between areas in urban centers. Arterials serve as links between local streets and expressways and freeways with interchanges.

Average Annual Daily Traffic (AADT) - A useful and simple measurement of how busy a road is determined by averaging the daily flow of traffic over a year. Consists of a seven-day average of traffic on a roadway facility.

Balance of Trade - The surplus or deficit that results from comparing a country's exports and imports of merchandise only.

Belly Cargo - Cargo carried in the belly deck below the passenger deck of a passenger aircraft.

Bobtail - A truck with shorter bed. Otherwise known as a Straight Truck, Box Truck, or Box Van.

Boxcar - An enclosed railcar, typically 40 to 50 feet long, used for packaged freight and some bulk commodities.

Break-Bulk - The separation of a consolidated bulk load into smaller individual shipments for delivery to the ultimate consignee. The freight may be moved intact inside the trailer, or it may be interchanged and rehandled to connecting carriers.

Break-Bulk Cargo - Cargo shipped as a unit or package (for example: palletized cargo, boxed cargo, large machinery, trucks) but is not containerized.

Break-Bulk Vessel - A vessel designed to handle break-bulk cargo.

Bulk Area - A storage area for large items that, at a minimum, are most efficiently handled by the palletload.

Bulk Cargo - Goods not in packages or containers. See also, Break-Bulk Cargo.

Bulk Transfer Facilities - Facilities used primarily for the storage and/or marketing of petroleum products, and/or facilities that receive petroleum products by tanker, barge, or pipeline.

Cabotage - The carriage of cargo that originates and terminates within the boundaries of a given country by a carrier of another country.

Cargo - Merchandise carried by a means of transportation.

Cargo-Only Airport - An airport that has one or more air cargo operators and no passenger operations.

Carload - In the rail industry parlance, carload traffic refers to cargo moved in or on boxcars, gondolas, tank cars, flatcars, and other conventional railroad vehicles. Typical carload commodities include lumber, paper, scrap metal, coal, aggregates, chemicals, steel, machinery, and large appliances, among many other things. Trains carrying this traffic are sometimes called carload or merchandise trains.

Carrier - An enterprise engaged in the business of transporting goods.

Classification Yard - A railroad terminal area where railcars are grouped together in blocks to form train units. These blocks are combined into long distance trains that drop off the blocks at various destinations along their routes.

Coastal Carriers - Water carriers providing service along coasts serving ports on the Atlantic or Pacific Oceans or on the Gulf of Mexico.

Combi Aircraft - A passenger/cargo aircraft specially designed to carry unitized cargo loads on the upper deck of the craft, forward of the passenger area.

Container - A single rigid receptacle without wheels that is used for the transport of goods (a type of carrier equipment into which freight is loaded).

Container Chassis - A vehicle built for the purpose of transporting a container so that, when a container and chassis are assembled, the produced unit serves as a road trailer.

Container Depot - The storage area for empty containers.

Container Terminal - An area designated for the stowage of cargo in containers that may be accessed by truck, rail, or ocean transportation.

Container Vessel - A vessel specifically designed for the carriage of containers.

Container Yard - The location designated by the carrier for receiving, assembling, holding, storing, and delivering containers, and where containers may be picked up by shippers or redelivered by consignees.

Containerization - The technique of using a boxlike device in which a number of packages are stored, protected, and handled as a single unit in transit.

Cross Dock - An enterprise that provides services to transfer goods from one piece of transportation equipment to another. Commonly used to transfer shipments between local delivery trucks and long-haul (intercity) trucks.

Cross-Docking - The movement of goods directly from receiving dock to shipping dock to eliminate storage expense. Many times a site is chosen to consolidate goods from several origins and reship to the retail or manufacturing site (sometimes called Merge in Transit or Flow Through Distribution).

Cube Out - The situation when a piece of equipment has reached its volumetric capacity before reaching the permitted weight limit.

Customization Centers - Locations where goods are prepared as floor-ready merchandise based on the latest point of sale data.

Distribution Center (DC) - A finished goods warehouse from which a company assembles customer orders.

Dock - A space used for receiving merchandise at a freight terminal.

Enterprise Resource Planning (ERP) - A cross-functional/regional planning process supporting regional forecasting, distribution planning, operations centers planning, and other planning activities. The process provides the means to plan, analyze, and monitor the flow of demand/supply alignment and to allocate critical resources to support the business plan.

Export - To send goods and services to another country.

Federal Aviation Administration - The federal agency that administers federal safety regulations governing air transportation.

First Tier (or Top Tier) – A term used to point out the leading industry group in a specific sector. This is not typically an official term, but a term used herein to classify the leading entities.

Foreign Trade Zone (FTZ) - A site sanctioned by the U.S. Customs Service in which imported goods are exempted from duties until withdrawn for domestic sale or use. Such zones are used by commercial warehouses or assembly plants.

Freight Forwarder - An enterprise providing services to facilitate the transport of shipments. Services can include documentation preparation, space and equipment reservation, warehousing, consolidation, delivery, clearance, banking and insurance services, and agency services. The forwarder may facilitate transport by land, air, or ocean, or may specialize in one mode of transport. Also called Forwarder or Foreign Freight Forwarder.

Freight Analysis Framework (FAF) - The Freight Analysis Framework, created by the Federal Highway Administration, integrates data from a variety of sources to estimate commodity flows and related freight transportation activity among states, regions, and major international gateways.

Freight Gateways - A term generally used to refer to major freight airports, seaports, or intermodal facilities.

Full Container Load (FCL) - A term used when goods occupy a whole container.

Full Equivalent Unit (FEU) - A unit of measure to account for a full-sized (40-foot long) international container. One FEU equates to two 20-foot Equivalent Units (TEUs).

Full Truck Load (FTL) - Same as Full Container Load, but in reference to motor carriage instead of containers.

Goods - A term associated with more than one definition: 1) common term indicating movable property, merchandise or wares, 2) all materials used to satisfy demands, 3) whole or part of the cargo received from the shipper, including any equipment supplied by the shipper.

Goods Movement – The process and activities involved in the pickup, movement and delivery of goods (agricultural, consumer, and industrial products and raw materials) from producer/points of origin to consumer/point of use or delivery. 'Goods Movement' relies on a series of transportation, financial, and information systems for this to occur, that involves an international, national, state, regional and local networks of

producers and suppliers, carriers and representative agents from the private sector, the public sector (federal, state, regional and local government agencies), and the general public. (Definition taken from *Goods Movement Action Plan,* January 2007)

Hopper Cars - Railcars that permit top loading and bottom unloading of bulk commodities; some hopper cars have permanent tops with hatches to provide protection against the elements.

Hostling Trucks – A motorized vehicle (small truck) used for moving trailers/chassis around a port terminal or intermodal yard, specifically to transfer cargo containers and equipment from one mode to another.

Hub - A central location to which traffic from many cities is directed and from which traffic is fed to other areas.

Hub Airport - An airport that serves as the focal point for the origin and termination of long-distance flights; flights from outlying areas meet connecting flights at the hub airport.

Inland Port – An inland port can be defined as a transloading center, where international containerized cargo is unloaded from one mode (e.g., truck) and loaded to another mode (e.g., rail). Specific inland ports can take many forms and serve various purposes.

Integrated Freight Carriers - Typically refers to air cargo and express carriers that provide door-to-door service via any combination of modes. They control the reliability of service by owning the ground transport operations as well as the air lift capacity, exercising control through ownership (for example, FedEx and UPS). They also use information technology to exercise control.

Integrated Logistics - An integrating process that combines the classic logistics functions of physical distribution and materials management with the purchasing of raw materials and/or inventory and sales, marketing, information technology, and strategic planning functions.

Intermodal - See Intermodal Transportation.

Intermodal Facility - Facilities that allow for the transfer of uniform containers from one mode to another. The term is most commonly associated with a facility that allows for the transfer of containers between rail and truck. It is also used more widely to apply to cargo transfer between ships, barges, railcars, and trailer chassis.

Intermodal Transportation - The use of two or more transportation modes to transport freight; for example, rail to ship to truck, most commonly used or applied in industry to describe shipment of containers by rail.

Inventory Carrying Cost - A measure to account for the cost of goods in delay. This measure is not commonly used in the public transportation sector.

Just In Case (JIC) - An inventory strategy companies use whereby large inventories are kept on hand.

Just In Time (JIT) - An inventory strategy companies employ to increase efficiency and decrease waste by receiving goods only as they are needed in the production process, thereby reducing inventory costs. This method requires that producers are able to accurately forecast demand.

Less than Container Load (LCL) - A term used when goods do not completely occupy an entire container. When many shippers' goods occupy a single container, each shipper's shipment is considered to be LCL.

Less-Than-Truckload (LTL) - A segment of the trucking industry catering to shippers with loads that are less than a full truck load. Shipments that are smaller than a full truckload are combined with other LTL shipments, thereby allowing the LTL trucker to benefit from the economies of scale enjoyed by full truckload truckers.

Level of Service (LOS) - A standard measurement used by transportation officials that reflects the relative ease of traffic flow on a scale of A to F, with free-flow conditions being rated LOS A and completely congested conditions rated as LOS F.

Lift Capacity - Term used to describe a particular carrier or terminal operator's capacity to handle cargo. Most often (not exclusively) applied to intermodal yards and air cargo carriers.

Line-Haul - The long-haul portion of an intermodal trip, typically the main rail trip between the originating and terminating intermodal yards. On either end of the line-haul is the local dray to and from the intermodal yard.

Local Dray - A local truck trip to and from an intermodal yard or port or warehouse.

Logistics - The process of planning, implementing, and controlling procedures for the efficient and effective storage of goods, services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements. This definition includes inbound, outbound, internal, and external movements.

Mega Terminals - In the context of the marine and ports industry, a large terminal built to accommodate the new generation of mega ships (sometimes referred to as post-Panamax). In cases where a new terminal cannot be built, one or more of the existing terminals are tied together to provide the needed acreage and facilities.

Metric Revenue Tons (MRT) - Traditionally, cargo volumes through ports were reported in terms of tons (or metric tons). However, containerized cargo tends to have a higher value (revenue) to weight ratio than most non-containerized cargo. While non-containerized cargo has a one-to-one relationship between metric tons (MT) and metric revenue tons, the relationship for containerized cargo is typically greater than one and varies depending on the mix of cargo.

Metropolitan Planning Organization (MPO) - A regional transportation planning body required to approve transportation improvement plans, to ensure that they are consistent with federal legislation and that they are fiscally sound. It aims to achieve local consensus between different levels of government and across jurisdictions.

Mode of Transportation - The specific type of technology or vehicle involved in the movement of goods and passengers; for example, a railroad, an automobile, an airplane, or a ship.

Movement of Goods - The transfer of goods from one location to another.

Net Rentable Area - The actual square footage of a building that can be rented.

Net Weight - The weight of the merchandise, unpacked, exclusive of any containers.

Non-Integrated Freight Carriers - These types of freight carriers serve two functions: (1) provide scheduled service on major traffic lanes, and (2) provide outsourcing, carrying contracted freight for freight forwarders and other airlines. They typically involve a single mode of transport.

Non-Vessel Operating Common Carrier (NVOCC) - A firm that offers the same services as an ocean carrier, but does not own or operate a vessel. NVOCCs usually act as consolidators, accepting small shipments (LCL) and consolidating them into full container loads. They also consolidate and disperse international containers that originate at, or are bound for, inland ports. They then act as a shipper, tendering the containers to ocean common carriers. They are required to file tariffs with the Federal Maritime Commission and are subject to the same laws and statutes that apply to primary common carriers.

North American Free Trade Agreement (NAFTA) - A free trade agreement, implemented January 1, 1994, between Canada, the United States, and Mexico.

On-Dock, Near-Dock, Off-Dock Intermodal Facilities - On-dock intermodal facilities are located in or immediately adjacent to marine terminals. Near-dock intermodal facilities are located within a few miles from port areas. Off-dock intermodal facilities are comparatively distant from port areas.

Person Hours - A measure to account for the number of hours spent by the occupants of vehicles in traffic.

PierPass – PierPass (or PierPASS) is a not-for-profit organization created by marine terminal operators to reduce congestion and improve air quality in and around the ports of Los Angeles and Long Beach. OffPeak is the off-peak hours program created by PierPass. OffPeak provides an incentive for cargo owners to move cargo at night and on weekends, in order to reduce traffic and pollution during peak daytime traffic hours and to alleviate port congestion (http://www.pierpass.org/about_pierpass). PierPass was introduced in July 2005 in response to a legislative initiative. PierPass as referenced in the MCGMAP is the program now administered by PierPass Inc.

Port – An entry point into, typically a harbor where ships will anchor or an airport.

Ports of Call - Ports at which a vessel, or string of vessels, stop so as to unload and load cargo.

Port of Entry - A port at which foreign goods are admitted into the receiving country.

Post-Panamax Vessel - A container ship too large to pass through the Panama Canal, typically with a capacity in excess of 6,000 TEUs.

Project Cargo - Typically associated with large machinery and equipment used in the construction of major infrastructure projects such as power plants or industrial plants. Large or voluminous shipments, or shipments composed of complex components that must be disassembled, shipped, and then re-assembled.

Project Team – In this document, Project Team refers to the group of consultants assembled to prepare the MCGMAP.

Private Carrier - A carrier that provides transportation service to the firm that owns or leases the vehicles and does not charge a fee. Private motor carriers may haul at a fee for wholly-owned subsidiaries.

Regional Transportation Plan - A long-term multimodal transportation plan prepared by a Metropolitan Planning Organization (MPO), typically with a 20-year outlook.

Rolling Stock - Traditionally means "vehicles." The term is used in logistics to refer to inventory in motion, or inventory in the pipeline, not at rest.

Roll On/Roll Off (RO/RO) - A term most commonly used to describe ships designed for the carriage of wheeled cargo. These ships typically have large doors in the hull and external ramps that fold down to allow rolling of wheeled cargo between the ship and the pier. The term is also applied to the wheeled cargo itself (RO/RO cargo).

Scheduled Service - A type of service offered by carriers for a designated route that includes multiple designated stopping points, with scheduled times of arrival and departure. The carrier aims to stay within the schedule so as to provide a reliable service that customers can depend on, and can sequence their shipments accordingly.

Second Tier - A term used to point out the second most significant group of players in a specific sector (see First Tier).

Shipping Line - Businesses that own and/or operate the ocean vessels carrying ocean-borne cargo between international ports (also referred to as steamship lines).

Short Line - A local rail line that covers a short distance, not part of a rail network. Ports use a short line to move goods between customers, storage areas, and staging areas within the port without interfering with main line operations.

Simultaneous and Continuous – Defined by the state of California as "the total cost of goods movement related infrastructure project should include the cost of required project-specific mitigation and the combined cost should be funded as the cost of the project".

Southern California – Refers to Southern California region as a whole; inclusive of the Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura.

Spur Track - A railroad track connecting a company's plant or warehouse with the railroad's track; the user bears the cost of the spur track and its maintenance.

Steamship Line - A company that owns and/or operates vessels in maritime trade.

Supply Chain(s) - A group of physical entities such as manufacturing plants, distribution centers, conveyances, retail outlets, people, and information that are linked together through processes (such as procurement or logistics) in an integrated fashion, to supply goods or services from source through consumption.

Supply Chain Management (SCM) - The integration of the supplier, distributor, and customer logistics requirements into one cohesive process to include demand planning, forecasting, materials requisition, order processing, inventory allocation, order fulfillment, transportation services, receiving, invoicing, and payment.

Terminal Operator - The enterprise responsible for the operation of facilities for one or more modes of transportation.

Third Party Logistics Provider (3PL) - A third party that handles many of the supply chain logistics aspects on behalf of a large shipper/receiver. Makes many of the decisions related to the shipment of goods: mode choice, routing, transit times, pricing, staging locations, etc.

Transloading - The practice of transferring goods from marine containers to domestic intermodal containers or trucks at a distribution center or warehouse.

Transportation Corridor - A single route or combination of routes along the same general path, between at least two points (one on either end). In general, a transportation corridor is not just one road or rail line, but a combination of modes.

Transshipment - The shipment of merchandise to the point of destination in another country on more than one vessel or vehicle.

Truck Climbing Lanes - Highway lanes in which trucks must operate where the incline of the road becomes steep to the point of reducing truck speeds. They are designed to permit slower-moving trucks to operate at their own pace without reducing the speed of the mixed-flow traffic operating in the lanes without trucks. Typically located on the outside lanes of a highway in an uphill direction.

Truckload (TL) - Quantity of freight required to fill a truck, or at a minimum, the amount required to qualify for a truckload rate.

Truck Turn Time - The time it takes from when a truck arrives at a port (or intermodal yard), loads/unloads its cargo, and departs.

Twenty-foot Equivalent Unit (TEU) - A measure of containerized cargo equal to one standard 20-foot by eight foot by 8½ foot container. A full size 40-foot container (FEU) is counted as two TEUs.

Vessel String - Term used in the ocean shipping business to refer to a group of vessels that serve a specific route. In order to meet a scheduled service, the vessels are sequenced into a string so as to serve the route and meet predetermined dates and times of arrival and departure.

Warehouse - Storage place for products that are in transit. Principal warehouse activities include receipt of product, storage, shipment, and order picking.

Multi-County Goods Movement Action Plan

Los Angeles County Action Plan

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
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Table of Contents

INTRODUCTION **1**
Purpose **1**
CONTEXT AND FRAMEWORK FOR THE LOA ANGELES COUNTY PLAN **3**
RECENT AND ONGOING COUNTY EFFORTS **4**
Plans and Studies 4
Projects and Strategies 5
Institutional Efforts 6
SUBREGIONAL PROFILES **7**
Arroyo Verdugo Subregion 9
Central Los Angeles Subregion 10
Gateway Cities Subregion 12
Las Vigenes/Malibu Subregion 14
North Los Angeles County Subregion 16
San Fernando Valley Subregion 17
San Gabriel Valley Subregion 20
South Bay Cities Subregion 21
Westside Cities Subregion 23
LOS ANGELES COUNTY GOODS MOVEMENT SYSTEM **25**
Seaports 25
Airports 27
Intermodal Facilities 29
Warehousing 30
Rail 32
Roadway System and Truck Flows 35
COUNTY SPECIFIC CHALLENGES AND ISSUES **40**
Environmental and Community Impacts, and Potential Health Risks 41
Rail and Truck Volumes and Related Impacts 44
Port/Intermodal Yard Capacity 51
Air Cargo Capacity 52
Economic Growth 53
Funding Limitations 53
Subregional Goods Movement Issues and Perspectives 55
LOS ANGELES COUNTY ACTIONS **61**
LOS ANGELES COUNTY PROJECT LIST **63**
NEXT STEPS **64**
Partnerships and Advocacy 64
Environmental and Community Impacts 65
Mobility 65
Funding 66

List of Tables

Table 1 – Subregional Population Growth, 2003-2030 7

Table 2 – Subregional Employment Growth, 2003-2030 9
Table 3 – Annual Air Cargo Activity 2003-2005 MCGMAP Study Area Airports 27
Table 4 – Average Daily Trains on BNSF East-West Mainline between Hobart Yard and Fullerton Wednesday-Friday 34
Table 5 – Average Daily Trains on UP East-West Mainlines at Fontana on the Alhambra Subdivision and at West Riverside on the Los Angeles Subdivision Wednesday - Friday 34
Table 6 – 2003 Truck Volumes on County's Freeway Segments 36
Table 7 – Comparison of Port Truck Volumes to Total Daily Truck Volumes on Study Area Roadways, Year 2003 39
Table 8 – Freight Train Delay on UP and BNSF Mainline Freight Network (existing track no improvement) 44
Table 9 – Truck Volumes Derived from Model Runs (2003-2030) 48
Table 10 – Projected 2030 Air Cargo Demand in Los Angeles County 52
Table 11 – Los Angeles County Goods Movement Projects 67

List of Figures

Figure 1 – Multi-County Goods Movement Action Plan Los Angeles County 2
Figure 2 – Multi-County Goods Movement Action Plan LA County Subregions 8
Figure 3 – Arroyo Verdugo Subregion Warehouse Land Use 10
Figure 4 – Central Los Angeles County Subregion Warehouse Land Use 12
Figure 5 – Gateway Cities Subregion Warehouse Land Use 14
Figure 6 – Las Virgenes/Malibu Subregion Warehouse Land Use 15
Figure 7 – North Los Angeles County Subregion Warehouse Land Use 17
Figure 8 – San Fernando Valley Subregion Warehouse Land Use 19
Figure 9 – San Gabriel Valley Subregion Warehouse Land Use 21
Figure 10 – South Bay Cities Subregion Warehouse Land Use 23
Figure 11 – Westside Cities Subregion Warehouse Land Use 25
Figure 12 – Ports of Los Angeles and Long Beach Container Volume Growth 1996-2006 (actual), 2010-2030 (projected) (TEUs) 26
Figure 13 – Air Freight Imports and Exports via Los Angeles International Airport (1994-2005) 28
Figure 14 – Multi-County Goods Movement Action Plan Warehouse Land Use 31
Figure 15 – Multi-County Goods Movement Action Plan Railroad Lines 33
Figure 16 – Distribution of Truck Travel by County 36
Figure 17 – Schools Located Within a 2-Mile Radius of San Pedro Bay Ports 42
Figure 18 – Multi-County Goods Movement Action Plan 2025 Forecast Rail Volume 46
Figure 19 – Truck Growth 2003-2030 (Greater then 75%) 49
Figure 20 – Truck Growth on I-710 (2003-2030) 49

Introduction

Purpose

This document outlines a Goods Movement Action Plan for Los Angeles County, California, as part of a broader Multi-County Goods Movement Action Plan (MCGMAP) developed collectively by the participating agencies (or "project partners") representing Los Angeles County Metropolitan Transportation Authority (Metro), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), San Diego Association of Governments (SANDAG), Ventura County Transportation Commission (VCTC), Southern California Association of Governments (SCAG), and the California Department of Transportation (Caltrans). The MCGMAP contains strategies to support the efficient movement of goods without disproportionately impacting local communities, the environment, or the transportation network. The MCGMAP is also a regional framework for goods movement initiatives that provides direction and recommendations at a macro level for a multi-county study area. In some instances this macro level approach merits more in-depth analysis.

The Goods Movement Action Plan for Los Angeles County (herein referred to as "the LA GMAP") outlines key goods movement issues and challenges that impact Los Angeles County and its communities. It also references goods movement plans, proposals and initiatives that are underway. It is important to note that the LA GMAP and MCGMAP builds on a large body of work that has been researched and developed over the past few years, all of which collectively address a comprehensive range of goods movement issues. A map of the Los Angeles County's goods movement system is shown in Figure 1.

Other efforts, such as the Goods Movement Strategic Plan for Los Angeles County, will likely address new and existing issues as they arise (refer to Next Steps section of this document). The LA GMAP begins to address the most significant goods movement issues currently faced by the county. While the LA GMAP is not intended to be a full and complete glossary of every issue and impact on each subregion within the county, it focuses on recommended projects and strategies that can help better manage the movement of goods and their associated impacts. The LA GMAP concludes with specific Los Angeles County actions, mitigation measures, projects and strategies and identified needs that support the four action sets contained in the MCGMAP. Lastly, this chapter identifies the next steps needed to address the county's challenges.

Airports
Ports
Railroad
Freeways
Highway
Urban Areas

Multi-County Goods Movement Action Plan
Los Angeles County

0 10 20 40 Miles

N

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006

Figure 1

Context and Framework for the Los Angeles County Plan

In recent years, goods movement has emerged as a major challenge facing Southern California in part due to future projections that predict dramatic growth in freight/goods movement throughout the multi-county study region and the relationship between goods movement and the region's economy, mobility, and environment. In fact, goods movement is now recognized as not only a Southern California issue, but a state and national issue as well. These challenges, which are described in both the MCGMAP and subsequent sections of this county plan, have been publicized in recent goods movement studies and efforts and articulated to the MCGMAP project partners by goods movement stakeholders in the region.

If nothing is done to address these challenges, the projected growth in international and domestic goods movement will exacerbate the existing mobility, environmental, and funding constraints in the study area. Absent any improvements, increased trade volume will result in more trucks and trains handling goods, increases in the potential for accidents, incidents and vehicular and train conflicts at grade crossings, more bottlenecks, chokepoints and traffic delays on a highway and rail system that is already at or near capacity, and increased environmental impacts.

Differing perspectives exist on how to effectively address these challenges. Because the ability to transport goods efficiently and the capacity and quality of trade infrastructure are key determinants of international competitiveness, some stakeholders advocate for increased infrastructure capacity at the ports and along rail lines and roadways. This in turn would enable Southern California to retain and possibly expand the economic benefits of trade it now receives. On the other hand, some stakeholders, particularly environmental and community groups support policies or legislation that limits port growth. Furthermore, these stakeholders demand that quality of life is enhanced and sustainable communities are preserved by taking a more aggressive role in protecting public health and the environment through emissions reduction measures and community impact mitigation. These stakeholders also advocate for strategies that reduce reliance on trucks (and diesel fuel) to move goods to goods movement facilities (e.g., rail yards, warehouses, and distribution centers), reduce the local impacts of goods movement (e.g. land use conflicts, noise, and visual impacts), and explore the use of advanced, low or no emission technologies to transport goods.

Implementing any new projects and strategies will require adequate funding, though traditional funding sources are strained. This situation has been worsened by the fact that Southern California receives a disproportionately low share of federal and state funding, though many stakeholders recognize the need for the federal government to pay their fair share of costs associated with this industry. To address the funding issue, some stakeholders believe that private sector funding (e.g., tolls, fees, etc.) should be tied to specific projects so that the benefits of the project will be realized by those who pay for it. On the other hand, some advocate for a legislated fee approach, wherein the revenues generated by such fees are used to fund infrastructure improvements as well as mitigation projects to mitigate the adverse community and environmental impacts of trade.

The MCGMAP project partners recognize that while the goods movement industry remains a major economic driver in Los Angeles County, the study region, and the state there are also significant public health risks and other environmental and community impacts associated with goods movement. It is within this framework of challenges and divergent perspectives that the MCGMAP and the LA GMAP have been developed. The following sections outline the recent and ongoing efforts to address goods movement and describe the subregions, county specific challenges and issues, county actions, projects and the next steps needed for subsequent planning efforts.

Recent and Ongoing County Efforts

The MCGMAP and LA GMAP incorporate and build on previous projects and efforts, which are summarized in the following sections. These include plans and studies, projects and strategies, and institutional efforts.

Plans and Studies

In recent years, a number of studies have been completed that examine specific components or areas of the county's goods movement system. These include but are not limited to the following:

- Improving Truck Movement in Urban Industrial Districts, October 1999
- Alameda Corridor East Trade Corridor Plan, June 2001
- Port of Long Beach/Los Angeles Transportation Study, June 2001
- Alternative Access and Locations for Air Cargo, June 2002
- Empty Ocean Container Logistics Study, May 2002
- Port of Long Beach Rail Master Planning Study, September 2002
- LA-Inland Empire Railroad Mainline Advanced Planning Study, October 2002
- Port of Los Angeles Baseline Transportation Study, April 2004
- North County Combined Highway Corridors Study Final Report, April 2004
- A Study of Drayage at the Ports of Los Angeles and Long Beach, December 2004
- I-710 Major Corridor Study, March 2005
- Port and Modal Elasticity Study, September 2005
- SR-91/I-605 Needs Assessment Study, September 2005
- San Pedro Bay Ports Rail Study Update, December 2006
- South Bay Goods Movement Study, June 2007

In addition to these studies, statewide and regional plans have been developed that address goods movement mobility and/or environmental challenges. In January 2007, the California Environmental Protection Agency (Cal/EPA) and the Business, Transportation, and Housing Agency (BTH) released the final State Goods Movement Action Plan, which is the statewide action plan for goods movement. The state plan incorporated key elements of the California Air Resources Board (CARB) Emission Reduction Plan for Ports and Goods Movement in California, which was adopted in April 2006. Also, the California Marine and Intermodal Transportation System Advisory Council (CALMITSAC) documented the state's maritime goods movement needs in its California Marine Transportation System Infrastructure Needs report. At the regional level, the South Coast Air Quality Management District (SCAQMD) adopted the 2007 Air Quality

Management Plan (AQMP) in June 2007. The AQMP contains strategies intended to reduce emissions from goods movement activities. Finally, the Ports of Long Beach and Los Angeles adopted the San Pedro Bay Ports Clean Air Action Plan (CAAP) in November 2006. The CAAP is designed to reduce air emissions from port-related sources such as trucks, locomotives, and ocean-going vessels.

Furthermore, there are a number of plans, studies, and proposals that are currently in progress. For example, the Southern California Association of Governments (SCAG) is developing the "Environmental Mitigation Plan for Goods Movement in Southern California" that analyzes environmental and community impact mitigation strategies and will recommend a strategy for mitigating goods movement related impacts. SCAG will also conduct a multi-million dollar "Comprehensive Regional Goods Movement Plan and Implementation Strategy" that will refine the goods movement element of the SCAG 2008 Regional Transportation Plan, conduct a needs assessment of warehouse and intermodal facilities, and explore the use of new technology alternatives to move goods. Building on the recommendations from the MCGMAP, Los Angeles County in partnership with Caltrans and the counties of Orange, Riverside, San Bernardino, and Ventura have begun the Environmental Justice Analysis and Outreach for the MCGMAP. This effort will result in a guidebook for local jurisdictions that includes a list of strategies for reducing the impact of goods movement on communities. Building upon the work begun on the I-710 Major Corridor Study, Metro, in conjunction with Caltrans, Gateway Cities Council of Governments, Ports of Long Angeles and Long Beach, SCAG, and the I-5 Joint Powers Authority are developing the Environmental Impact Report/Environmental Impact Statement for the I-710. Also of note, the Ports of Los Angeles and Long Beach are currently conducting the "Advanced Cargo Transportation Technology Evaluation and Comparison" study, which will examine potential options for connecting the ports with near-dock rail intermodal facilities using advanced, clean technologies.

Projects and Strategies

A number of goods movement projects have been implemented in the county in recent years. Perhaps the most notable of these is the Alameda Corridor, which opened in 2002 and is a grade separated rail line linking the Ports of Los Angeles and Long Beach to downtown Los Angeles. In addition, road/rail grade separations and grade crossing improvements along the Alameda Corridor East Trade Corridor and other roadway improvements have been made or will be implemented to help relieve congestion, increase mobility, and mitigate the impacts of goods movement.

Improving the operational efficiency of existing infrastructure is also a crucial priority. To this end, the Ports and marine terminal operators in conjunction with elected officials and the Gateway Cities Council of Governments instituted the OffPeak program (also known as PierPass) in July 2005. The purpose of OffPeak is to shift port traffic away from daytime hours to off peak (night and weekend) hours. It does so by charging a Traffic Mitigation Fee of $50 per twenty foot equivalent unit (TEU) container to those containers moved during peak hours (Monday through Friday, 3:00 am-6:00 pm) and not charging a fee to move containers during off peak hours (currently defined as Monday through Thursday, 6:00 PM to 3:00 AM and Saturday from 8:00 AM to 6:00 PM). The program has been very successful and about 37 percent of port truck trips are now made during off

peak hours[1].

Institutional Efforts

In addition to these efforts, Metro has worked in partnership with public and private sector stakeholders on developing appropriate policies, improvements and financing strategies that address the anticipated increase in goods movement activities throughout the county without disproportionately impacting local communities and the environment. For example, Metro has programmed funds for freight/goods movement projects through its Call for Project process for Alameda Corridor, Alameda Corridor East and a number of grade separations and truck access improvement projects for local roadways, bridges, interchanges and intersections. Further, Metro has expanded its leadership role in coalition building through its work with the Mobility 21 Coalition and served a lead role in the development of the MCGMAP with specific directions from its Board of Directors to take a more proactive role in the goods movement arena. On January 29, 2007 the Metro Board of Directors held its first workshop on goods movement. During the workshop a broad cross section of stakeholders representing councils of governments, environmental and air quality regulatory agencies, the ports, developers, trucking, freight and logistics industries, Alameda Corridor East Construction Authority, Alameda Corridor Transportation Authority, the Los Angeles Economic Corporation Development as well as representatives from Business, Transportation and Housing, and the California Transportation Commission provided testimony about the impacts of goods movement throughout Los Angeles County and recommendations to address these impacts.

At its February, 2007 meeting, the Board adopted a goods movement policy that supports goods movement initiatives through advancing specific projects/programs, advocacy, collaborative efforts and, pursuing various funding/financing strategies through federal, state and private sector partnerships to address goods movement impacts. Metro's Board also directed staff to conduct a Goods Movement Strategic Plan for Los Angeles County, upon completion of the MCGMAP.

In April, 2007, the Board directed staff to continue to advocate for Los Angeles County projects that were included in the State's Goods Movement Action Plan, and to specifically advocate for increased levels of funding from the State Trade Corridors Improvement Fund (TCIF) program, and incorporate the evaluation of the feasibility of a Los Angeles County inland port into the Goods Movement Strategic Plan for Los Angeles County.

In October 2007, Metro along with other local, regional, state, and federal agencies signed the Southern California National Freight Gateway (SCNFG) Cooperation Agreement. This agreement and other related activities will be instrumental in developing a set of feasible actions to accelerate air quality and emission reduction plans discussed in the MCGMAP. Southern California transportation and governmental agencies have also been active participants in the meetings convened by the California Transportation Commission to develop criteria for allocating funds under the Trade Corridors Improvement Fund. On April 10, 2008, the California Transportation Commission approved $1.65 billion in state Trade Corridor Improvement Funds for improving the flow of goods from the San Pedro Bay ports throughout the Southern California region.

Metro will continue to work with Los Angeles County jurisdictions, the County of Los Angeles, Councils of Governments, county transportation commissions of Orange, Riverside, San Bernardino & Ventura, Caltrans, Southern California Association of Governments, San Diego Association of Governments, environmental groups, the ports (sea and air), the railroads, regulatory agencies and other affected stakeholders to ensure that the MCGMAP and LA GMAP remain living documents that provides guidance for decision makers responsible for planning and programming funds for goods movement throughout the region. The MCGMAP and LA GMAP are intended to complement local, state, and regional plans that promote livable and sustainable communities and reflect the priorities of the region.

Subregional Profiles

Los Angeles County is composed of 89 jurisdictions[2] as well as county unincorporated areas. The cities and communities are divided geographically into the following nine subregions (Figure 2):

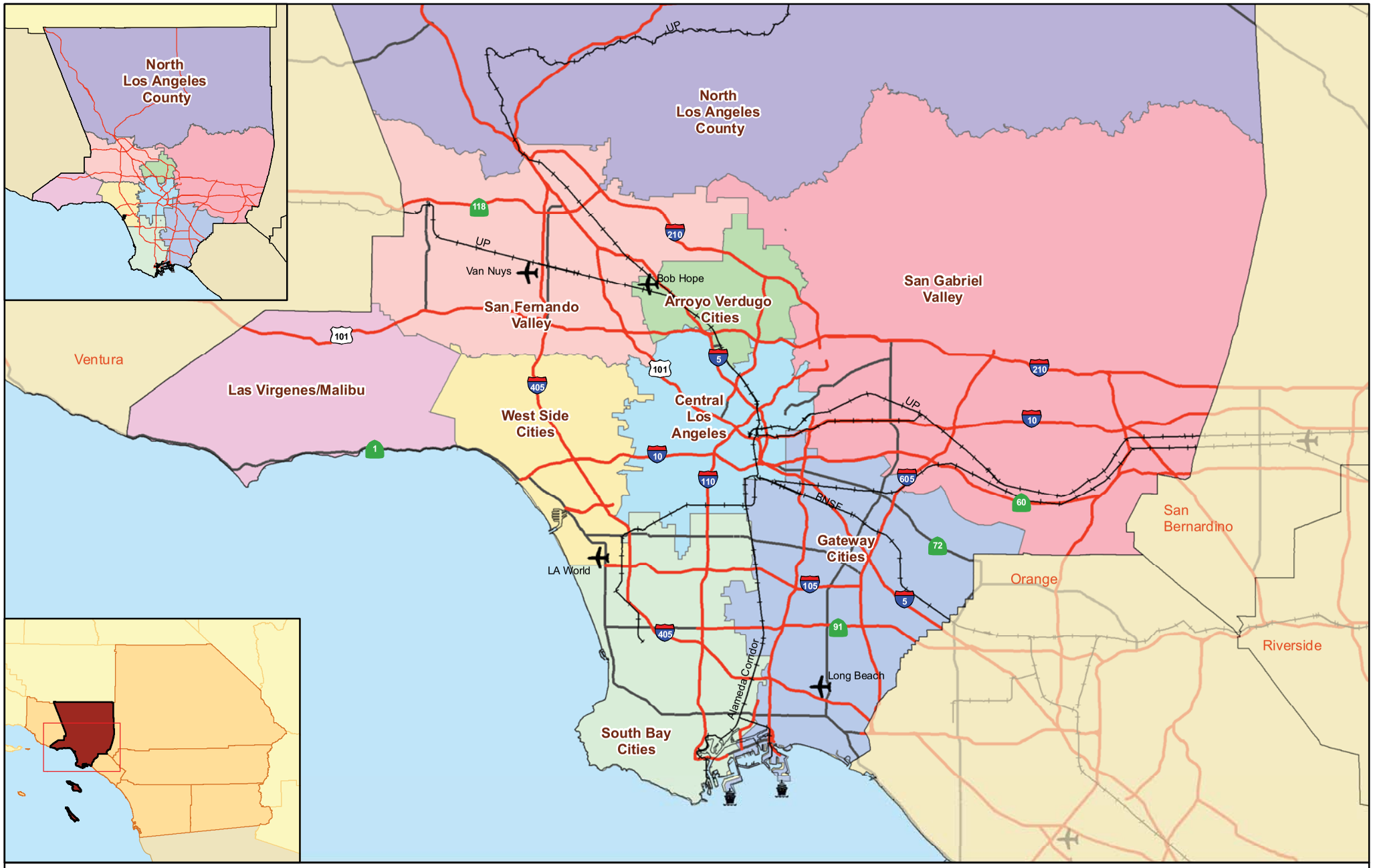
- Arroyo Verdugo
- Central Los Angeles County
- Gateway Cities
- Las Virgenes/Malibu
- North Los Angeles County
- San Fernando Valley
- San Gabriel Valley
- South Bay Cities
- West Side Cities

Each subregion provides important input into Metro's planning efforts and processes. As indicated in Tables 1 and 2, each of the subregions is expected to experience significant population and employment growth. Brief descriptions of each subregion are provided on the following pages.

Table 1
Subregional Population Growth, 2003-2030

Subregion	Population		
	2003	2030	% Change
Arroyo Verdugo Cities	339,006	394,918	16%
Gateway Cities	1,887,355	2,220,215	18%
Las Virgenes Cities	87,736	125,764	43%
North Los Angeles County Cities	593,665	1,191,665	101%
Central Los Angeles Cities	1,697,898	2,007,206	18%
San Fernando Valley Cities	1,406,147	1,582,476	13%
San Gabriel Valley Cities	1,803,814	2,331,228	29%
South Bay Cities	1,434,224	1,674,917	17%
West Side Cities	585,906	664,641	13%

Source: Metro



Airports
Ports
Railroad
Freeways
Highway

Multi-County Goods Movement Action Plan
LA County Subregions

0 10 20 40 Miles

N

Sources:
StreetMap 2006
Metro

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Figure 2

Table 2
Subregional Employment Growth, 2003-2030

Subregion	Employment		
	2003	2030	% Change
Arroyo Verdugo Cities	208,217	269,157	29%
Gateway Cities	786,668	960,037	22%
Las Virgenes Cities	46,402	58,503	26%
North Los Angeles County Cities	193,437	292,691	51%
Central Los Angeles Cities	896,025	1,061,631	18%
San Fernando Valley Cities	583,395	723,501	24%
San Gabriel Valley Cities	749,778	922,804	23%
South Bay Cities	633,862	788,678	24%
West Side Cities	465,729	574,039	23%

Source: Metro

ARROYO VERDUGO SUBREGION

Setting

Arroyo Verdugo sits against a backdrop of the San Gabriel Mountains between the San Fernando and San Gabriel Valleys. It is located on the northern edge of the Los Angeles Basin, and is bounded to the north by the Angeles National Forest, to the west and south by the City of Los Angeles, and on the east by the City of Pasadena. The Arroyo Verdugo subregion comprises a land area of 60 square miles.

Arroyo Verdugo Cities

Burbank, Glendale, and La Cañada Flintridge

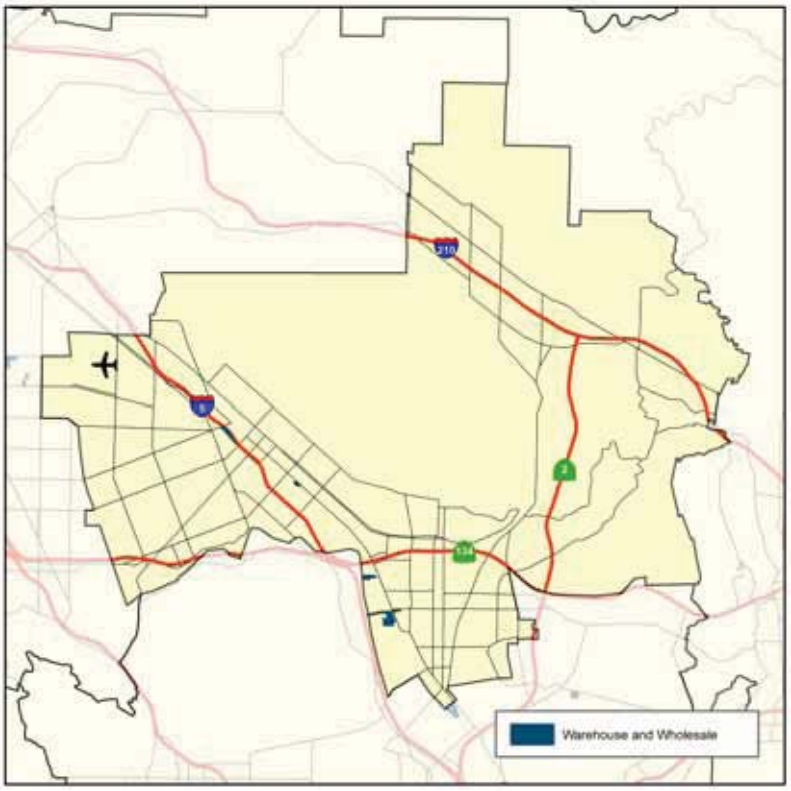
Major Transportation Facilities

Several major freeways traverse this subregion including the Foothill (I-210), Glendale (SR-2), Golden State (I-5) and Ventura (US-101 and SR-134) freeways. The northern portion of the Hollywood Freeway (SR-170) extends northwesterly to the south and west of the subregion. Metrolink's Ventura County and Antelope Valley Lines provide commuter rail services to Burbank and Glendale. Limited Amtrak service is also available.

Warehousing

Figure 3 shows the location of warehousing in the Arroyo Verdugo Subregion. This activity is not prevalent within the subregion. Major truck traffic occurs on I-5 and warehousing is concentrated in close proximity to that freeway.

Figure 3
Arroyo Verdugo Subregion Warehouse Land Use



Source: StreetMap 2006,
SCAG 2000 Land Use

CENTRAL LOS ANGELES SUBREGION

Setting

The Central Area is generally bounded by the City of Glendale to the north; the cities of Inglewood, Vernon, and Commerce to the south; the cities of West Hollywood, Beverly Hills, and Culver City to the west; and the cities of Pasadena, South Pasadena, Alhambra, Monterey Park, and Montebello to the east.

The Central Area contains a diverse land use pattern that includes the county's heaviest concentration of commercial and government offices; major industrial areas along the Los Angeles River; the most densely populated residential communities in the region; and retail, recreational, and cultural facilities. Downtown Los Angeles is the county's largest employment district and over the past decade the site of a considerable amount of residential, entertainment, and retail development. The Central subregion's road infrastructure is built-out and cannot accommodate more road capacity without serious community impacts. The Central Los Angeles subregion

comprises a land area of 126 square miles.

Central Los Angeles Communities

Atwater Village, Baldwin Hills, Boyle Heights, Central City, Chinatown, Eagle Rock, Echo Park, Glassell Park, Hancock Park, Highland Park, Hollywood, Hollywood Hills, Korea Town, Leimert Park, Little Tokyo, Miracle Mile, Mt. Washington, Silver Lake, University Park, West Adams, Wilshire Center, portions of South Los Angeles, and the unincorporated county area of East Los Angeles.

Major Transportation Facilities

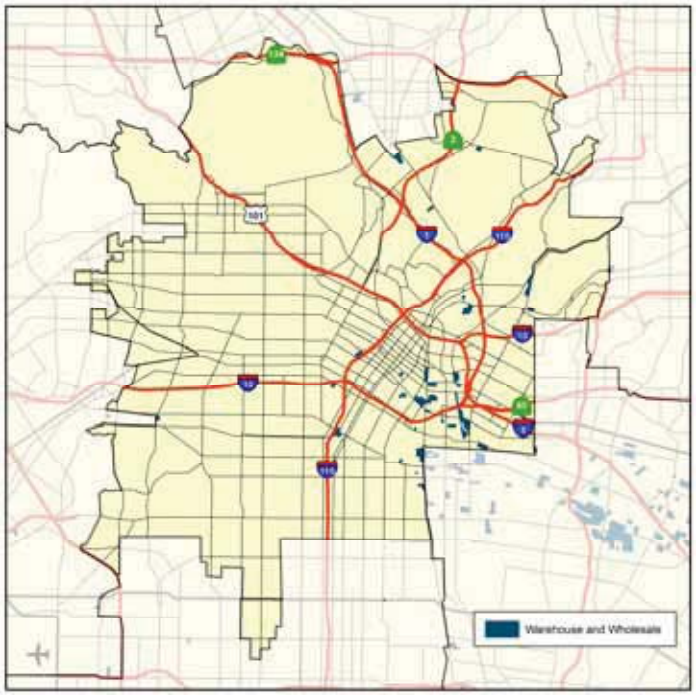
A total of eight freeways pass through the Central Area. They include SR-2 (Glendale Freeway), I-5 (Golden State/Santa Ana Freeway), I-10 (Santa Monica/San Bernardino Freeway), SR-60 (Pomona Freeway), SR-134 (Ventura Freeway), and the US-101 (Hollywood Freeway). The El Monte Busway runs along the San Bernardino freeway's median and terminates at Alameda Street. A transitway, which provides elevated HOV lanes and a busway, runs down the center of the Harbor Freeway from USC in Central Los Angeles south of the I-105 (Century Freeway).

Union Station, the Los Angeles Union Passenger Terminal (LAUPT), is the heart of the region's rail system. Amtrak, Metrolink and Metro's Rail system of fixed guideways (rail and transitways) emanate from Union Station. Union Pacific and BNSF freight railroads also traverse this subregion.

Warehousing

Figure 4 shows warehouse activity in the Central Los Angeles County Subregion. The subregion is a core manufacturing area in the county. A concentration is evident in the southwest portion in close proximity to I-5.

Figure 4
Central Los Angeles County Subregion Warehouse Land Use



Source: StreetMap 2006,
SCAG 2000 Land Use

GATEWAY CITIES SUBREGION

Setting

The Gateway cities are located in southeast Los Angeles County. This subregion is bounded to the south by the Pacific Ocean and Ports of Long Beach and Los Angeles; the Orange County Line on the east; the I-110 (Harbor Transitway) on the west; and SR-60 (Pomona Freeway) on the north.

There are approximately two million people who commute to workplaces throughout the county. The Gateway Cities have a highly diverse population that has formed and retained a unique identity throughout various cities. The Port of Long Beach is located within this subregion and serves as an important industrial center to Southern California. Historically, the region as a whole has been the industrial heartland of Los Angeles County and remains so in a number of the Gateway cities. The Gateway Cities subregion comprises a land area of 226 square miles.

Gateway Cities

Artesia, Avalon, Bell, Bell Gardens, Bellflower, Cerritos, Commerce, Compton, Cudahy, Downey, Hawaiian Gardens, Huntington Park, La Habra Heights, La Mirada, Lakewood, Long Beach,

Lynwood, Maywood, Montebello, Norwalk, Paramount, Pico Rivera, Santa Fe Springs, Signal Hill, South Gate, Vernon, and Whittier and the County of Los Angeles including the unincorporated areas of East Los Angeles and Whittier.

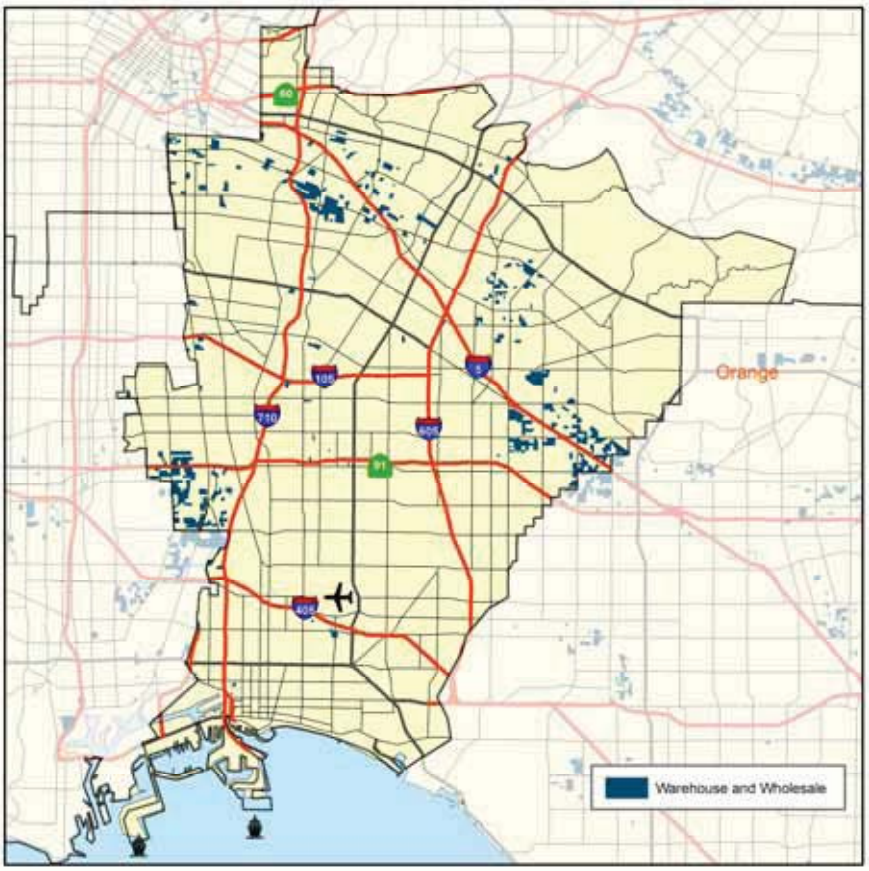
Major Transportation Facilities

The SR-60 (Pomona Freeway), SR-91 (Artesia Freeway), and I-105 (Glenn Anderson Freeway) serve as major east-west freeway corridors in this subregion. The I-5 (Santa Ana Freeway), I-405 (San Diego Freeway), I-710 (Long Beach Freeway), and I-605 (San Gabriel River Freeway) freeways serve as the major north-south corridors. The municipal airport of the City of Long Beach serves as a hub of corporate activity as well as being one of the busiest general aviation airports in the world. An all-weather port and a transportation infrastructure comprising marine terminals and rail and freeway networks are complemented by the Alameda Corridor, a 20-mile railway designed to speed cargo out of the Ports to all of North America while relieving arterial traffic delay and congestion. BNSF and Union Pacific trains operate within this subregion. In addition, the BNSF Hobart Yard, and Union Pacific's two intermodal rail facilities are located in this subregion. The Metro Blue and Green Lines provide service in this subregion.

Warehousing

Figure 5 shows warehousing in the Gateway Cities Subregion. Concentrations are evident along I-5 near the Orange County border, east of I-710 north of the ports, and at the confluence of I-5 and I-710.

Figure 5
Gateway Cities Subregion Warehouse Land Use



Source: StreetMap 2006,
SCAG 2000 Land Use

LAS VIRGENES/MALIBU SUBREGION

Setting

The Las Virgenes/Malibu subregion occupies the westernmost portion of Los Angeles County, and is bordered by Malibu and the Pacific Ocean to the south and Ventura County to the west and north. The area's most prominent feature is the strikingly rugged Santa Monica Mountains, which divide this subregion. The Las Virgenes cities occupy the north-facing foothills and valleys adjacent to the Santa Monica Mountains State Park and National Recreation Area. The Las Virgines/Malibu subregion comprises a land area of 162 square miles.

Las Virgenes/Malibu Cities

Agoura Hills, Calabasas, Hidden Hills, Malibu, and Westlake Village

Major Transportation Facilities

The Ventura Freeway (US-101) is the subregion's dominant transportation corridor, around which most commercial/research park development and employment opportunities have clustered. This generally low-density area has a limited network of arterial roadways, of which Pacific Coast Highway (SR-1) is the most heavily traveled. A series of north-south arterials connect the two highways, which include Decker/Westlake (SR-23), Kanan Dume/Kanan, Las Virgenes/Malibu Canyon Road, and Topanga Canyon Boulevard (SR-27).

Warehousing

As evident in Figure 6 there are no areas of warehousing in the Las Virgenes/Malibu subregion. The only freeway is US-101 and it is not a major truck carrier. The area is also noted for more exclusive residential areas. There is minimal industrial land use and much of the area is vacant due to the Santa Monica National Recreation Area located in this subregion.

Figure 6
Las Virgenes/Malibu Subregion Warehouse Land Use

Source: StreetMap 2006,
SCAG 2000 Land Use

NORTH LOS ANGELES COUNTY SUBREGION

Setting

This subregion comprises all of Los Angeles County north of the San Fernando Valley and includes the Angeles National Forest. The two most populous areas of the subregion are the Santa Clarita and Antelope Valleys. Santa Clarita, in the southern portion of the subregion, is divided between Lancaster and Palmdale in the Antelope Valley to the north, by the Angeles National Forest. The North Los Angeles County subregion comprises a land area of 2,503 square miles.

North Los Angeles County Cities

Lancaster, Palmdale, Santa Clarita, and parts of unincorporated Los Angeles County

Major Transportation Facilities

Area freeways include the Golden State (I-5) and the Antelope Valley (SR-14). SR-126 and SR-138 also impact the region. Metrolink operates commuter rail services with stations located in the cities of Lancaster, Santa Clarita and in unincorporated LA County. Union Pacific operates limited service within this subregion.

Warehousing

There is currently very limited development of warehousing in the North Los Angeles County Subregion (Figure 7). This area has potential to serve as a warehousing hub primarily due to its large tracts of available land at costs less than the more urbanized portions of the county.

Figure 7
North Los Angeles County Subregion Warehouse Land Use

Source: StreetMap 2006,
SCAG 2000 Land Use

SAN FERNANDO VALLEY SUBREGION

Setting

The Valley extends north of the Hollywood Hills and Santa Monica, west to the Las Virgenes/Malibu area, and eastwards near the San Gabriel Valley towards the Arroyo Verdugo subregion. This subregion occupies the north and central portions of Los Angeles County. The San Fernando Valley subregion comprises a land area of 250 square miles.

San Fernando Valley Cities and Communities

San Fernando Valley portion of the City of Los Angeles and City of San Fernando

Major Transportation Facilities

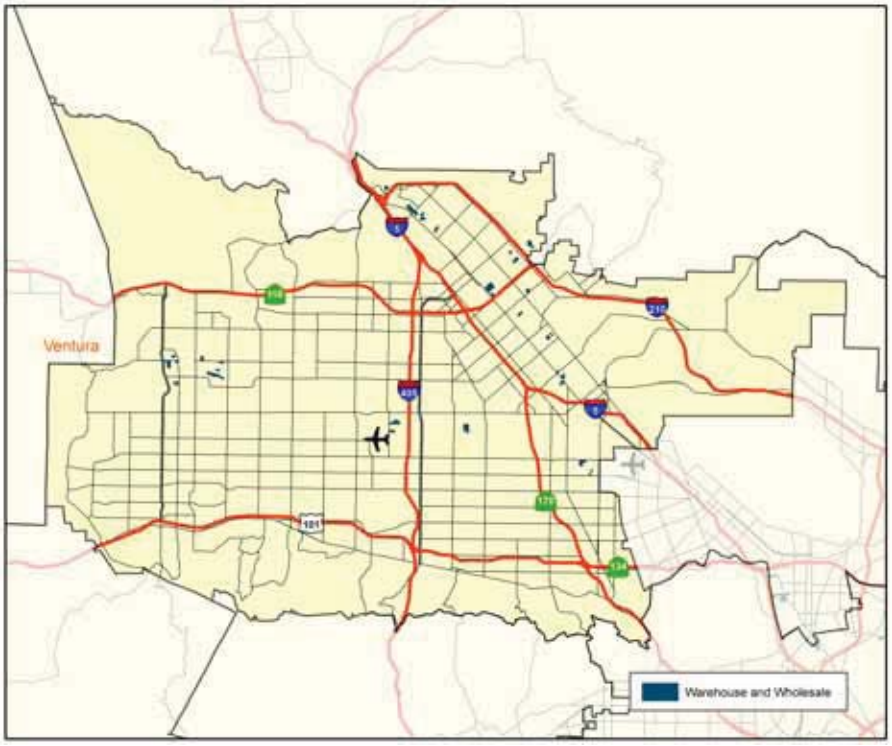
A number of freeways crisscross this subregion including the Golden State (I-5), Ventura (US-101 and SR-134), Simi Valley (SR-118), Hollywood (SR-170), San Diego (I-405), and Foothill (I-210) freeways. There are several carpool lanes running on SR-118, SR-134, SR-170, and I-405.

The Metro Red Line serves the area between downtown Los Angeles, Universal City and North Hollywood. The Metro Orange line is a 14 mile exclusive transitway that is an extension of the Metro Red line. It provides access into the Valley from North Hollywood. More than 20 Metro local bus lines as well as other municipal bus operators provide connections to the Orange line. Metrolink's Antelope Valley and Ventura County Lines and Amtrak provide passenger rail service into this subregion. There is limited freight service within the subregion through Union Pacific operations.

Warehousing

The San Fernando Valley Subregion has a limited amount of warehousing (Figure 8). The warehousing evident is found in conjunction with manufacturing areas in the subregion. The industrial land use pattern is also limited. The subregion is primarily residential with commercial development along major arterials.

Figure 8
San Fernando Valley Subregion Warehouse Land Use



Source: StreetMap 2006,
SCAG 2000 Land Use

SAN GABRIEL VALLEY SUBREGION

Setting

The San Gabriel Valley is located in the easternmost portion of Los Angeles County. This subregion is bounded on the west by the cities of Pasadena, South Pasadena, Alhambra and Monterey Park, on the north by the San Gabriel Mountains, on the east by the Los Angeles County/San Bernardino County Line, and on the south by the City of Montebello and the communities of Hacienda Heights and Rowland Heights.

The area is approximately 97 percent built-out leaving very little undeveloped land for commercial or industrial uses. The subregion encompasses thirty jurisdictions and a portion of an unincorporated county area whose combined population represents 20 percent of the total population of Los Angeles County. The San Gabriel Valley subregion is characterized by socioeconomic and ethnic diversity and is comprised of some of the most affluent and the lowest income communities within Los Angeles County. The San Gabriel Valley subregion comprises a land area of 345 square miles.

San Gabriel Valley Cities

Alhambra, Arcadia, Azusa, Baldwin Park, Bradbury, Claremont, Covina, Diamond Bar, Duarte, El Monte, Glendora, Industry, Irwindale, La Puente, La Verne, Monrovia, Montebello, Monterey Park, Pasadena, Pomona, Rosemead, San Dimas, San Gabriel, San Marino, Sierra Madre, South El Monte, South Pasadena, Temple City, Walnut, and West Covina

Major Transportation Facilities

One of the unique transportation features of this subregion is the significant number of freeways that traverse it; namely, San Bernardino (I-10), Foothill (I-210), Pasadena (SR-110), Orange (SR-57), Pomona (SR-60), Chino Valley (SR-71), San Gabriel River (I-605), and the Long Beach (I-710) Freeways.

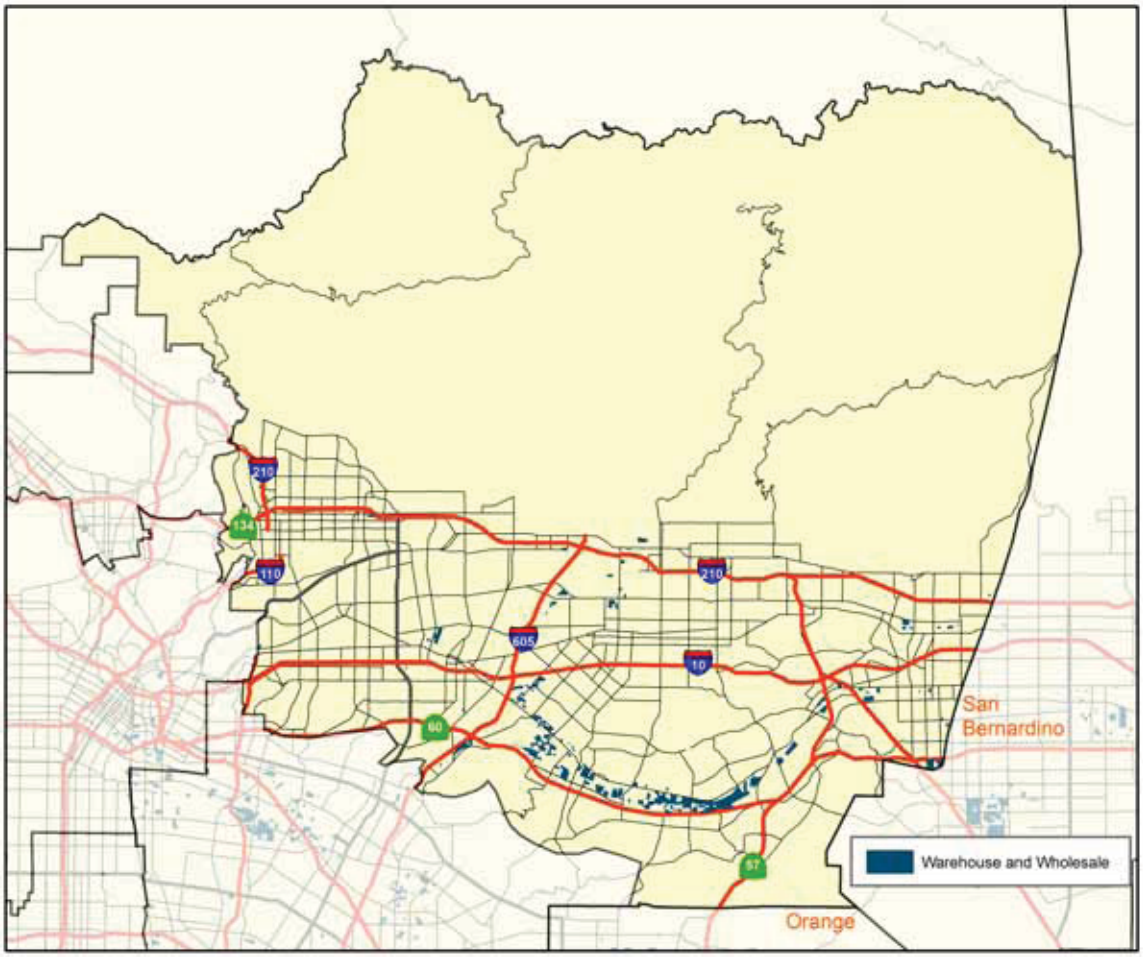
Another unique transportation feature is 70 miles of two mainline freight lines traveling east-west through the valley paralleling the I-10 and SR-60 freeways carrying goods through the valley to the rest of the nation. A major truck/railroad intermodal facility is located in the City of Industry.

The San Gabriel Valley subregion is served by the San Bernardino and Riverside Metrolink lines whose combined ridership accounts for approximately 42 percent of the system's total weekday ridership. The Metro Gold Line, which opened in July, 2003, serves the subregion with seven stations located in the cities of South Pasadena and Pasadena.

Warehousing

The most significant concentration of warehousing in the San Gabriel Valley Subregion is along SR-60 (Figure 9). Much of this concentration is in the City of Industry.

Figure 9
San Gabriel Valley Subregion Warehouse Land Use



Source: StreetMap 2006,
SCAG 2000 Land Use

SOUTH BAY CITIES SUBREGION

Setting

The South Bay cities are located at the southern end of the Santa Monica Bay – bounded by the Pacific Ocean on the west and south; the Port of Los Angeles, the City of Carson and the Harbor Freeway (I-110) on the east; the Marina Freeway (SR-90) and the cities of Inglewood and Los Angeles on the north.

The area is almost entirely built-out in terms of residential uses and has somewhat limited growth available for commercial and industrial uses. Land use patterns are such that new businesses have replaced older ones, rather than adding to the "stock" of subregional businesses. Typically, residential development follows a general pattern where the communities in the Beach cities and

on the peninsula are largely high-income areas, and the central and eastern portions of the subregion contain middle-income communities. The South Bay Cities subregion comprises a land area of 183 square miles.

South Bay Cities

Carson, El Segundo, Gardena, Hawthorne, Hermosa Beach, Inglewood, Lawndale, Lomita, City of Los Angeles – San Pedro/Wilmington Harbor Corridor, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Torrance, and parts of unincorporated Los Angeles County

Major Transportation Facilities

The Glenn Anderson (or Century, I-105), Harbor (I-110), and the San Diego (I-405) freeways serve the South Bay area. The Gardena Freeway (SR-91) weaves in and out of the easternmost portion of the subregion. A unique feature of the carpool lanes on the I-110 and I-105 freeways is that they flow directly into each other via an elevated direct connector interchange, bypassing the at-grade interchange used by other traffic.

The Metro Green Line runs in the median of the I-105 freeway from Norwalk in the east to the southern edge of Los Angeles International Airport (LAX), and then south to Redondo Beach. A short segment of the Alameda Corridor runs along the subregion's eastern border. Furthermore, BNSF provides limited freight service within this region.

Warehousing

There is a concentration of warehousing in the South Bay Cities Subregion, east of the 710 and north of the 405 (Figure 10). Most of the warehouse land use is near areas of petroleum refining and processing and focuses on related activities.

Figure 10
South Bay Cities Subregion Warehouse Land Use

Source: StreetMap 2006,
SCAG 2000 Land Use

WESTSIDE CITIES SUBREGION

Setting

The Westside cities subregion is bounded by Mulholland Drive to the north, the Pacific Ocean to the west, the South Bay Cities subregion to the south, and the Central Los Angeles subregion to the east. The subregion is a series of developed and mature communities with a mix of low, medium and dense residential, employment, and activity centers clustered within close proximity of each other. Some of the Westside cities almost triple in population during the day as they attract hundreds of thousands of people to employment, educational, commercial, cultural and recreational destinations from all over the Los Angeles region. Some of the Westside's neighborhoods (such as parts of Santa Monica, West Hollywood, Westwood and Venice) have population densities almost 10 times the county average, and more people will be calling the Westside home in future years.

Access is key in the Westside as people place a higher value on lifestyle preferences (geographical and community) and on amenities within short distances over job location. This clustering gives the feeling that all traffic seems to lead into the area bounded by Santa Monica, West Los Angeles, Westwood, Century City, Beverly Hills, and West Hollywood. The Westside cities' road infrastructure is completely built-out and cannot accommodate any more road capacity without serious community impacts. The Westside Cities subregion comprises a land area of

approximately 103 square miles.

Westside Cities and Communities

Beverly Hills, Culver City, Santa Monica, West Hollywood, parts of the city and county of Los Angeles including Pacific Palisades, Brentwood, Century City, Westwood, Westchester, LAX, Baldwin Hills, Ladera Heights, Marina del Rey, and Venice

Major Transportation Facilities

The Santa Monica (I-10), the San Diego (I-405), and Marina (SR-90) freeways serve the Westside area. Several major east-west and north-south boulevards parallel I-10 and I-405 providing primary access to and within the Westside area. The Los Angeles International Airport (LAX) is also located within this subregion.

Warehousing

As seen in Figure 11, there are only a few locations for warehousing in the Westside Cities Subregion. The two major freeways (I-405 and I-10) do not carry the large volumes of trucks like freeways to the east. There also is not a large amount of manufacturing in the subregion. The area is primarily residential with commercial along the major arterials. The area is primarily noted for some rather exclusive residential areas and high real estate values.

Figure 11
Westside Cities Subregion Warehouse Land Use

Source: StreetMap 2006,
SCAG 2000 Land Use

Los Angeles County Goods Movement System

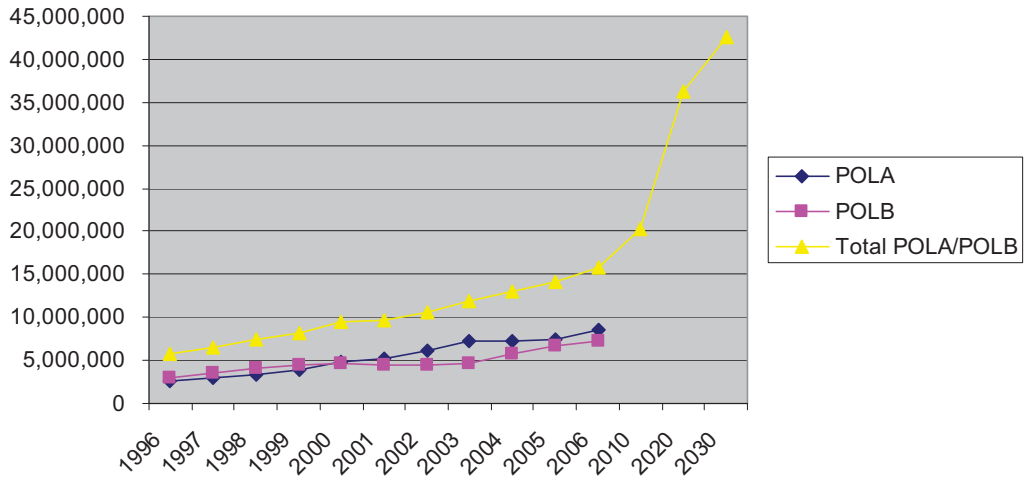
Los Angeles County is the nation's gateway to Asian trade and provides access to the heavily utilized Pacific Rim trade routes. Goods movement in the county utilizes a system of seaports, airports, intermodal facilities, and warehousing that are linked by freight rail lines, highways, and arterials.

SEAPORTS

Los Angeles County is the gateway to the Pacific Rim and is home to the Port of Long Beach (POLB) and Port of Los Angeles (POLA). In 2006, POLA handled about 8.5 million and POLB handled about 7.2 million twenty foot equivalent unit (TEU) containers, which ranked as the largest

and second largest ports, respectively, in the U.S. Between 1996 and 2006, port volume has increased more than 150 percent (Figure 12). When combined, the ports handled 15.7 million TEUs, making them the fifth largest in the world. Container volume at the ports represents one-third of all U.S. waterborne container traffic and six times the volume handled at the Bay Area ports. Three quarters of the trade through the ports is produced or consumed outside Southern California. Nearly $256 billion in containerized trade passed through the ports in 2005 and supported a national total of 3.3 million jobs generating over $100 billion in income. The Ports forecast that they will be handling 36.2 million TEUs by 2020 and 42.5 million TEUs by 2030.

Figure 12: Ports of Los Angeles and Long Beach container volume growth 1996-2006 (actual), 2010-2030(projected) (TEUs)



Sources: American Association of Port Authorities, Ports of Los Angeles and Long Beach

The POLA handled cargo worth $205.6 billion in FY 2006. Top trading partners (by cargo value) in FY 2006 were China, Japan, Taiwan, South Korea, and Thailand. Leading containerized exports (in FY 2006 by TEU volume) at the POLA include paper products, fabric (including raw cotton), pet and animal feed, metal scrap, and synthetic resins. Leading containerized imports (in FY 2006 by TEU volume) at the POLA include furniture, apparel, computers and office machines, toys and sporting goods, and vehicles and vehicle parts[3].

The POLB handled over 159 million metric revenue tons (MRT) in calendar year 2005. The cargo passing through the POLB in 2005 was valued at approximately $100 billion. Top ten trading partners with the POLB are China, South Korea, Japan, Hong Kong, Malaysia, Ecuador, Mexico, Indonesia, Taiwan, and Thailand. Leading exports by tonnage at the POLB include petroleum, chemicals, wastepaper, petroleum coke, scrap metal, plastics, foods, electronics, steel, cotton, and machinery. Leading imports by tonnage at the POLB include petroleum, electronics, plastics, furniture, clothing, machinery, rubber, cement, chinaware, and hardware[4].

AIRPORTS

The county has three major commercial airports- Los Angeles International Airport (LAX), Bob Hope Airport (BUR), and Long Beach Airport (LGB). The other airports located in the county are Palmdale Regional Airport (PMD) located in Antelope Valley and Van Nuys Airport (VNY) located in San Fernando Valley, both of which do not handle air cargo.

In 2005, LAX, LGB, and BUR handled 2,244,353 air cargo tons, accounting for 79 percent of total SCAG air cargo tonnage. LAX handled 95 percent of this with 2,137,188 tons. The remainder was contributed by Long Beach (54,298 tons) and Burbank (52,867 tons). Table 3 summarizes air cargo flows for the SCAG region counties.

Table 3
Annual Air Cargo Activity 2003-2005 MCGMAP Study Area Airports

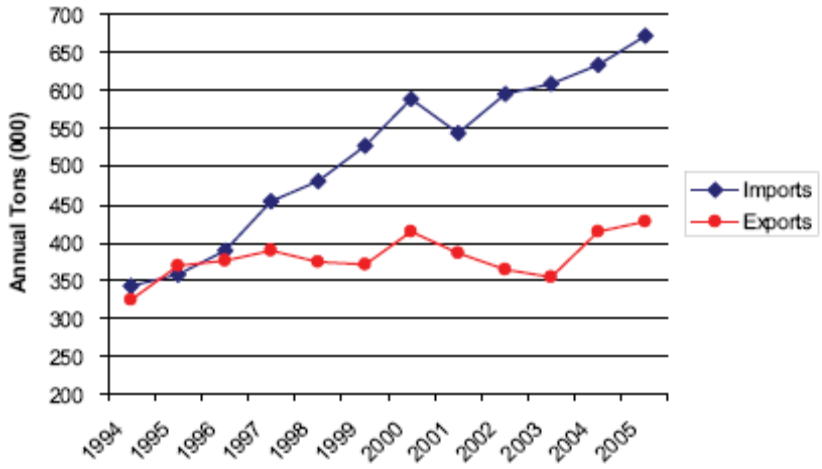
Airport	2003	2004	2005	2005 SCAG Market Share
Los Angeles (LAX)	2,022,076	2,115,314	2,137,188	75.20%
Ontario (ONT)	571,992	605,211	575,369	20.20%
Long Beach (LGB)	56,081	57,050	54,298	1.90%
Bob Hope (BUR)	47,634	49,633	52,867	1.90%
John Wayne (SNA)	15,816	20,796	24,103	0.80%
Total	2,713,599	2,848,004	2,843,825	100.00%

Source: SCAG Region Aviation Activity Report, 2003-2005

Los Angeles International Airport - LAX is the world's sixth busiest airport in air cargo tonnage, handling approximately 2.13 million tons in 2005. The leading reason for the concentration of air cargo activity at LAX is the broad range of service options and flights available to service providers. As a whole, air cargo carriers and service providers tend to gravitate toward airports that offer the broadest range of flights and destination options. Air cargo is a time sensitive business, and service providers want the flexibility to choose between a variety of different flight options to meet customer service and pricing needs. LAX offers the greatest variety of flights and destinations making it a preferred location for service providers. Of course, other factors such as infrastructure to support cargo operations, including air freight terminals, runways for larger aircraft, freight forwarders, trucking companies, customs, and Department of Agriculture inspections are also important.

Los Angeles World Airports (LAWA) notes that the greater Los Angeles region's international trade is valued at $200 billion, and LAX alone is responsible for more than $69 billion in exports and imports. Between 2000 and 2005, tonnage of international air freight passing through LAX rose 9.3 percent, imports grew by 13.9 percent, and exports grew by 2.8 percent. Figure 13 depicts historical trends in air freight imports and exports at LAX.

Figure 13
Air Freight Imports and Exports via Los Angeles International Airport
(1994- 2005)



Source: LAWA international freight statistics, 1994-2005

Airport property within the City of Los Angeles is 3,651 acres, constituting a large industrial district. The airport consists of the following cargo-specific facilities and uses:

- Four runways
- Four million square feet (SF) of passenger terminal space, including nine terminals and 163 aircraft gates
- 170 acres of cargo ramp and 2 million SF of building space concentrated in three cargo complexes
- Approximately 50 trucking firms operate terminals within two miles of the airport perimeter

Long Beach Airport - Situated in Los Angeles County, LGB handled 54,300 tons of air cargo in 2005. It is served by FedEx, Airborne Express, and UPS. The airport has four smaller runways ranging from 4,200 to 6,200 feet and one primary runway at 10,000 feet. The airport occupies 1,166 acres.

Bob Hope Airport in Burbank - BUR is the closest airport to downtown Los Angeles. The airport handled nearly 52,900 tons of cargo in 2005, 42 percent of which was inbound and 58 percent of which was outbound. The airport has two runways, one is 6,900 feet and the other is 5,800 feet.

Palmdale Regional Airport - Located in the Antelope Valley and the northeast portion of the city of Palmdale, PMD is on a 60-acre site at United States Air Force Plant 42. The airport is owned and operated by LAWA under a joint-use agreement with the U.S. Air Force. The airport has three

runways and features a modern 9,000 SF terminal capable of handling up to 300,000 passengers annually. PMD has no commercial service at this time and no reported cargo activity.

Van Nuys Airport - VNY is located in the heart of the San Fernando Valley and averages nearly one-half million takeoffs and landings annually, with 454,753 total operations in 2004. It is one of the four airports owned and operated by LAWA. Van Nuys Airport covers 725 acres and has two runways. VNY is a general aviation airport and has no commercial passenger service or reported air cargo activity.

INTERMODAL FACILITIES

Intermodal facilities allow for the transfer of containers between rail and truck. The location of an intermodal yard, relative to the ports, impacts the level of truck travel through the study area. The two types of intermodal terminals include on-dock rail terminals and near/off-dock terminals.

On-dock terminals are single-user facilities fed directly from an ocean vessel and are located within the POLA and POLB. Near/Off-dock facilities are typically common user facilities that create blocks of traffic built by terminal operators to match the markets served by the trains. For example, all Chicago freight is grouped together and separated from Dallas or Kansas City blocks of traffic. Five near/off-dock intermodal facilities are located in Los Angeles County. These include the Union Pacific in the City of Industry, City of Commerce, Intermodal Container Transfer Facility (ICTF), the Los Angeles Transportation Center (LATC) in Los Angeles, and the BNSF Hobart Yard in the City of Commerce. The two types of terminal facilities have important safety and velocity differences. On-dock terminals have been very successful in reducing truck traffic. A truck carrying a port-generated container to an intermodal yard near a port will travel a shorter distance than a truck going to an inland facility, or an off-dock intermodal yard. In 2005, over 1.6 million lifts (21 percent of the San Pedro Bay ports volume) were handled at the on-dock rail yards, while near/off-dock yards handled 19.5 percent of San Pedro Bay ports volume[5].

The efficiency of an intermodal yard has an impact on overall productivity and velocity of the goods movement system. Intermodal throughput capacity is affected by the types of operations and practices utilized by the railroads operating the intermodal yards. For example, the UP uses a "wheeled operation" at its Intermodal Container Transfer Facility (ICTF), where almost every container is stored on a trailer chassis. While this lowers the cost of operations, it also limits the container throughput per acre. In comparison, the BNSF uses management techniques to increase throughput per acre at its Hobart facility, including stacking containers vertically, allocating containers (per carrier), and imposing fees on containers that stay longer than a day. The result is that throughput per acre and per year is twice as high at Hobart as it is at ICTF. Marine terminal on-dock rail yards have a different set of safety concerns than off-dock rail facilities. These safety issues are driven by the marine terminal workers.

Based on acreage and volume data for various intermodal terminals in the Los Angeles County, the annual per acre throughput estimates are as follows:

- **UP's Los Angeles Transportation Center (LATC)** – 130 acres with 250,000 lifts annually - 2,100 lifts per acre[6]
- **UP's East Los Angeles (East LA) - 150 acres with 450,000 lifts annually (high)** - 3,200 lifts per year (capacity is 550,000 lifts per year - 3,900 lifts per acre) [7]. Forty-five percent of the intermodal lifts are international and 55 percent are domestic. This facility is a major processor of international containers. The City of Industry intermodal facility is situated within city limits and is operated as a domestic container facility.
- **UP's Intermodal Container Transfer Facility (ICTF) - 237 acres with 650,000 lifts in 2005** - 2,700 lifts per acre (capacity is 850,000 lifts annually – 3,500 lifts per acre).
- **BNSF's Hobart Yard - 245 acres with 1,350,000 lifts in 2005** – 5,500 lifts per acre. This facility is the largest intermodal operation in the U.S. when measured by volume. The annual throughput per acre is more than 10,000 TEUs.

WAREHOUSING

As illustrated in Figure 14, warehousing in the county is concentrated in the City of Industry, along SR-60, in the Alameda corridor south of SR-91 and two concentrations along I-5 near the Orange County line and south of the intersection of I-710.

The greater Los Angeles County area is attractive to warehousing and distribution centers due to its proximity to ports and consumers, a large and available labor force, and existing transportation hubs. There are three primary types and sizes of warehouses:

- Private and third-party refrigerated or cold storage warehouses grouped near ports, with clusters near downtown Los Angeles and Vernon. These warehouses tend to be smaller than 100,000 SF.
- Third-party transloading, cross-docking, and value-added distribution centers grouped near ports. These warehouses tend to be between 50,000 SF and 150,000 SF.
- A mixture of private and third-party warehouses clustered in "Mid-County", "San Gabriel Valley", and "Gateway Cities" such as the City of Industry, Santa Fe Springs, Cerritos, and La Mirada. These types of warehouses have between 50,000 SF and 150,000 SF and a concentration of local food, beverages, and paper goods distribution.

According to the U.S. Census Bureau, there were a total of 1,101 warehouses and storage facilities in Los Angeles County in 2001. The Census Bureau's definition for warehousing and storage sector is based on industry codes 48 and 49 under the North American Industry Classification System (NAICS). Among them, 63 percent are general warehousing and storage, 20 percent are refrigerated warehousing and storage, 10 percent are other warehousing and storage, and the remaining seven percent are used for farm product warehousing and storage.

Airports
Ports
Freeways
Highway
Urban Areas
Wholesaling/Warehousing

Multi-County Goods Movement Action Plan
Warehouse Land Use

0 5 10 20 Miles

N

Sources:
StreetMap 2006
SCAG 2000 Land Use

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Figure 14

Los Angeles' industrial market remains one of the strongest in the study area. The availability rate for the county continues to decline and the overall vacancy rate is also declining. Construction of new industrial facilities has increased, with approximately 8.8 million SF already in the planning and development phase.

The potential for warehousing growth in Los Angeles County is limited by the following conditions:

- Many buildings are old and too small for current operations
- Large blocks of land for new facilities are in short supply
- Lease costs are relatively high
- Increased highway and railroad congestion

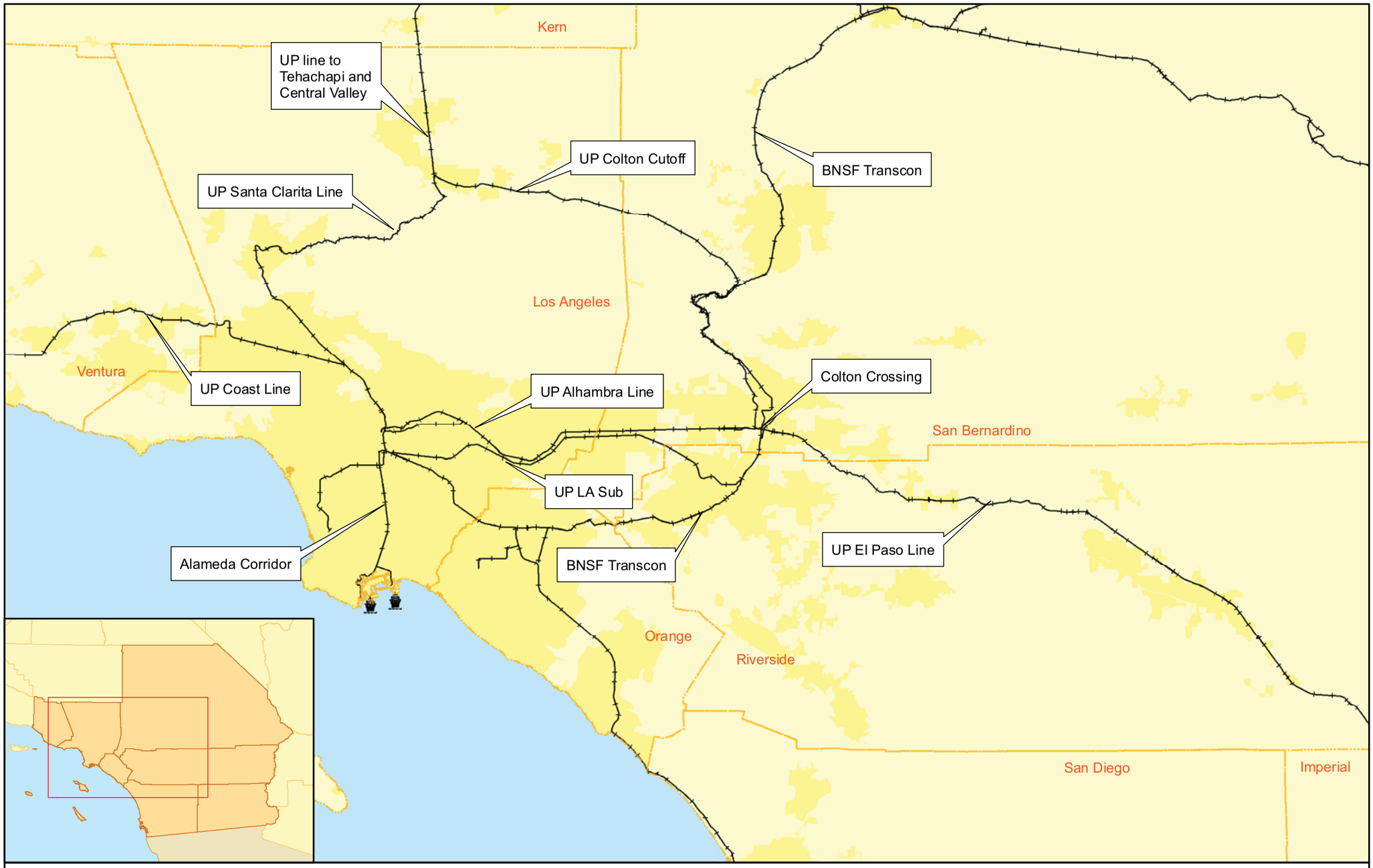
A contributing factor to the strong industrial market in Los Angeles County is the high volume of manufacturing activity occurring within the county. According to the Los Angeles County Economic Development Corporation (LAEDC), 11 percent (approximately 808,000 jobs) of the five county (Los Angeles, Orange, Riverside, Ventura and San Bernardino Counties) Southern California region's total employment is factory [manufacturing] jobs. The LAEDC points out that more than two-thirds of these manufacturing jobs are at companies with fewer than 250 employees; however, the LAEDC states that Los Angeles County as a whole is the nation's largest manufacturing center.

RAIL

Freight trains in the County primarily utilize three east-west rail lines, the Alameda Corridor, and short lines. These lines provide connections between the Ports of Los Angels and Long Beach, the Los Angeles Basin, and the transcontinental rail system. International container traffic going to and from the POLA and POLB is routed along the Alameda Corridor then either through the BNSF Transcon west of San Bernardino, the UP Los Angeles Subdivision, or the UP Alhambra Subdivision as shown in Figure 15. Passenger trains including Amtrak (intercity passenger rail) and Metrolink commuter (transit rail) operations share the freight rail network in the county.

The three basin lines transport more than 98 percent of all Los Angeles and Long Beach port intermodal traffic (which includes about 52 percent of the total San Pedro Bay ports container volume as well as transload and intermodal volumes). These lines also transport all automobile rail loads imported and exported through the ports of Los Angeles, Long Beach, San Diego, and Hueneme. In addition, the lines transport carload traffic and connect to branch lines in the basin.

The BNSF Transcon runs from San Bernardino to downtown Los Angeles, where it connects to the triple track Alameda Corridor and eventually to the POLA and POLB. UP's Los Angeles Subdivision runs from West Riverside to downtown Los Angeles, and the Alhambra Subdivision runs from Colton in San Bernardino County to downtown Los Angeles. Both lines connect to the Alameda Corridor. They also connect to the north-south rail routes for UP, the Coast and the Santa Clarita Lines.



Airports
Ports
Railroad
Urban Areas

Multi-County Goods Movement Action Plan
Railroad Lines

0 15 30 60 Miles

N

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006
MCGMAP Tech Memo 3 2006

Figure 15

Metrolink operates its 91 Line service, its Inland Empire Orange County Line service, and its Orange County Line service on the BNSF Transcon. Amtrak's long distance Southwest Chief and the Amtrak Pacific Surfliners also operate on the Transcon.

The markets served by BNSF and UP generate significant train volumes. The average east-west daily train count on BNSF during the late week period (Wednesday-Friday, the busiest days) is included in Table 4. Table 5 provides the average east-west daily train counts on UP (Wednesday-Friday, the busiest days) at West Riverside on the Los Angeles Subdivision and South Fontana on the Alhambra Subdivision. Passenger trains include Metrolink commuter trains, Pacific Surfliner trains, and Amtrak long distance trains. Most of the passenger trains on BNSF Los Angeles Basin lines travel between Los Angeles and Fullerton.

Table 4
Average Daily Trains on BNSF East-West Mainline between Hobart Yard and Fullerton
Wednesday-Friday

Transcon	2003	2004	2005 (thru July)
Freight	47	49	48
Passenger	52	52	57
TOTAL	99	101	105

Sources: BNSF, 2005; and Metrolink, 2006

Table 5
Average Daily Trains on UP East-West Mainlines at Fontana on the Alhambra Subdivision and at West Riverside on the Los Angeles Subdivision
Wednesday-Friday

Los Angeles Subdivision	2003	2004	2005 (thru July)
Freight	22	24	23
Passenger	12	12	12
Total	34	36	35
Alhambra Subdivision	**2003**	**2004**	**2005 (thru July)**
Freight	41	44	43
Passenger	1	1	1
Total	42	45	44
Grand Total	76	81	79

Source: "The Los Angeles-Inland Empire Railroad Mainline Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC) for SCAG, 2002.

Alameda Corridor

Opened in April 2002 at a cost of $2.4 billion, the Alameda Corridor is one of the largest public/private goods movement projects in the nation. The Alameda Corridor is a completely grade separated rail line connecting POLA/POLB to the downtown Los Angeles rail yards. It has doubled railroad speeds and eliminated conflict at 200 at-grade crossings, resulting in significant air quality and community benefits. The Corridor was financed through a combination of local funds, loans,

and revenue bonds, which are being repaid by fees collected on containers using the Corridor. Fees vary by the type of container, with one waterborne loaded TEU paying $16.75 per hour. In 2007, the Corridor handled an average of 49 trains per day[8].

Short Lines

The Los Angeles Junction Railway (LAJ) operates in the cities of Commerce and Vernon. LAJ is a wholly-owned subsidiary of BNSF. UP has access to all customers through LAJ. The track and property are owned by BNSF, but are maintained and dispatched by LAJ.

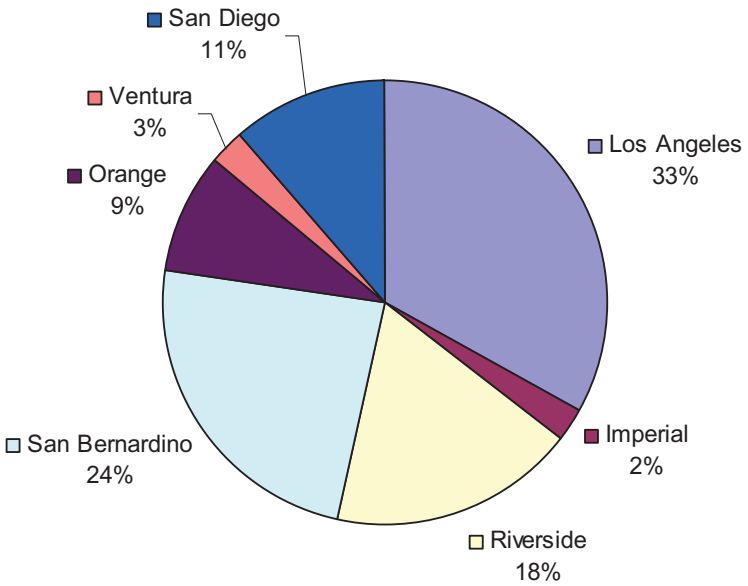
ROADWAY SYSTEM & TRUCK FLOWS

The roadway system within Los Angeles County can be divided into three primary components: freeways, arterials, and local roads. The purpose of each of those components, in terms of goods movement, is summarized below:

- Freeways link the cities throughout Los Angeles County to the adjoining counties, states, and nations. For the purposes of this report, the term freeway refers to both interstate highways and state highways. The freeways in Los Angeles County link the freight gateways (ports, intermodal facilities, etc.) to markets throughout the United States, Canada, and Mexico. Freeways provide the infrastructure to service the short-, medium-, and long-haul (or line-haul) portions of truck trips. The Los Angeles County freeway system carries approximately 52 percent of all Los Angeles County trips, which are served by a large number of limited access highways. The major limited access highways that serve goods movement are I-5, I-10, SR-60, SR-91, I-605 and I-710.
- Arterials serve as the link between freeways and local roads. The arterials in Los Angeles County provide the necessary connectivity for both personal and commercial transportation. According to the 2004 SCAG RTP, these facilities often act as alternatives to freeways. This is especially true in the case of short-haul trips between adjacent cities in the study area, as well as between major goods movement activity centers such as ports' intermodal yards and warehousing areas.
- Local Roads provide the final link between the freight gateways and the local markets. Local roads are commonly utilized to travel from the arterials to the warehouse and distribution facilities. The impacts of truck traffic can sometimes appear greater on local facilities due to limited size and capacity. The majority of truck trips on local roads are of short length, representing the first or last stage in goods movement between distribution centers, markets, or both. Local roads could be used as detours when freeways fail due to non-recurrent congestion. For example, when I-710 shuts down, Long Beach Boulevard and Alameda Street (north-south arterials parallel to I-710) serve as alternate routes, and Washington Boulevard serves as a detour option for I-10.

Figure 16 shows the distribution of truck traffic in the region by county, measured in terms of truck miles of travel on the state highway system. Los Angeles County accounts for 33 percent of the total regional truck miles of travel – the highest in the region.

Figure 16
Distribution of Truck Travel by County



Source: "Truck Miles of Travel: California State Highway System 1988-2003," California Department of Transportation (Caltrans), 2005

Table 6 shows the 2003 truck volumes on the county's freeway segments. Some of the heavily used truck corridors in the county include the following:

Table 6
2003 Truck Volumes on County's Freeway Segments

Route	Segments	County	Year 2003 Trucks ADT by Direction		Total Truck ADT 2003
			N/E	S/W	
I-10	PCH to I-405	Los Angeles	5,555	5,083	10,638
I-10	I-405 to I-110	Los Angeles	5,183	5,456	10,639
I-10	I-110 to I-5	Los Angeles	6,862	6,356	13,218
I-10	I-5 to I-710	Los Angeles	3,868	4,160	8,028
I-10	I-710 to I-605	Los Angeles	6,498	7,160	13,658
I-10	I-605 to SR-57	Los Angeles	7,900	9,001	16,901
I-10	SR-57 to I-15	San Bernardino/Los Angeles	9,863	8,140	18,003
I-101	I-5 to I-10	Los Angeles	4,000	4,589	8,589
I-101	I-10 to I-110	Los Angeles	5,560	5,838	11,398

Table 6
2003 Truck Volumes on County's Freeway Segments

Route	Segments	County	Year 2003 Trucks ADT by Direction		Total Truck ADT 2003
			N/E	S/W	
I-101	I-110 to I-170	Los Angeles	3,772	3,966	7,738
I-101	SR-170 to I-405	Los Angeles	3,932	3,806	7,738
I-101	I-405 to SR-23	Ventura/Los Angeles	4,885	5,390	10,275
I-105	PCH to I-405	Los Angeles	5,928	5,281	11,209
I-105	I-405 to I-110	Los Angeles	5,500	5,709	11,209
I-105	I-110 to I-710	Los Angeles	8,782	8,585	17,367
I-105	I-710 to I-605	Los Angeles	8,889	8,357	17,346
I-110	Arroyo Pky to I-10	Los Angeles	241	210	451
I-110	I-10 to I-105	Los Angeles	7,808	7,580	15,388
I-110	I-105 to SR-91	Los Angeles	8,595	7,972	16,567
I-110	SR-91 to I-405	Los Angeles	11,175	7,610	18,785
I-110	I-405 to SR-47	Los Angeles	4,594	6,432	11,026
I-210	SR-14 to SR-118	Los Angeles	4,982	4,496	9,478
I-210	SR-118 to SR-2	Los Angeles	4,765	5,286	10,051
I-210	SR-2 to SR-134	Los Angeles	9,383	6,735	16,118
I-210	SR-134 to I-605	Los Angeles	7,679	8,439	16,118
I-210	I-605 to SR-57	Los Angeles	3,432	3,448	6,880
I-405	I-605 to I-710	Los Angeles	5,431	4,169	9,600
I-405	I-710 to I-110	Los Angeles	6,796	9,006	15,802
I-405	I-110 to SR-91	Los Angeles	5,729	5,846	11,575
I-405	SR-91 to I-105	Los Angeles	6,028	5,849	11,877
I-405	I-105 to I-10	Los Angeles	6,178	5,700	11,878
I-405	I-10 to US-101	Los Angeles	6,933	6,085	13,018
I-405	US-101 to I-5	Los Angeles	4,572	4,122	8,694
I-5	SR-118 to SR-14	Los Angeles	6,016	6,020	12,036
I-5	SR-134 to SR-118	Los Angeles	8,475	7,922	16,397
I-5	SR-60 to SR-134	Los Angeles	9,751	8,233	17,984
I-5	I-710 to SR-60	Los Angeles	10,643	9,474	20,117
I-5	I-605 to I-710	Los Angeles	11,042	10,018	21,060
I-5	Los Angeles County Line to I-605	Los Angeles	10,906	9,751	20,657
I-5	SR-57 to Los Angeles County Line	Los Angeles	9,490	8,710	18,200
I-605	I-405 to SR-91	Los Angeles	4,317	4,341	8,658
I-605	SR-91 to I-105	Los Angeles	5,663	5,773	11,436
I-605	I-105 to I-5	Los Angeles	19,005	18,695	37,700
I-605	I-5 to SR-60	Los Angeles	17,803	18,061	35,864
I-605	SR-60 to I-10	Los Angeles	10,201	17,449	27,650
I-605	I-10 to I-210	Los Angeles	9,898	9,491	19,389

Table 6
2003 Truck Volumes on County's Freeway Segments

Route	Segments	County	Year 2003 Trucks ADT by Direction		Total Truck ADT 2003
			N/E	S/W	
I-710	Port to I-405	Los Angeles	12,931	13,199	26,130
I-710	I-405 to SR-91	Los Angeles	19,351	18,537	37,888
I-710	SR-91 to I-105	Los Angeles	18,719	19,553	38,272
I-710	I-105 to I-5	Los Angeles	18,277	18,273	36,550
I-710	I-5 to SR-60	Los Angeles	5,512	5,873	11,385
I-710	SR-60 to I-10	Los Angeles	5,158	6,227	11,385
I-710	I-10 to I-210	Los Angeles	216	1,281	1,497
SR-134	I-5 to I-210	Los Angeles	2,988	2,720	5,708
SR-134	I-101 to I-5	Los Angeles	2,850	2,858	5,708
SR-57	SR-91 to SR-60	Orange/Los Angeles	10,404	9,996	20,400
SR-57	SR-60 to I-10	Los Angeles	4,718	4,636	9,354
SR-57	I-10 to I-210	Los Angeles	7,967	8,127	16,094
SR-60	I-10 to I-710	Los Angeles	5,116	5,048	10,164
SR-60	I-710 to I-605	Los Angeles	7,546	8,529	16,075
SR-60	I-605 to SR-57	Los Angeles	9,202	10,593	19,795
SR-60	SR-57 to I-15	Riverside/Los Angeles	10,771	13,569	24,340
SR-91	I-10 to I-710	Los Angeles	7,021	6,589	13,610
SR-91	I-710 to I-605	Los Angeles	12,492	12,788	25,280
SR-91	I-605 to I-5	Los Angeles	12,092	13,188	25,280
SR-118	I-405 to SR-23	Ventura/Los Angeles	11,076	14,204	25,280
SR-170	I-5 to SR-134	Los Angeles	3,339	3,337	6,676

Source: Caltrans, Traffic and Vehicle Data Systems Unit, 2004 Truck; Wilbur Smith Associates, 2007

Departing trucks must travel through Los Angeles County to reach destinations within the study area. Freeway facilities near ports carry high volumes in truck traffic. Roadway facilities are used to carry goods from the Ports to inland distribution warehouses and/or rail yards; this constitutes one of the first links in the goods movement supply chain. Transport of transloaded goods represents the second and/or third links of the goods movement supply chain. Therefore, more secondary and tertiary truck trips are carried on freeways and roadways further inland from the Ports.

In 2004, the POLA commissioned the Baseline Transportation Study to identify existing truck traffic volumes to and from the port.[9] The study yielded data that identified specific port-related truck traffic on roadways within the study area. The study defines port-related trucks as container trucks traveling to and from the San Pedro Bay port facilities. The 2004 POLA study data was analyzed in conjunction with Caltrans truck count data for identical roadway segments and identified the percentage of port-related trucks compared to total truck volumes on study area roadways. The result of this analysis is shown in Table 7.

Table 7
Comparison of Port Truck Volumes to Total Daily Truck Volumes on Study Area Roadways, Year 2003

Highways	Segments	Total Daily Vehicle Volume	Total Daily Truck Volume	Daily Port Truck Volume	Total Trucks as % of Total Vehicle Volume	Port Trucks as % of Total Truck Volume
I-110	PCH to Sepulveda	148,000	9,900	7,810	6.7%	78.9%
	Sepulveda to I-405	226,000	11,900	7,335	5.3%	61.6%
	I-405 to SR-91	266,000	23,900	6,015	9.0%	25.2%
	SR-91 to I-105	247,000	17,800	4,680	7.2%	26.3%
	I-105 to I-10	324,000	15,900	2,485	4.9%	15.6%
I-710	PCH to Willow	146,000	25,400	23,900	17.4%	94.1%
	Willow to I-405	161,000	27,100	23,235	16.8%	85.7%
	I-405 to SR-91	186,000	31,400	20,045	16.9%	63.8%
	SR-91 to I-105	227,000	38,300	15,315	16.9%	40.0%
	I-105 to I-5	237,000	34,600	11,685	14.6%	33.8%
	I-5 to SR-60	199,000	24,200	1,025	12.2%	4.2%
	SR-60 to I-10	132,000	11,300	845	8.6%	7.5%
I-405	I-605 to I-710	289,000	15,700	1,875	5.4%	11.9%
	I-710 to I-110	283,000	15,400	2,965	5.4%	19.3%
	I-110 to SR-91	270,000	14,600	1,960	5.4%	13.4%
	SR-91 to I-105	294,000	12,100	1,810	4.1%	15.0%
	I-105 to I-10	310,000	12,800	1,590	4.1%	12.4%
SR-91	SR-57 to I-5	250,000	21,800	1,135	8.7%	5.2%
	I-5 to I-605	283,000	39,900	1,470	14.1%	3.7%
	I-605 to I-710	263,000	37,100	2,870	14.1%	7.7%
	I-710 to I-110	212,000	13,700	1,385	6.5%	10.1%
	I-110 to I-405	67,000	1,500	195	2.2%	13.0%
I-105	I-605 to I-710	212,000	18,800	2,800	8.9%	14.9%
	I-710 to I-110	231,000	14,700	1,605	6.4%	10.9%
	I-110 to I-405	243,000	13,800	390	5.7%	2.8%
I-5	SR-57 to SR-91	223,000	21,400	225	9.6%	1.1%
	SR-91 to I-605	199,000	18,600	160	9.3%	0.9%
	I-605 to I-710	249,000	23,200	195	9.3%	0.8%
	I-710 to SR-60	267,000	20,600	1,800	7.7%	8.7%
	SR-60 to I-10	247,000	20,400	710	8.3%	3.5%
SR-60	SR-57 to I-605	265,000	23,200	1,560	8.8%	6.7%
I-10	SR-57 to I-605	259,000	18,100	1,775	7.0%	9.8%
	I-605 to I-710	234,000	14,200	585	6.1%	4.1%
	I-710 to I-5	254,000	9,000	190	3.5%	2.1%
	SR-60 to I-110	284,000	21,600	300	7.6%	1.4%
I-605	I-405 to SR-91	245,000	11,300	20	4.6%	0.2%

Table 7
Comparison of Port Truck Volumes to Total Daily Truck Volumes on Study Area Roadways, Year 2003

Highways	Segments	Total Daily Vehicle Volume	Total Daily Truck Volume	Daily Port Truck Volume	Total Trucks as % of Total Vehicle Volume	Port Trucks as % of Total Truck Volume
	I-105 to I-5	297,000	41,900	4,100	14.1%	9.8%
	I-5 to SR-60	265,000	37,400	3,825	14.1%	10.2%
	SR-60 to I-10	224,000	26,800	1,815	12.0%	6.8%
SR-57	I-5 to SR-91	276,000	18,800	10	6.8%	0.1%
	SR-91 to SR-60	296,000	23,400	135	7.9%	0.6%
	SR-60 to I-10	139,000	8,100	40	5.8%	0.5%

Sources: "Baseline Transportation Study," Port of Los Angeles, 2004, p. 39; Caltrans Truck Volumes 2004 (Year 2003 Data)

The following key observations can be made from this data:

- I-710 is the primary and dominant corridor for port-specific traffic
- An inverse relationship exists between distance to the ports and port-related traffic: as distance to the port increases, direct port-related truck volume decreases.

The 2004 POLA study states that a significant decrease in container truck activity was noted on the I-710 and I-110 freeways during congestion. However, less of a reduction was noted on SR-60 and SR-91,[10] due to the fact that these facilities were used by large shippers of domestic and transloaded cargo (such as Wal-Mart and Target), transported with the trucks to inland destinations.

County Specific Challenges and Issues

In Los Angeles County, goods movement issues do not influence all of the subregions in the same manner. The west side of the county faces issues similar to those faced in Ventura County, and the east side of the county faces issues similar to those faced in Riverside and San Bernardino Counties. Certain issues are more pronounced near the ports, a key generator of freight volume.

Los Angeles County faces the following critical issues (not in priority order):

- Environmental and community impacts, and potential health risks
- Increasing rail and truck volume and their associated impacts
- Port, intermodal, and air cargo capacity
- Economic growth
- Funding limitations

ENVIRONMENTAL AND COMMUNITY IMPACTS, AND POTENTIAL HEALTH RISKS

Throughout the stakeholder outreach process of the MCGMAP, members of the local communities in and around areas of high goods movement activity expressed concerns about impacts caused by goods movement. In addition, numerous studies have shown that the movement of goods throughout the MCGMAP region results in adverse impacts to the environment, community, and quality of life. The residents of Los Angeles County are aware of the impacts of goods movement and have voiced their concern to public agencies planning and implementing goods movement projects. Some stakeholders within Los Angeles County have made it clear that they will oppose any future enhancements to the county's goods movement system unless mitigation measures are first implemented to reduce existing impacts to the environment and community. In addition to air quality, the goods movement industry impacts almost all other areas of the environment and community, including water, health, noise, lighting, hazardous materials, and general quality of life.

In Los Angeles County, goods movement negatively impacts air quality. This is due to the high amount of goods movement activity from ocean-going vessels, trucks, locomotives, and other cargo handling activities associated with the movement of goods and the reliance on diesel fuel by the goods movement industry for mobility and operations. As discussed in Chapter 5 of the MCGMAP, diesel fuel results in the emissions of diesel particulate matter (DPM), which has been identified as a toxic air contaminant (TAC) by the state's Office of Environmental Health Hazard Assessment (OEHHA). Diesel fuel is also a significant contributor of nitrogen oxides (NOx), the primary pollutant for ozone formation. Both DPM and NOx are linked to various health issues for susceptible populations like the young and the elderly; as well as people with cancer and asthma, preterm births, and low birth weight babies.

Further health effects can be attributed to diesel particulate matter according to research compiled by the Keck School of Medicine of University of Southern California (USC). This research determined an increase in the following incidences:

- Asthma
- Preterm and low birth weight babies
- Cardiac birth defects
- Thickening of arterial walls
- Oropharyngeal (mouth and throat) cancer
- Slowed lung development in children

Also, there is concern about the health of people residing in proximity to goods movement facilities and corridors. There are 46 schools located within two miles of the Port of Los Angeles or the Port of Long Beach (i.e., San Pedro Bay ports) as displayed in Figure 17.

Figure 17
Schools Located Within a 2-Mile Radius of San Pedro Bay Ports

Source: 2000 U.S. Census TIGER Data

Goods movement accounts for one-third of total NOx emissions and six percent of total PM-10 emissions[11] with heavy duty trucks as the largest source of emissions. Heavy duty trucks that meet the 2007/2010 EPA emissions standards will significantly lower emissions even with increases in vehicle miles traveled. Ocean-going vessel (OGV) emissions will continue to grow. In 2030, OGV emissions in the South Coast Air Basin will be three times the current level. Without additional caps, locomotive emissions will also increase. Harbor craft and port handling equipment emissions are expected to decline[12] due to proactive steps taken by ports and nearby communities.

Due to the current dependency of the goods movement industry on diesel fuel, this plan discusses the need for emission reduction from goods movement mobile sources including OGVs, on-road heavy-duty vehicles, cargo handling equipment, harbor craft, and railroad locomotives. There are a number of strategies included in the SCAG/ICF International study entitled "Environmental Mitigation Plan for Goods Movement in Southern California" that reduce emission from these sources. Implementation of the strategies outlined in the SCAG/ICF Study will have a linear effect on the reduction of emissions (e.g. a 20 percent penetration will have twice the emission reduction of a 10 percent penetration).

In addition to goods movement-related emissions, other impacts on local communities should also be recognized. These include:

- Noise
- Traffic congestion
- Land use conflicts such as residential neighborhoods located adjacent to goods movement facilities and/or activities,
- Visual impacts or views blocked by stacks of containers/blight

Noise impacts occur in association with loading and unloading activities, and along rail and truck routes that support the movement of trains or trucks. Congestion on freeways and the street network can compound noise impacts from trucks, from the sounds created by their braking and acceleration. To the extent that congestion on streets that serve warehouse operations increases over time, the potential for noise impacts also increases. Communities located near the air and water ports, rail yards, and other transfer points frequently complain about the annoyances associated with the operations of these facilities.

Furthermore, rail noise impacts arise from the sound of at-grade crossing warning devices. Since safety regulations require that these devices be sounded as a train approaches and during the entire time that the train is passing through the crossing, the noise impact can occur for several minutes at a time. Concurrently, while traffic awaits a train's passage, idling trucks can create annoying noise and also increase air pollution in the area.

Other impacts that affect local communities include traffic congestion and bright or spillover lighting where transfer facilities are located near residential areas. Over time, the lengthening durations of nighttime work has increased, which increases annoyance and concern among residents of affected communities.

Negative impacts on communities from goods movement are also the result of land use decisions. Residential areas are often in close proximity to truck and rail corridors as well as highly industrialized ports and high-activity warehousing and distribution centers. Property prices adjacent to ports and goods movement corridors are generally discounted due to their location. This has increased the conflict between residential and industrial land uses because (a) goods movement facilities have expanded thus encroaching into residential neighborhoods, and (b) residential development due to population growth (and a need for affordable housing) has expanded thus encroaching onto goods movement facilities. Buffer zones are being squeezed out of existence thereby resulting in land use incompatibilities.

To begin to address these issues, Metro, Riverside County Transportation Commission, San Bernardino Associated Governments, and Ventura County Transportation Commission recently received a Caltrans grant to conduct the Environmental Justice Analysis and Outreach project. The purpose of this effort is to develop a guidebook that contains strategies and best practices that can be used by local jurisdictions and businesses to mitigate the community and environmental impacts of goods movement. In addition, the guidebook will contain one case study per county that will analyze and recommend strategies to reduce the impacts of goods movement.

RAIL AND TRUCK VOLUMES AND RELATED IMPACTS

Increasing rail and truck volume on the county's rail and roadway network will result in increased delay and congestion. Related to this volume are delay and safety impacts at at-grade rail crossings and safety and pavement deterioration impacts from truck travel.

Rail Volumes and Related Impacts

Mainlines east of Los Angeles are reaching capacity with a resulting delay of over 30 minutes in an average train trip between Los Angeles and Colton. BNSF Transcon is 95 percent double tracked between Los Angeles and Chicago giving BNSF a clear advantage over UP in line-haul capacity and speed. BNSF has stated that Transcon will be at capacity by 2010 between Commerce and Fullerton if a third track is not constructed.

Metrolink operates commuter service from Riverside to Los Angeles on the UP LA Subvision Line. UP could shift many freight trains now operating to Riverside on the LA Sub Line over to the Alhambra Line at Pomona. These changes would create a freight-only route and a mixed freight/passenger route resulting in increased operational efficiency for UP. None of these changes is currently funded and the reroute of Metrolink trains will require a new agreement with the commuter train agency.[13]

Significant freight rail capacity issues have emerged in recent years along the Union Pacific, Alhambra, Los Angeles subdivision and the BNSF Transcon Lines. Figure 18 shows the increase in rail volumes by the year 2025. Absent additional track capacity, the mainline rail system could experience delays of over 3 hours per train by 2010 (Table 8). Increasing freight volumes can also impact passenger service by increasing delay and reducing capacity for future growth. In addition, the growing number of freight trains will increase passenger vehicle delay and emissions at-grade road/rail crossings. For example, a recent trucking/goods movement survey administered to the South Bay Cities identified 19 locations where rail crossings caused significant motorist delay.[14] Furthermore, between 2002 and 2006 15 collisions at at-grade road/rail crossings occurred in this subregion. Almost all of the incidents involved vehicles ignoring warnings and entering the crossing.

Table 8
Freight train delay on the UP and BNSF mainline freight network (existing tracks with no improvements)

	Average Delay Per Train (minutes)	
	Year 2000 baseline	2010 Freight/2000 Passenger
BNSF Freight	31.9	206.3
UP Freight	30.4	196.9

Source: LA-Inland Empire Railroad Mainline Advanced Planning Study, 2002

The Alameda Corridor, one of the more notable goods movement projects in Los Angeles County, was developed specifically to address many of these issues. It consolidates harbor-related rail traffic from four separate branch lines into a 20-mile, fully grade-separated route. The corridor connects the POLA and POLB to the transcontinental rail line near downtown Los Angeles and eliminates traffic conflicts at 200 at-grade crossings, thereby reducing accidents, improving the safety of the traveling public, and reducing emissions and congestion.

Based on the demonstrated benefits of the Alameda Corridor, the Alameda Corridor-East Construction Authority, the Gateway Council of Governments, and the South Bay Council of Governments have identified a series of grade crossings that need to be improved or grade-separated. The federal Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) earmarked $167.64 million to the Alameda Corridor-East, which will be split among Los Angeles, Orange, Riverside, and San Bernardino counties. An additional $42.88 million was earmarked for individual grade separations east of downtown Los Angeles.

Airports
Ports
Urban Areas
Other Railroad

Trains per Day
27 - 49
50 - 81
82 - 130
131 - 162
163 - 255

Multi-County Goods Movement Action Plan
2025 Forecast Rail Volume

0 15 30 60 Miles

N

Sources:
StreetMap 2006
WSA 2006

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Figure 18

However, with the cost of the Alameda Corridor-East program alone estimated at over $4.4 billion (Los Angeles County portion estimated at $1.9 billion), these funds are not sufficient to implement the entire series of needed grade separations. As a result, local governments have sought other local sources of funds for the unfunded amount. With the expectation that rail freight traffic will increase, communities along the mainlines will continue to face environmental, safety, and congestion impacts as long as the necessary funding levels are not met.

Simulation studies show the significant impact of vehicle delay at highway-railroad grade crossings along the mainline infrastructure from downtown Los Angeles east and north to Barstow and Indio. The simulated value of total vehicle hours of delay in year 2000 was calculated to be 2,622 hours per peak day.[15] Extrapolating this to an annual value, assuming 300 peak days per year, potentially yields nearly 790,000 vehicle hours of delay at these crossings. As the railroads within the MCGMAP region move towards longer trains (8,000 ft.), the extent of grade crossing delays could increase. Moreover, delay at grade crossings result in environmental impacts (e.g., increased emissions from idling vehicles). A 2005 study by Leachman and Associates established baseline emissions conditions from simulation models, including traffic delay emissions at grade crossings.[16]

Truck Volume and Related Impacts

As stated earlier, Los Angeles County plays a critical role in the movement of goods. As total volumes increase, the share of truck volumes along major corridors will also increase. Increased freight flows have had significant impacts on metropolitan areas. Traffic at major freight generators (ports, airports, rail yards, warehouse/distribution nodes) has greatly increased, adding to congestion and impacting surrounding neighborhoods. About 40 percent of the congestion is estimated to be caused by bottlenecks and recurring congestion at locations where the volume of traffic routinely exceeds the capacity of the roadway, resulting in stop-and-go traffic flow and long backups. The balance, about 60 percent of delay, is estimated to be caused by non-recurring congestion such as construction work zones, accidents (crashes), incidents (breakdowns, spills), extreme weather conditions, and suboptimal traffic control devices or measures.

There are four major types of bottlenecks: interchange, steep-grade, signalized-intersection, and lane-drop bottlenecks. For example, interchange bottlenecks account for the most truck hours of delay, estimated at about 124 million hours annually in 2004.[17] The Transportation Research Board (TRB) and the Federal Highway Administration (FHWA) estimate a delay cost of $32.15 per hour, and most of these costs are passed along to shippers and consumers.

Table 9 shows the growth in daily truck volumes on major freeways from 2003 through 2030 derived from model runs.

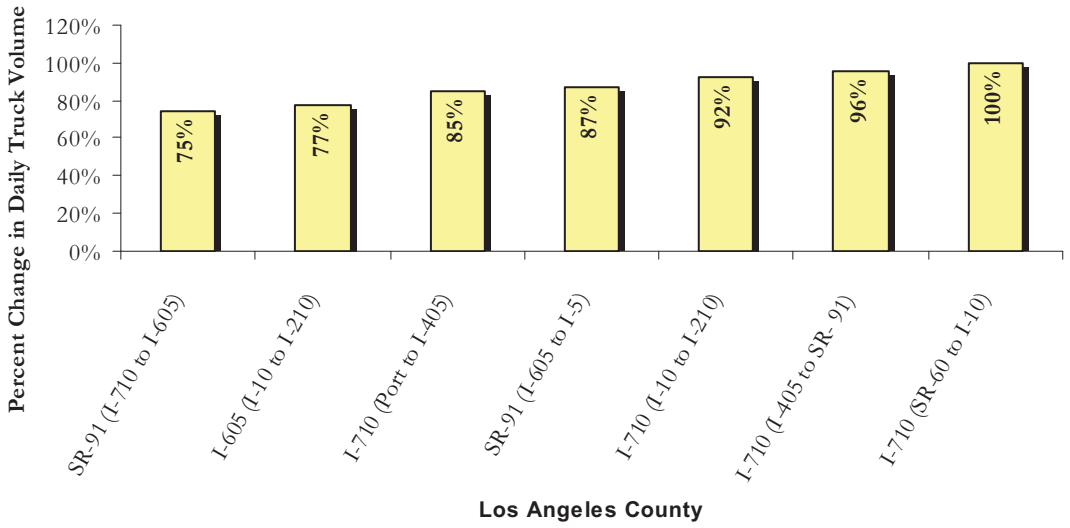
Table 9
Truck Volumes Derived from Model Runs (2003-2030)

Route	Segments	City	SCAG Model 2003 Truck Volume	SCAG Model 2030 Truck Volume	Percent Change in Daily Truck Volume
I-605	SR-91 to I-105	Los Angeles	20,969	28,798	37%
I-605	I-405 to SR-91	Los Angeles	11,945	16,638	39%
I-605	I-105 to I-5	Los Angeles	24,521	37,506	53%
I-605	I-5 to SR-60	Los Angeles	25,925	41,975	62%
I-605	SR-60 to I-10	Los Angeles	20,414	34,397	68%
I-605	I-10 to I-210	Los Angeles	13,933	24,667	77%
I-710	I-105 to I-5	Los Angeles	22,323	33,381	50%
I-710	I-5 to SR-60	Los Angeles	12,403	19,590	58%
I-710	SR-91 to I-105	Los Angeles	29,634	51,145	73%
I-710	Port to I-405	Los Angeles	25,173	46,543	85%
I-710	I-10 to I-210	Los Angeles	8,022	15,404	92%
I-710	I-405 to SR-91	Los Angeles	34,564	67,599	96%
I-710	SR-60 to I-10	Los Angeles	8,344	16,697	100%
SR-134	I-101 to I-5	Los Angeles	12,028	18,255	52%
SR-134	I-5 to I-210	Los Angeles	11,544	18,366	59%
SR-170	I-5 to SR-134	Los Angeles	14,485	22,007	52%
SR-57	I-10 to I-210	Los Angeles	11,733	18,447	57%
SR-57	SR-60 to I-10	Los Angeles	8,914	14,091	58%
SR-60	I-10 to I-710	Los Angeles	17,321	21,294	23%
SR-60	I-710 to I-605	Los Angeles	18,907	25,209	33%
SR-60	I-605 to SR-57	Los Angeles	19,415	26,174	35%
SR-91	I-10 to I-710	Los Angeles	14,774	21,574	46%
SR-91	I-710 to I-605	Los Angeles	23,017	40,189	75%
SR-91	I-605 to I-5	Los Angeles	20,162	37,788	87%

Source: SCAG 2007 Draft AQMP Baseline model, SCAG, April 2006.

Freeways including I-710, I-605, and SR-91 will continue to carry the highest percentages of truck volume. Figure 19 shows truck growth from 2003 to 2030 in Los Angeles at 75 percent.

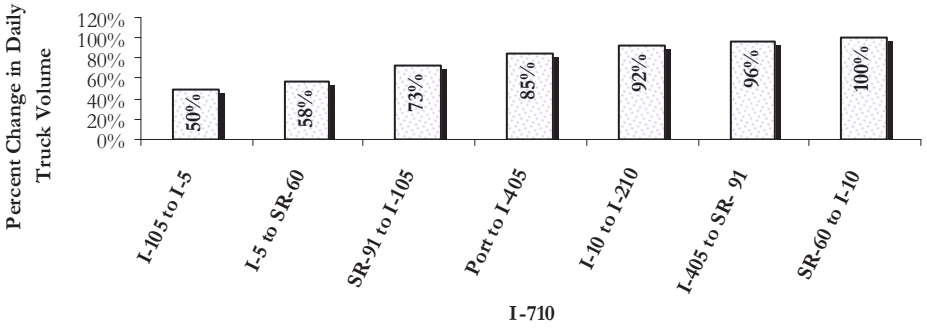
Figure 19
Truck Growth 2003-2030
(Greater than 75%)



Source: SCAG 2007 Draft AQMP Baseline model, SCAG, April, 2006.

I-710 shows an increase of 50 percent in daily truck volumes from I-105 to I-10 by 2030 as shown in Figure 20.

Figure 20
Truck Growth on I-710 (2003-2030)



Source: SCAG 2030 Draft AQMP Baseline model, SCAG, April, 2006.

The subregions most affected by freeway capacity issues are the same as those affected by rail capacity issues. The Gateway cities, City of Los Angeles, San Gabriel Valley and South Bay cities' subregions have roads that carry increased volumes of truck traffic. Arroyo Verdugo and North Los Angeles County are impacted at a less significant level. The only freeway with major truck volumes that extends through the three subregions is the I-5.

Beyond the impacts associated with truck related congestion, other issues related to truck travel include roadway deterioration, accidents, and safety concerns. These issues are under the purview of the California Department of Transportation (Caltrans) in their role as owner and operator of the state highway system.

Pavement deterioration caused by heavy trucks is a major issue, given that a disproportionate amount of roadway damage is directly related to truck traffic.[18] According to the American Association of State Highway and Transportation Officials (AASHTO), the maintenance cost impact related to axle weight increases at a gradual rate up to 10,000 pounds and rapidly increases above 16,000 pounds. It also concluded that pavement damage increases exponentially as axle weight increases, and that the passage of an 80,000 pound, five-axle tractor-trailer has about the same impact on highway deterioration as that of 9,600 automobiles. For local cities and subregional governments faced with increased volumes of truck traffic, this is a key concern. In a 2007 survey, the South Bay cities were asked to rate the severity among various truck-related issues. The result of the survey ranked truck-related street deterioration as the most severe issue facing the subregion. Congestion, pollution and noise were all ranked second in severity; with a surveyed severity ranking approximately 26 percent lower than street deterioration.

Another contributing factor to roadway congestion is inadequate highway maintenance. The larger and older the system becomes, the more expensive it is to maintain and operate. The average urban motorist in the U.S. pays $400 annually in additional vehicle operating costs as a result of driving on roads in need of repair. Poor road maintenance contributes to accelerated vehicle deterioration, increased frequency of needed maintenance, and increased fuel consumption.[19] However, trucks and cars each pay about 80 percent to 90 percent of their total road costs.[20]

Accidents involving trucks are another major concern, since these types of accidents result in a higher probability of damage to the passenger vehicle and injury to its occupants. Of all accidents involving large trucks, 84 percent of fatalities are passengers in vehicles other than the truck.[21] Accidents involving trucks have a higher degree of severity due to the great differential in size and mass between trucks and cars. This generally places the occupants of the passenger vehicle at a great disadvantage in such collisions.[22] In the same study of all large truck collision incidents, 50.7 percent of these events were caused by the driver of the passenger vehicle. Many cities in the county have identified motorist safety as a critical issue that must be addressed. This trend can be seen in the South Bay cities subregion, where 76 percent of reported truck related collisions from 2003 to 2005 were on city or county roads, with only 24 percent occurring on state highways.

Safety on roadways, as it relates to truck traffic, is a factor of the truck volumes and total congestion on the roadway system. The propensity for truck-involved accidents is found to be a decreasing function of the number of lanes and the average annual daily traffic (AADT) per lane, and an increasing function of truck percentages of AADT, all factored by the effects of time of day, day of week, and weather conditions.[23] In Southern California, the data for truck accidents in the study area correlates with overall truck travel volumes in the study area by county. In 2003, the highest number of fatalities and injuries involving truck accidents occurred in Los Angeles, Riverside, and San Bernardino Counties, which account for the majority of truck travel volumes in the study area.

Furthermore, "large trucks can intimidate motorists traveling in passenger vehicles. It is not unusual for relatively small passenger vehicles to be boxed in by trucks in front, behind, and alongside them. If all vehicles in the general-traffic lanes were roughly the same size, there would be less stress on those motorists who are nervous about sharing the road with large trucks."[24]

Road capacity and mobility is an issue for every subregion in the county. Improvements to one freeway affect the efficiency and congestion of others. The ability to accommodate trucks on antiquated facilities designed for smaller, lighter trucks, as well as lower truck volumes is also a county-wide issue, affecting both truck related congestion and motorist safety. It is important to note that many old existing highways such as I-710 have non-standard features which contribute to truck congestion and safety concerns. A summary of other types of deficiencies is provided below:[25]

- **Non-Standard Weaving Distances:** Weaving distance is typically determined based on the number of vehicles entering or exiting a weaving section as well as the speed of the weaving section. Operational performance (e.g., acceleration and braking) and vehicle size can affect required weaving distances, and trucks require substantially more weaving distance than automobiles.
- **Narrow/Non-Existent Shoulders:** Throughout much of the study area the shoulders are narrow or non-standard widths (<10 feet). In some segments no shoulders are provided.
- **Narrow Lane Widths:** Narrow lanes (<12 foot lanes) tend to reduce the motorists' comfort level and speed, thus reducing overall capacity, especially when trucks are present.
- **Median Barriers:** Most of the median barriers on old freeways are metal beam barriers that are no longer in use and less effective in preventing trucks from crossing onto opposing traffic lanes.

PORT/INTERMODAL YARD CAPACITY

Analysis estimates actual throughput capacity of the ports of Los Angeles and Long Beach to be between 28 and 30 million TEUs, far below projected demand of 42.5 million TEUs by 2030. This is nearly double the 2006 volume of 15.7 million TEUs. Additionally, this estimate assumes no new landfill will be added and also assumes that minimal development of vacant land will occur in addition to minor terminal redevelopment, 24/7 operations, increased container stacking, increased stack heights, reduced container dwell time, upgraded information systems, and enhanced on-dock rail operations. Therefore, the ports could face capacity constraints if container volumes reach the projected 2030 levels.

As described previously, on-dock and off-dock rail intermodal facilities allow for the transfer of intermodal containers between rail and truck and play an essential role in transporting containers via rail, which in turn reduces truck trips out of the ports. However, as port volume continues to increase, the intermodal facilities will face significant capacity constraints.

Based on acreage and volume data for various intermodal terminals in the Los Angeles County, the estimated capacities of intermodal facilities in the county are: City of Industry (255,000 lifts per

year capacity), City of Commerce (500,000 lifts per year capacity), the Intermodal Container Transfer Facility (ICTF) near the ports (800,000 lifts per year capacity), and the Los Angeles Transportation Center (LATC) in Los Angeles (250,000 lifts per year capacity).

The Ports forecast that direct intermodal demand will be about 17 million TEUs in 2030 assuming total port volume reaches 42.5 million TEUs. It is estimated that between 40-87 percent (6.7-14.8 million TEUs) of intermodal demand could be handled by both on-dock and off/near-dock facilities, depending on the ports' ability to implement rail projects proposed and approved by the ports and the application of modified operating practices and additional labor shifts. Note that if all of the projects and strategies in the San Pedro Bay Ports Rail Study Update are implemented, there would still be a 13 percent (2.2 million TEUs) capacity shortfall that would require the ports to examine other potential projects to meet this demand. Under a no-build scenario in which existing rail yard conditions are maintained, the capacity shortfall would be 10.25 million TEUs or about 60 percent of demand[26]. Any intermodal demand that cannot be met due to capacity shortfalls would result in additional truck trips and mobility impacts to the region's roadway network. Therefore, addressing intermodal demand will be essential.

AIR CARGO CAPACITY

As stated earlier, Los Angeles County has three commercial airports with air cargo service- Los Angeles International (LAX), Burbank (BUR) and Long Beach (LGB). Table 10 highlights the projected 2030 air cargo demand at the County's three airports.

Table 10
Projected 2030 Air Cargo Demand in Los Angeles County

Airport	Air Cargo (tons) 2005	Air Cargo (tons) 2030	Percent Growth 2005-2030
Los Angeles International (LAX)	2,137,188	2,340,000	9.5%
Bob Hope (BUR)	52,867	87,000	64.5%
Long Beach (LGB)	54,298	137,000	152%
Total Los Angeles County	**2,244,353**	**2,564,000**	**14.2%**

Source: SCAG Regional Aviation Activity Report 2003-2005; SCAG 2004 Regional Transportation Plan

Delays during peak periods continue to mount at LAX, due to a shortage of ramp space, on-airport warehouse space, and peak-period lift capacity. A lack of warehouse and terminal capacity often results in congestion and delays at existing cargo terminals. Specifically, this affects joint-use facilities operated by a third party, as opposed to individual cargo terminals controlled by a single carrier.

Impacts to air cargo will be primarily in Los Angeles and South Bay cities due to the proximity of LAX. Congestion and noise due to LAX generated truck traffic will be felt most in these areas. The two freeways adjacent to LAX, I-105 and I-405 handle the most truck trips generated by LAX. Arroyo Verdugo and Los Angeles would be impacted by changes to nearby Bob Hope airport. Long Beach Airport generated truck traffic would also impact South Bay cities.

One potential air cargo location is Palmdale Regional Airport (PMD) located in the Antelope Valley near the northeast portion of the city of Palmdale. The airport is owned and operated by LAWA under a joint-use agreement with the U.S. Air Force. The airport has three runways and features a modern 9,000 SF terminal capable of handling 300,000 passengers annually. PMD has no commercial service at this time and no reported cargo activity.

ECONOMIC GROWTH

Despite the economic costs associated with environmental and community impacts, the goods movement industry serves as an economic engine for the county, MCGMAP study region, and the state by providing numerous jobs and tax revenue. For example, logistics jobs (wholesale trade; trucking; supply chain management; warehousing; couriers; air, sea, and rail transportation) provide positive economic benefits for the county. The logistics industry has the ability to replace manufacturing as it provides good entry-level pay and job ladders for people who have not attended a single college class. In wholesale sub-sectors, 80.6 percent of the jobs require no advanced schooling and another 5.7 percent require either trade or community college training. In transportation and warehousing sub-sectors, 92.9 percent of the jobs require no advanced schooling and another 1.1 percent requires trade school training. Furthermore, these jobs pay well - logistics jobs in 2005 on average paid $47,411 per year, just 2 percent below all manufacturing jobs ($48,397). Logistics activity accounted for 687,837 jobs in Southern California, which translates into about 6.1 percent of all of the jobs in the region.

The projected growth in freight traffic poses a major concern due to limited transportation funding and high infrastructure improvement costs. Population and employment forecasts, as well as projections for increased international and domestic trade volumes all lead to worsening congestion and potential gridlock. Chronic congestion remains a drain on the region's economy. Critical bottlenecks, additional track extensions, centralized traffic control, storage tracks and other yard improvements in the port area also need to be addressed.

As the nation's leading manufacturer center and home to the nation's number one and two ports in TEU volume, Los Angeles County must maintain and enhance the economic vitality associated with goods movement. To maintain the economic vitality of the goods movement industry, the region needs to provide a competitive advantage in terms of speed and reliability of moving goods to U.S. markets while mitigating environmental impacts. The projects recommended in the LA GMAP (and MCGMAP) are ultimately designed to ensure that Southern California strengthens its economic position, while simultaneously and continuously mitigating environmental and community impacts associated with goods movement. However, one of the major challenges for stakeholders within this county, region, and state is to develop ways to translate portions of the economic benefits derived from goods movement activities into funding for requisite infrastructure improvements and environmental mitigation measures.

FUNDING LIMITATIONS

As outlined in the MCGMAP regional goods movement projects/strategies list, over $50 billion in mitigation and infrastructure projects is needed throughout the six county study region and beyond,

while only about $2.4 billion of that is currently committed. As described later in this chapter, Los Angeles County goods movement project needs are over $23 billion. Clearly, funding limitations represent a key challenge to the county and region.

Fortunately, a portion of this shortfall will be addressed through the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B), approved by voters on November 7, 2006, which provides for $19.925 billion in General Obligation bond funds to fund transportation investments statewide. Of this total, $3.1 billion will be set aside in a Ports Infrastructure, Security, and Air Quality Improvement Account to fund goods movement-related infrastructure, emission reductions strategies, and homeland security improvements:

- The California Transportation Commission (CTC), approved $1.65 billion of the $3 billion that was earmarked and made available for improvements along trade corridors of national significance to Southern California.
- An additional $1 billion will be allocated by the California Air Resources Board (CARB) for emission reductions from activities related to goods movement.
- $100 million will be allocated to ports for security improvements.

Other components of the infrastructure bond program could potentially fund goods movement-related projects that involve congestion mitigation, intercity passenger rail, and highway-railroad crossing safety.

In addition to TCIF funds, Metro has recommended funding over $100 million for goods movement projects in Los Angeles County between 2007 and 2012 through the 2007 Call for Projects. Those projects include:

- Washington Blvd. widening and reconstruction
- Bellflower Blvd. at Imperial Highway improvements
- Paramount Blvd. at Firestone Blvd. improvements
- I-110 freeway/C street interchange improvement
- Nogales Street (LA subdivision) grade separation project
- Gerald Desmond Bridge replacement
- South Wilmington grade separation
- Olympic Blvd. and Mateo street improvement
- I-110/SR-47 and John S. Gibson/NB I-110 ramp access
- Harbor Blvd. signalized intersection improvements – Swinford to 6th
- Highway-rail grade crossing improvement system

While existing sources of funding, including TCIF and Call for Projects funds, will improve the county's goods movement system, they provide only a small percentage of the region's total need. As a result, developing an equitable public/private funding strategy will be essential.
User fees offer a potential source of new funding. For example, the Ports of Los Angeles and Long Beach have adopted a Clean Truck Fee of $35 per TEU to help pay for the replacement or retrofit of almost 17,000 drayage trucks serving the ports by 2012. This fee will be charged to cargo owners and apply to all loaded containers entering or leaving the ports by truck. The Ports expect

that the fee would generate about $1.6 billion of the $2 billion needed to upgrade drayage trucks to the 2007 standard established in the Ports' Clean Air Action Plan. Also in January 2008, the Board of Harbor Commissioners for the Ports of Long Beach and Los Angeles approved a motion to implement an Infrastructure Cargo Fee of $15 per loaded TEU. This fee will be used to fund highway and rail improvements (including grade separations) in the vicinity of the ports.

In the 2007 legislative session, Senator Lowenthal introduced a container fee bill (SB 974) that would impose a $30 per TEU fee on containers imported and exported through the Ports of Los Angeles, Long Beach, and Oakland. Funding generated by this legislation would be split equally between infrastructure projects aimed at congestion relief and environmental mitigation efforts. The bill was held in committee at the request of Senator Lowenthal so that he could work with the governor and other legislators on a revised bill. A container fee bill may move this legislative session (2008).

Another funding concept that could lessen the environmental impact on wildlife and ecosystems caused by goods movement is called mitigation banking. With this concept, an entity whose development impacts a particular environment must decrease impact on another environment. Wetlands are an appropriate example since port facilities are on the coast. Development adjacent to ports that impact wetlands could be mitigated by "banking" wetlands in other areas.

This strategy has its share of problems including the lack of understanding of the complexity of some environments. All wetlands are not equal and therefore the banked location may not truly mitigate the impact of developing the desired wetland. Despite this concern, the concept presents a viable option and deserves attention.

SUBREGIONAL GOODS MOVEMENT ISSUES AND PERSPECTIVES

While the county as a whole is facing a number of important goods movement challenges, the impact on each subregion varies. The following sections provide an overview of issues and perspectives for each subregion.

ARROYO VERDUGO SUBREGION

The Arroyo Verdugo Subregion is not as directly impacted by goods movement issues as subregions like San Gabriel Valley and Gateway Cities. The only infrastructure feature in the subregion that has significant freight movement is I-5. Interstate I-5 is severely congested and is the major north-south freight corridor through the study area. However, lower goods movement volume in this subregion should not lead to the conclusion that there are no impacts, since an individual truck or freight train produces the same congestion and environmental impact regardless of the location.

CENTRAL LOS ANGELES COUNTY SUBREGION

Heavy truck traffic, roadway deficiencies, neighborhood intrusion, incompatible land uses and environmental justice issues are just a few of the challenges that the City of Los Angeles Department of Transportation (LADOT) Goods Movement Improvement Program is addressing in this subregion. This multi-year program also identifies the problems with truck movement and access to intermodal facilities, distribution centers, industrial land uses, and freeways and recommends solutions. As a part of this program three studies were conducted throughout communities in the City of Los Angeles that have a high concentration of freight activities underway - (1)"Improving Truck Movement in Urban Industrial Districts", (2) "Improving Truck Movement in Urban Industrial Districts II – Northeast LA and the San Fernando Valley", and (3) Improving Truck Movement in Urban Industrial Districts III – Hollywood, Mid-City, South LA, West LA, Los Angeles International Airport, and the Port of Los Angeles".

In general, neighborhoods in close proximity to land fills, car dealerships, beverage plants, rock quarries and other truck generators experience the heaviest truck traffic. Lack of enforcement of commercial vehicle operations has resulted in voluntary compliance of truck weight restrictions and use of designated truck routes which further exacerbates the problem. Moreover, it is not uncommon to find industrial uses in the vicinity of sensitive land uses and adjacent to minority communities. LADOT studies also reveal that inadequate roadway widths and curb radii inhibit truck maneuvers; heavy truck traffic and poorly maintained roads contribute to an increase in vehicular accidents; and the lack of grade separations increases the potential for auto, commuter rail and freight rail conflicts at grade crossings.

GATEWAY CITIES SUBREGION

The Gateway Cities are in the unique position of housing the Port of Long Beach, which combined with the adjacent Port of Los Angeles comprises the fifth largest container port in the world, as well as a diverse array of communities that are home to two million people directly impacted by the trade and logistics industry. In an effort to address this dual role, the Gateway Cities COG has been at the forefront of goods movement issues and has proactively sought innovative strategies in addressing goods movement impacts. Interstate I-710, the region's most predominant goods movement corridor for trucks and the Alameda Corridor(a project of critical national significance) are located in this subregion.

These southeast Los Angeles County communities have been vociferous about community, environmental, and health impacts of goods movement that have the potential to further denigrate air quality and undermine the quality of life, while at the same time recognizing the need for well-paying jobs to replace the manufacturing base that was once the foundation of the sub-region's economy. As a result, several efforts have been undertaken by the Gateway Cities Council of Government to address these concerns. Transportation planning efforts include, the SR-91/I-605 Needs Assessment Study, the Gateway Cities Clean Air Action Plan and most notably, the I-710 Major Corridor Study. The I-710 Major Corridor Study focused on developing solutions to the traffic congestion, safety and air quality problems along the I-710 corridor. After extensive outreach and successful consensus building, a locally preferred strategy that includes a combination of mix flow

lanes, HOV lanes and a dedicated freight system or truck lanes and use of advanced and/or alternative technologies was selected. The environmental phase of study has begun, as noted earlier in this document.

While the communities in this subregion await completion of the environmental phase of the I-710 study, there remain mixed views on truck lanes. On one hand, there is deep public support for "separating the cars from the trucks;" on the other hand, construction of truck lanes is understood to be costly in both dollars and land use, and new capacity could be overwhelmed by port growth. The subregion's communities therefore strongly support exploring non-highway alignments, utility easements, dedicated freight guideways, and advancing the use of alternative and emerging technologies that minimize noise and emissions and reduce the health related effects associated with goods movement. These sentiments are promulgated in the SR-91/I-605/I-405 Guiding Principles that were adopted by the GCCOG Board of Directors on November 1, 2007. Once funding becomes available, it is expected that this subregion will be one of the first to test the viability of these emerging technologies.

The Gateway Cities COG has also engaged in incremental solutions to ameliorate current conditions. The Truck Impacted Intersections program is making arterial improvements for traffic safety throughout the subregion. More prominently, the Gateway Cities COG pioneered a truck replacement program that has become a national model. With early funding and program development support from EPA, CARB, SCAQMD and the Port of Long Beach, the program today operates with its major financial support from the Port of Los Angeles and is in the process of adapting its operation to meet the goals and objectives of the San Pedro Bay Ports' Clean Air Action Plan. To date, the program has replaced over 500 older diesel trucks with newer, cleaner trucks that must be used in the same vocation within the South Coast Air Basin for at least five years. The older truck engines are physically destroyed so that it cannot be put back into service either here or overseas. The Gateway Cities COG continues to partner with the ports in exploring and encouraging various improvements that could reduce environmental and community impacts in the subregion. Also, having experienced both rail involved collisions and derailments in its communities, the COG is an active advocate for cleaner rail and safer rail including operational improvements as well as arterial grade separations. Finally, the Gateway Cities COG will be facilitating a community workshop and brainstorming session with representatives from the goods movement industry prior to the summer of 2008. The purpose of this workshop is to identify collaborative ways to address goods movement in a manner that will benefit local communities as well as the logistics industry.

LAS VIRGENES/MALIBU SUBREGION

The Las Virgenes/Malibu subregion is not directly influenced by goods movement issues. Freight movement of goods is much less than in most of the study area. The Ventura Freeway (US-101) is the only major transportation feature and it does not carry freight in the quantities of other freeways in the study area. The subregion is north and west of the port and although US-101 provides a route north, most freight going north takes the more direct I-5. The area is also a desirable residential area and real estate prices would preclude such land uses as warehousing.

Lower goods movement volume in this subregion should not lead to the conclusion that there are no impacts, since an individual truck or freight train produces the same congestion and environmental impact irrespective of location. However, the relative magnitude of goods movement impacts is lower in this subregion than in other subregions with higher goods movement volume.

NORTH LOS ANGELES COUNTY SUBREGION

Addressing goods movement issues is not new to the communities in this subregion. In July, 2004 the Metro Board adopted the North County Combined Highway Corridors Study as the plan for transportation improvements in North Los Angeles County. The North County Combined Highway Corridor Study is a consensus document that is supported by the North County Transportation Coalition, the cities of Palmdale, Lancaster and Santa Clarita. The study reveals that the current configurations of I-5, SR-14, and SR-138 inhibit their ability to handle the forecasted travel demand and projected increase in goods movement. The Study also states that substantial long-term corridor investments in the region will be needed to accommodate the projected increase in population, commuter traffic and goods movement. There is currently, a comprehensive review of the truck route system underway in this subregion.

Also, communities in this subregion support efforts to increase moving long distance freight to and from the San Pedro Ports by rail to reduce the number of trucks on the highway. There is general interest in locating an inland port outside of the Los Angeles Metropolitan area and a very strong interest in determining the feasibility of locating an inland port in the Antelope Valley. Available rights of way, accessibility to highways, close proximity to the Los Angeles Palmdale Regional Airport air freight facility, future connectivity to the High Desert Corridor as well as economic opportunities associated with a logistics based industry have been cited as features that could make an inland port in this subregion very attractive.

SAN FERNANDO VALLEY SUBREGION

The San Fernando Valley has historically been a bedroom community for employment in other areas of Los Angeles County. Although this is changing with more job opportunities moving into the area, the industries are not the type that manufacture or store large volumes of freight. The area does not produce or attract large freight volumes so its primary contribution to goods movement would be as a bridge.

The major freight corridor in the subregion is I-5. The subregion is not being envisioned as a potential inland port. The inland ports are in areas with less valuable real estate or with high existing concentrations of warehousing. The potential inland port in north Los Angeles County however would impact this subregion to the extent that freight movement on I-5 is influenced.

Lower goods movement volume in this subregion should not lead to the conclusion that there are no impacts, since an individual truck or freight train produces the same congestion and environmental impact irrespective of location. However, the relative magnitude of goods

movement impacts is lower in this subregion than in other subregions with higher goods movement volume.

SAN GABRIEL VALLEY SUBREGION

Minimizing local community and environmental impacts associated with goods movements is a primary concern in this subregion. The subregion contains some of the most heavily traveled freight corridors including two Union Pacific mainline rail corridors, SR-60 and I-605. Local challenges range from abating noise from freight trains carrying goods throughout the San Gabriel Valley to neighboring counties, to seeking better ways to deliver goods to local markets. Designating specific arterials as truck routes and prohibiting nighttime deliveries are of interest to some of the communities in this subregion. Also, there is general interest in increasing the movement of goods by rail to relieve freeway congestion, if this can be done without impacting local communities and exploring innovative funding sources for goods movement projects and mitigation strategies.

The San Gabriel Valley Council of Governments has been at the forefront of goods movement issues largely due to its role in support of the Alameda Corridor East (ACE) Project. The ACE Construction Authority, acting on behalf of the San Gabriel Valley Council of Governments, oversees the design and construction of the ACE Project. The ACE Project is the largest goods movement project underway in the San Gabriel Valley and is designated as a project of National Significance by the Federal Highway Administration.

The ACE corridor generally parallels the San Bernardino and Pomona Freeways along the Union Pacific rail lines. The ACE Project is intended to mitigate the effect of existing and increased freight traffic while increasing safety, improving mobility and air quality by providing safety upgrades, traffic signal control measures, and 20 grade separations throughout the San Gabriel Valley. The ACE Project is also part of a larger multi-county goods movement transportation corridor known as the Alameda Corridor East Trade Corridor that encompasses Los Angeles, Orange, Riverside and San Bernardino Counties.

Among other goods movement related efforts, the San Gabriel Valley COG has indicated the need for an East-West Corridor Goods Movement Improvement Feasibility Study, designated truck route, various interchange upgrades (I-10/I-605, SR-60/I-605, and SR-57/SR-60) as well as the need for truck climbing lanes on the westbound I-10 to the westbound SR-57.

SOUTH BAY CITIES SUBREGION

The impact of goods movement is of particular concern to the South Bay communities given its close proximity to the ports and LAX, access to freeways and its light industrial uses (warehousing and distribution centers). Pavement deterioration, neighborhood intrusion, noise, truck parking, truck related collisions, pollution, safety, congestion and the treatment of hazardous materials are just a few of the challenges in this subregion. As a result, the South Bay Cities Council of Governments (SBCCOG) and the Southern California Association of Governments (SCAG) commissioned a South Bay Goods Movement Study to assess the impacts of goods movement

and identify solutions that would improve mobility and reduce the environmental and health related effects associated with goods movement. This study provides an analysis of the infrastructure that supports the goods movement industry and describes the major economic forces that drive the demand for this industry within the subregion. The study also identifies freeway improvements (mainline and interchange), major highway improvements, and arterial roadway improvements (intersection improvements, lane drops, pavement rehabilitation and reconstruction) needed to address current and expected future system deficiencies. The study recommends various intermodal improvements and port related projects, and emphasizes the importance of focusing on improvements and mitigation measures that help facilitate trade and minimize impacts on the South Bay communities. The South Bay Goods Movement Study was completed in June, 2007.

Forward thinking by the cities in this subregion has prompted SBCCOG to secure funding from Metro to build upon the macro-level work completed in the SCAG/SBCCOG Goods Movement Study with a more detailed South Bay Goods Movement Feasibility Analysis. The South Bay Goods Movement Feasibility Analysis is intended to provide analyses of specific transportation system impacts and recommend solutions. This study will identify specific chokepoints or deficiencies in the system and include conceptual engineering plans and cost estimates for improving the deficiencies. In addition, this study will include high priority goods movement projects and contain cost/benefit data and an investment strategy for implementing improvements within 5 years. The South Bay Goods Movement Feasibility Analysis is scheduled to be completed in the fall of 2008.

Lastly, at the forefront of discussions in this subregion, is a growing concern about the potential spillover of heavy truck traffic from the I-710 Long Beach Freeway to the I-110 Harbor Freeway. It is expected that the leadership in this subregion will address this concern as well.

WEST SIDE CITIES SUBREGION

Los Angeles World Airport (LAX) is the primary goods movement facility in this subregion. Changes to the airport are of much concern to local residents. Lawsuits against the Los Angeles International Airport (LAX) Master Plan were approved for settlement by the LA City Council in January of 2006. The settlement included provisions to provide funding to Inglewood, Los Angeles County, El Segundo, and ARSAC (Alliance for a Regional Solution to Airport Congest) totaling $266 million over a 10-year period to include:

- Accelerated noise mitigation for Inglewood, Los Angeles County, and El Segundo;
- Job training and increased job opportunities;
- Traffic mitigation for Inglewood and El Segundo;
- Street removal and landscaping in the dunes west of Pershing Drive; and
- Street lighting in Westchester.

An additional commitment of $60 million will be spent by LAWA on various air quality and environmental justice programs. Under no circumstances will any of LAWA's obligations under the settlement require any expenditure from the city's general fund or any other city-controlled source of funds[27].

As would be expected from the close proximity of the airport to the South Bay Subregion, this settlement also has influence on the South Bay cities.

The road infrastructure handles limited freight although any increase will impact a system that is totally built out and already severely congested.

Los Angeles County Actions

Los Angeles County Actions set forth in this section support the recommendations and four actions sets contained in the MCGMAP are

- Action Set 1: Accelerate Regional Environmental Mitigation,
- Action Set 2: Relieve Congestion and Increase Mobility,
- Action Set 3: Improve Operational Efficiency,
- Action Set 4: Develop Equitable Public/Private Funding Strategy.

Below are brief descriptions of the MCGMAP action sets and specific actions that are recommended for Los Angeles County.

MCGMAP Action Set 1 - Accelerate Regional Environmental Mitigation seeks to mitigate environmental impacts through a broad regional approach and project-specific mitigation measures. The regional approach is for broad strategic policies and efforts focusing on further reducing region-wide impacts. The project specific mitigation requires project sponsors to consider and disclose environmental impacts when planning projects and addressing potential impacts to be resolved.

Los Angeles County Specific Actions:

- Develop guidelines for local jurisdictions to use in siting and designing goods movement related land uses and transportation facilities. (Environmental Justice Analysis and Outreach Study for the MCGMAP that is underway.)
- Encourage federal participation in developing guidelines and international agreements that regulate vessels (and other stationary sources of diesel emissions) used for transporting goods to and through U.S. ports.
- Support clean lease arrangements made by the ports for reducing ship emissions.
- Initiate a follow-on effort to identify more aggressive goods movement initiatives to achieve regional air quality attainment, including the identification of sources of funding to accelerate the environmental cleanup.
- Implement highway capacity and operational improvements, and rail grade separations contained in Table 11 of this plan.
- Accelerate funding and implementation of local air quality plans.
- Support strengthening of fuel and engine standards for reducing emissions.
- Use best available technology and practices during construction to reduce related impacts.
- Comply with natural resource statutes to protect endangered species.

- Include “smart design” and good planning principles such as landscaped buffering, noise barriers, exterior light shielding and positioning, and compatible land uses and wetlands protection.

MCGMAP Action Set 2 - Relieve Congestion and Improve Mobility focuses on increasing intermodal and mainline rail capacity and improving all aspects of the transportation system to increase mobility and improve safety.

Los Angeles County Specific Actions:

- Complete the Alameda Corridor East (ACE) Trade Corridor railroad grade crossing improvement program in Los Angeles, Orange, Riverside, and San Bernardino Counties.
- Continue with analysis and planning of I-710 dedicated freight guideway/facility.
- Further investigate the feasibility of inland port / concentrate inland warehouse and distribution locations.
- Participate with the railroads in eliminating key bottlenecks and increasing capacity along the mainline rail system as outlined in the Los Angeles-Inland Empire Railroad Mainline Advanced Planning Study.
- Develop the appropriate institutional arrangements and negotiating framework to provide simultaneous and continuous improvement to mainline track improvements, the Colton Crossing grade separation, highway-rail grade separations, locomotive emission reductions, and other rail corridor related mitigations.
- Initiate a Regionally Significant Transportation Investment Study (RSTIS) to evaluate the feasibility of implementing a Dedicated Freight Guideway System/Regional Truck Lanes (I-710 from Port of Long Beach to SR-60, East-West Corridor between the I-710 and I-15; and I-15 to Victorville) inclusive of potential non-freeway implementation.
- Implement rail grade separations, intermodal facilities/yard, mainline rail and highway capacity and operational improvements contained in Table 11 of this plan.

MCGMAP Action Set 3 - Improve Operational Efficiency focuses on non-capital projects (i.e., methods and technology) that would increase capacity and productivity of the existing infrastructure.

Los Angeles County Specific Actions:

- Implement efficiency improvements contained in the San Pedro Bay Ports Master Plans that reduce impacts from trucks and containers on the transportation system and community.
- Improve terminal productivity, truck turn times, and intermodal operations.
- Develop partnerships between public and private entities to coordinate work and to research and develop advances in goods movement transportation technologies.
- Implement rail grade separations, ITS for vehicle management and routing, and highway capacity and operational improvements contained in Table 11 of this plan.

MCGMAP Action Set 4 - Develop Equitable Public/Private Funding Strategy will require a coordinated effort between the private and public sectors (including local, state, and federal governments). This coordinated effort will provide the increased funding that is needed to keep pace with the anticipated freight demand and role of our regional system in support of the national economy.

Los Angeles County Specific Actions:

- Maximize Southern California's fair-share of state and federal funds through ongoing and coordinated legislative efforts.
- Provide input to legislation focused on user fees and to any ongoing efforts to negotiate user fees with industry that can be included in a specific plan of finance for goods movement and air quality improvements.
- Pursue public-private funding arrangements for specific facilities, where appropriate.
- Implement the Cooperation Agreement among regional, state, and federal agencies to facilitate the actions contained in the MCGMAP.
- Develop structure for managing user fees and revenue.
- Provide incentives for private sector contributions (e.g., enhanced reliability, streamlined approval processes).

Los Angeles County Project List

Table 11 (included at the end of this chapter) contains a draft list of infrastructure improvements/ strategies and mitigation measures. The draft list is comprised of rail grade separations, on dock rail improvements, intermodal facilities, maritime, inland port, mainline rail, truck lanes, and dedicated facilities, ITS for vehicle management and routing, highway capacity and operation improvements, local arterial improvements and other operational strategies to implement the MCGMAP action sets and the specific Los Angeles County actions described in the previous section. These improvements will address goods movement challenges and complement the vision and potential future system (described in the MCGMAP). However, extensive outreach, consensus building and feasibility studies will be required before advancing a number of the improvements identified in Table 11.

The projects and strategies contained in Table 11 are grouped into three categories: regional, county, or identified needs. With the exception of the identified needs, the regional and county categories of projects and strategies can be found in the MCGMAP. As described above (and in the MCGMAP), many of these regional and county projects can be implemented in short-term while others require additional planning and project development. As a result, cost estimates for some of the projects and strategies have yet to be determined. The regional and county categories of projects are considered essential and neither category should be viewed as taking precedence over the other. For example, the regional category of projects and strategies represent short-term to long-term strategies. These strategies focus on region-wide projects that provide environmental mitigation and/or ground access (rail, highway, and intermodal) improvements to and from the international gateways and the multi-county goods movement distribution centers and corridors (existing and proposed) within the Southern California region. The county category of projects and

strategies include improvements that connect regional goods movement corridors, distribution centers, and the existing statewide goods movement system as identified by Caltrans. Also, the projects and strategies contained in Table 11 are intended to (1) support the regional projects; (2) mitigate environmental and/or community impacts in a shorter horizon; (3) correct short-term system deficiencies; (4) precede or be implemented in conjunction with the regional projects based on local needs and project readiness; and (5) fill gaps in the existing and future goods movement infrastructure. Table 11 also contains improvements to address short/long-term needs or deficiencies that have been identified by local jurisdictions throughout Los Angeles County. These improvements are also in various planning and project development phases.

Further, a comprehensive list of unconstrained goods movement infrastructure improvements contained in planning documents for SCAG and Los Angeles, Orange, Riverside, San Bernardino, Ventura, and Imperial Counties can be found on Table 7 in Appendix B.

Next Steps

As referenced in the MCGMAP, stakeholders will continue to play an integral role in framing goods movement issues and defining priorities for Los Angeles County. Emphasis will be placed on proactive measures to raise state and federal awareness of the challenges due to goods movement and Southern California's preeminent role in the U.S. and international trade. The project partners will focus on maintaining dialogue and partnerships, advancing low to zero-emission technologies in the goods movement industry, expanding outreach efforts to the private sector and all levels of government, mitigating impacts and securing funding to implement the actions, projects, and strategies contained in the LA GMAP and subsequent plans. Also, based on feedback from stakeholders throughout the development of the MCGMAP, Metro and its project partners are committed to taking the following next steps that are consistent with the MCGMAP:

Partnership and Advocacy

- Implement the intent of the Southern California National Freight Gateway (SCNFG) Cooperation Agreement among federal, state, regional, and other implementing agencies to maintain dialogue to address the challenges outlined in MCGMAP.

- Request the incorporation of MCGMAP strategies and actions into other state, regional, and local plans.

- Continue to convene multi-county meetings to monitor the progress on the Action Plan and provide annual reports to the CEOs and to the boards of the partner agencies.

- Support and propose legislation that (1) provides funding mechanisms for goods movement projects/strategies including environmental improvements and (2) improves mobility and facilitates regional multi-county goods movement goals without undermining local community priorities and quality of life.

- Support groups such as Mobility 21 and the Coalition for America's Gateways and Trade Corridors in developing dedicated federal and state goods movement funding sources.

- Continue to work closely with all stakeholders including the Councils of Governments, community groups, environmental regulatory agencies and academia.

- Seek goods movement and logistics industry involvement throughout planning and project development phases to generate and vet solutions.

Environmental and Community Impacts

- Through the SCNFG Cooperation Agreement and other related activities, develop a specific set of feasible actions to accelerate implementation of the strategies contained in the various air quality and emission reduction plans that are within the scope of responsibility of the project partners.

- In partnership with CARB, air districts, the logistics industry, and local governments, initiate an activity to generate public and/or private funds to accelerate implementation of air quality improvement strategies being undertaken by these and other entities. Examples may include: container fees that provide a revenue stream to fund emissions reduction projects, impact fees paid by entities contributing to the goods movement-related air quality problem, supplemental transportation infrastructure project mitigation (to add to an air quality funding pool), mitigation banking, market-based strategies, and other vehicle-based fees commensurate with the impacts attributed to those vehicles.

- Continue work on the Environmental Justice Analysis and Outreach Study for the MCGMAP. This effort will develop a guidebook for local jurisdictions and the private sector to use in avoiding, minimizing, and mitigating the effects of goods movement infrastructure and to assist local jurisdictions in making informed land use decisions. It is scheduled to be completed in the winter of 2009.

- Seek new technology/low-emission solutions to goods movement issues through pilot implementations.

Mobility

- Initiate a study to investigate the linkage between industry supply chain trends and port and trade related transportation patterns and movements, to better understand the relationship of secondary and tertiary truck trips.

- Continue project development efforts, including planning, design, funding, and implementation, of the regional and county-specific projects listed in the Action Plan, including the mitigation of the impacts of those projects.

- Based on preliminary analysis conducted as part of the MCGMAP, initiate a Regionally Significant Transportation Investment Study (RSTIS) to evaluate the feasibility of implementing

a Dedicated Freight Guideway System/Regional Truck Lanes (I-710 from Port of Long Beach to SR-60, East-West Corridor bounded by the I-210 to the north and SR-91 to the south inclusive of the I-10 and SR-60 between the I-710 and I-15, and I-15 from SR-60 to Victorville) inclusive of potential non-freeway implementation.

- Initiate the Goods Movement Strategic Plan for Los Angeles County and other localized studies, as appropriate, to assess the impacts of goods movement and identify solutions by conducting project-level analyses that include, but are not limited to, the following:

    - Alternative freight movement technologies
    - Alternative alignments (highway or non-highway) for dedicated freight guideways/truck lanes, particularly along multiple east-west corridors.
    - Unconstrained rail capacity scenarios and the impact on the highway system performance.
    - Truck impacts and/or improvements on county freeways and major arterials.
    - Requisite community participation programs for affected stakeholders.
    - Potential safety hazards (e.g., auto-train conflicts, passenger –freight rail conflicts, derailments, etc.).
    - Potential health risks and economic costs associated with goods movement, and localized community impacts (e.g., congestion, noise, air quality, safety, right of way acquisitions, local economic or sales tax effects, incompatible land uses, etc.).
    - Feasibility of clustering development of new transloading and warehousing facilities adjacent to inland ports remote from residential and sensitive land uses.
    - Feasibility of inland ports and/or agile ports.
    - Secondary and tertiary truck trip generation and travel patterns.
    - Reverse flow (empty containers).

Funding

- Pursue new avenues of goods movement funding for projects, including the region's fair share of funding, other state appropriations, federal funds and reauthorizations, and private sector contributions consistent with the impacts of the benefits that are derived from using the region's premier goods movement system. (check ES)

- Continue fair share and user fee discussions with private sector stakeholders to seek their support in addressing goods movement impacts and filling funding gaps.

- Develop a clear and concise message on the costs and benefits of goods movement to effectively communicate to the public, policy, and funding decision makers at all levels of government.

- Establish structures to manage user fees and revenue that are acceptable to both public and private sector stakeholders.

Table 11
Los Angeles County Goods Movement Projects & Identified Needs

Project Type	Project Description	Cost[1] (Millions)	Category
Mitigation	Mitigation of regional and project specific impacts of goods movement infrastructure projects	TBD	Regional
	Environmental Mitigation Projects (San Pedro Bay Clean Air Action Plan)	$2,067	Regional
	Other Goods Movement Emission Reduction Plans and Identified Needs	TBD	Regional
Rail Grade Separations	Alameda Corridor East Trade Corridor Plan grade separations and grade crossing improvements (LA)	$1,891	Regional
	Brazil Street and San Fernando Road Railroad Crossing	$2	Identified Need
	Gateway Cities COG Rail Grade Separations (BNSF Mainline Grade Separations)	$196	Regional
	South Wilmington grade separation (included as part of I-110 Connector Improvement Program)	Cost included in I-110 Connectors Program	County
	Valley View Ave. grade separation in City of Santa Fe Springs	$79	County
	Nogales Street (LA Subdivision) grade separation project	$29	County
On-Dock Rail Improvements	San Pedro Bay Ports Rail systems (Port area rail enhancements / improvements)	$631	Regional
Intermodal Facilities / Yards	Construct BNSF "Southern California International Gateway" Near Dock Facility[2]	$300	Regional
	Modernization of UP Near Dock Intermodal Container Transfer Facility (ICTF)[2]	$300	Regional
Maritime	Shuttle Train Intermodal Service to Inland Empire; Inland Terminal.	$60	County
Inland Port	Further Investigation of Inland Port Strategy	TBD	Regional
Mainline Rail	Evaluation of Alternative Rail Technologies	$5	
	Rail capacity improvements (e.g., double and triple tracking; Colton Crossing)[3]	$2,200.0	Regional

Table 11
Los Angeles County Goods Movement Projects & Identified Needs

Project Type	Project Description	Cost[1] (Millions)	Category
	Relief Siding (2 projects) and upgrade sidings (1 project) on the Antelope Valley Line	$15	County
Modification of Port Operations	Expand labor force at the ports	TBD	Identified Need
	Establish port-wide terminal appointment systems for truckers	TBD	Identified Need
	Continue PierPass Program at San Pedro Bay ports and eventually extend to 24-hour operations when warranted.	TBD	Identified Need
	Develop chassis pools	TBD	Identified Need
	Implement incentives to limit container dwell time	TBD	Identified Need
	Improve communications (including electronic data interchange) and planning among terminals, steamship lines and railroads to increase efficiency of on-dock rail movements.	TBD	Identified Need
Truck Lanes / Dedicated Freight Facilities	I-5 Truck Lanes, Southbound from Pico Canyon Rd/Lyons Avenue to Weldon Canyon Road and Northbound From Weldon Canyon Road to Calgrove	$148	Regional
	I-5 Truck Lanes, Southbound from Parker Road to Pico Canyon Road and northbound from Calgrove to Parker Road	$244	Regional
	I-5 from Parker Road to Kern County line truck lanes	$416	Identified Need
	Dedicated Freight Guideway System/Regional Truck Lanes (I-710 From Port of Long Beach to SR-60; East-West Corridor bounded by the I-210 to the north and SR-91 to the south inclusive of the I-10 and SR-60 between the I-710 and I-15; and I-15 from SR-60 to Victorville) inclusive of potential non-freeway implementation	$8,411 (LA County portion)	Regional
ITS for Vehicle Management & Routing	POLA/POLB Advanced Transportation Management, Information, and Security (ATMIS) System	$10	County
	San Pedro ATSAC System in LADOT - Provide ATSAC control of all signalized intersections within the project limits to aide motorists	$6	County

Table 11
Los Angeles County Goods Movement Projects & Identified Needs

Project Type	Project Description	Cost[1] (Millions)	Category
	Wilmington ATSAC System in LADOT - Provide ATSAC control of all signalized intersections within the project limits to aide motorists	$7	County
	Use ITS technology to maximize the operating efficiency of freeways and arterial in the vicinity of the ports of Long Beach and Los Angeles.	TBD	Identified Need
Highway Capacity and Operational Improvements	High Desert Corridor[4] (SR-14 to LA County Line)	$5,600	Regional
	Expansion of I-5 from I-605 to Orange County Line	$1,150	Identified Need
	Penrose Street and I-5 southbound on and off ramps - widen south side of street and increase curb radii to 45 feet where feasible	TBD	Identified Need
	Penrose Street and I-5 northbound off ramp - widen south side of street and increase curb radii to 45 feet where feasible	TBD	Identified Need
	Roscoe Blvd. And I-405 northbound on ramp - widen Roscoe Blvd and increase curb radii to 45 feet where possible	TBD	Identified Need
	Roscoe Blvd. And I-405 northbound off ramp - widen Roscoe Blvd and increase curb radii to 45 feet where possible	TBD	Identified Need
	Reconstruct I-605/ I-10 Interchange	$1,000	County
	Reconstruct I-605/ SR- 60 Interchange	$1,000	County
	Reconstruct I-605 / SR- 91 Interchange	$240	County
	Reconstruct I-605/ I-105 Interchange	$500	County
	Reconstruct SR-57 / SR-60 Interchange	$550	County
	Replace/ Reconstruct Gerald Desmond Bridge	$800	Regional
	SR-14/Avenue G Interchange	TBD	Identified Need

Table 11
Los Angeles County Goods Movement Projects & Identified Needs

Project Type	Project Description	Cost[1] (Millions)	Category
	SR-47 Expressway including Commodore Heim Bridge Replacement	$662	Regional
	Seaside Ave & Navy Way Interchange - Navy Way Connectors to Westbound Seaside Avenue (SR-47) - Construct connector ramps at Navy Way and Seaside Avenue and eliminate the need for a traffic signal at the intersection to improve poor traffic conditions	$43	County
	8th St. and I-10 WB freeway on/off ramp - evaluate widening ramps and conversion of 8th to one way (City of LA)	TBD	Identified Need
	I-110 8th / 9th Street Interchange - Add auxiliary lanes and modify / reconstruct ramps	$39	County
	I-110 Connector Improvement Program includes: South Wilmington Grade Separation ($53 M), I-110 Freeway/ "C" Street Interchange Improvements ($22 M), I-110/SR-47 Interchange & John S. Gibson Blvd. Intersection/ NB I-110 Ramp Access Improvements ($39 M), SR	$134	County
	I-405: La Tijera Blvd to Jefferson Blvd, Add Auxiliary Lane	$39	Identified Need
	I-710 Early Action Projects (3) - City of Long Beach – Shoemaker Ave. bridge interchange/PCH interchange/Anaheim St. interchange, City of South Gate-Firestone Blvd interchange, and City of Vernon - Atlantic Blvd/Bandini Blvd ramp reconfiguration	$500	Regional
Local Arterial Operational Improvements / Identified Needs	Key Goods Movement Arterial Improvements	TBD	County
	Alameda St. and I-10 - widen roadway and add 2nd left turn lane	TBD	Identified Need
	Alameda St. and Washington Blvd - Add a 2nd left turn lane for NB and SB Alameda Blvd. And Widen	TBD	Identified Need
	Alameda St - 15th St. to Olympic Blvd - Widen Alameda St., Olympic Blvd., and 14th St; increase curb radii	TBD	Identified Need
	Alameda Street Widening and reconstruction in Los Angeles (101 Freeway to 7th street; I-10 Freeway to 7th street)	$29	County

Table 11
Los Angeles County Goods Movement Projects & Identified Needs

Project Type	Project Description	Cost[1] (Millions)	Category
	Arroyo Street between Foothill and Montero Ave. - widen westbound approach of Arroyo Street at Foothill Blvd	TBD	Identified Need
	Bellflower Blvd at Imperial Hwy - provide right-turn pockets and provide 50-foot turning radii for trucks at Bellflower/Imperial Hwy intersection		Identified Need
	Bradley Avenue and Penrose Street - increase curb radii to 45 feet where feasible	TBD	Identified Need
	Bradley Avenue between Tuxford Street and Penrose Street - widen roadway where feasible	TBD	Identified Need
	Branford Street and San Fernando Road - Widen both sides of street and increase curb radii to 45 feet where feasible	TBD	Identified Need
	Central Ave. and 16th St - Widen roadway & increase right turn lane from 10 to 18 ft.	TBD	Identified Need
	Crenshaw Blvd @ 182nd/I-405 On/Off Ramp Capacity Enhancements - Road widening to install dedicated right turn lanes - Crenshaw Blvd @ 182nd and I-405 SB ramps & 182nd @ I-405 NB ramps. Also pavement rehabilitation on Crenshaw Blvd from 182nd to 190th.	TBD	Identified Need
	Daly Street and North Main Street -widen intersection and increase curb radii	$1	Identified Need
	Doran Street and San Fernando Road - widen road crossing and increase curb radii to 45 feet where feasible	TBD	Identified Need
	Crenshaw Blvd @ 182nd/I-405 On/Off Ramp Capacity Enhancements - Road widening to install dedicated right turn lanes - Crenshaw Blvd @ 182nd and I-405 SB ramps & 182nd @ I-405 NB ramps. Also pavement rehabilitation on Crenshaw Blvd from 182nd to 190th.	TBD	Identified Need
	Highland Blvd. At Franklin & Highland Blvd. At Odin St. - realignment of Highland Ave.	TBD	Identified Need
	Hawthorne Blvd Mobility Improvement Project - The project will improve congestion and increase efficiency for vehicular, pedestrian, public transit and bicycle traffic on Hawthorne Blvd	TBD	Identified Need
	Laurel Canyon Blvd Widening south of Mulholland Drive	TBD	Identified Need
	Mateo St. and 7th St. - widen Mateo from 34 ft to 70 ft secondary standard	TBD	Identified Need

Table 11
Los Angeles County Goods Movement Projects & Identified Needs

Project Type	Project Description	Cost[1] (Millions)	Category
	Mateo St. and Olympic Blvd. - widen NW leg and increase width of right lane & curb radii	TBD	Identified Need
	Old Road widening north of Magic Mountain Parkway to Turnberry Lane	TBD	Identified Need
	Paramount Blvd. At Firestone - provide right-turn pockets and provide 50-foot turning radii for trucks at Paramount/Bellflower Blvd. intersection		Identified Need
	Penrose Street Widening - San Fernando Road and Lehigh Ave	$3	Identified Need
	Santa Fe Ave. and 8th St - Fully improve Santa Fe to secondary standards (increase width from 80 to 90 ft.); add NB LT lane	TBD	Identified Need
	San Pedro St. between 16th and 17th - widen street and add side by side NB and SB left turn lanes	TBD	Identified Need
	Soto St. and Whittier Blvd - Widen Soto from 80 to 100 ft. where right of way exists	TBD	Identified Need
	Soto St. and 8th St. - Widen Soto from 80 to 100 ft. where right of way exists	TBD	Identified Need
	Valley Blvd. Rail Corridor (Widen Vineburn Av. & Boca Av. - upgrade signals, railroad devices & operations)	TBD	Identified Need
	Washington Blvd Widening (near Hobart Yard, UP East LA intermodal facilities)	$14.0	County
Total Los Angeles County Goods Movement Projects		**$29,320.5**	

Notes:
1. All figures include environmental mitigation costs.
2. Private sector fund sources.
3. Project must demonstrate regional public benefit to qualify for public funds.
4. Requires further analysis west of US-395, private sector primary fund source, with possible exception of short-term project to construct section between Phantom East and I-15 for $350 million (San Bernardino County).

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Multi-County Goods Movement Action Plan

Orange County Action Plan

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
San Diego Association of Governments

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ECONOMISTS

Wilbur Smith Associates

April 30, 2008

Table of Contents

INTRODUCTION **1**
- **Purpose** **1**
- **The County's Goods Movement Profile** **2**
- **Institutional Relationships** **3**
- **Role** **5**
  - Ports/Air 5
  - Rail 7
  - Trucks 9
  - Warehousing 12

COUNTY SPECIFIC ISSUES **14**
- **Mainline Rail Capacity Issues** **14**
- **At-Grade Rail Safety and Congestion** **18**
- **Growing Truck and Vehicle Volumes on Orange County's Main Freeway Corridors** **18**
- **Warehousing and Other Local Truck Related Traffic** **21**
- **NAFTA Truck Traffic** **22**
- **Corridor Convergence Issues** **23**
- **Air Quality** **24**

ORANGE COUNTY'S GOODS MOVEMENT PLAN **25**
- **Overall Orange County Goods Movement Plan – Capital Projects and Funding Mechanism** **26**
- **Next Steps** **34**

CONCLUSION **36**
ONGOING COLLABORATION **39**

List of Tables

Table 1 – Air Cargo Activity 2003-2005 MCGMAP Study Area Airports (In Tons) 7
Table 2 – Year 2003 Truck ADT 10
Table 3 – Total Passenger and Freight Train Movements 14
Table 4 – Peak-Day Rail Traffic for 2025 (Number of Trains per Day by Segment) 15
Table 5 – Year 2003 and Year 2030 Truck Volumes Derived from Model Runs 19
Table 6 – Forecast Truck Volumes on Region's Highway System 20
Table 7 – Orange County Industrial Market – Fourth Quarter 2007 22
Table 8 – Estimated 2005 Annual Average Rail Emissions in SCAB 25
Table 9 – Grade Separation Projects 26
Table 10 – MCGMAP Projects in Orange County 28

List of Figures

Figure 1 – Multi-County Goods Movement Action Plan Orange County 4
Figure 2 – John Wayne Airport 6
Figure 3 – Multi-County Goods Movement Action Plan Railroad Lines 8
Figure 4 – 2003 Percentage of Truck VMT in the MCGMAP Study Area by County 9
Figure 5 – Multi-County Goods Movement Action Plan 2003 Truck ADT 11
Figure 6 – Multi-County Goods Movement Action Plan Warehouse Land Use 13

Figure 7 – Multi-County Goods Movement Action Plan 2025 Forecast Rail Freight Volume 16
Figure 8 – Multi-County Goods Movement Action Plan 2025 Forecast Rail Volume 17
Figure 9 – Truck Growth 2003-2030 21
Figure 10 – Orange County Railroad Grade Separation Projects 27

Introduction

Purpose

This report outlines a Goods Movement Action Plan for Orange County, California, part of a broader Multi-County Goods Movement Action Plan (MCGMAP) developed collectively by the Los Angeles County Metropolitan Transportation Authority (Metro), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), San Diego Association of Governments (SANDAG), Ventura County Transportation Commission (VCTC), Southern California Association of Governments (SCAG), and the California Department of Transportation (Caltrans). The MCGMAP contains strategies to support the efficient movement of goods without disproportionately impacting local communities, the environment, or the transportation network. The MCGMAP is also a regional framework for goods movement initiatives.

This report examines the key issues that impact Orange County from a goods movement standpoint. It examines the plans and proposals that are being pursued to resolve stated issues, and specific actions and strategies, which should become a focus for the county. This report builds on a large body of work that has been researched and developed over the past few years, all of which collectively addresses a comprehensive range of goods movement issues.

The Orange County Goods Movement Plan is intended to be an element within the broader Multi-County Goods Movement Action Plan. One of the objectives of the Action Plan is to determine specific transportation actions and performance on the regional transportation system and users of the system, make specific recommendations regarding freight transportation strategies, and develop a consensus based transportation improvement program by the project partners. The county report focuses on existing and future freight movements that originate within and outside the county, however, the context relates to the broader interaction of one segment of the regional transportation system as reflected in the Action Plan.

The Multi-County Goods Movement Action Plan has recommended four primary action sets for goods movement within the region. The action sets are:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility
- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

The County's Goods Movement Profile

- As the county and the region continues to attract new business and residents, it will be essential to ensure that the strengths of the county's transportation system are maintained by addressing congestion and increased movement of freight into and outside the geographic area of the county. The transportation system provides mobility of freight from the ports of Long Beach and Los Angeles to destinations throughout California and beyond. However, this county is also a producer and distributor of goods that enter the supply chain to diverse locations beyond our borders to more distant markets.

- The goals and strategies that are reflected to enhance freight movement in the county are:

    1. Support the county's economic well-being while remaining sensitive to environmental needs and concerns.
    2. Expand the development and funding of grade separations.
    3. Improve the capacity and quality of second tier roadways (Master Plan of Arterial Highways) which are used heavily for freight movement.
    4. Implement strategic improvements to facilitate mobility and support the efficient and reliable freight movement throughout the transportation systems in the county.
    5. Ensure adequate mainline freight capacity and safety.
    6. Continue to identify system needs and to research and develop technology for facilitating goods movement collaboratively with state, regional and local transportation agencies.
    7. Ensure mitigation of potential impacts for projects that will be implemented.

- The major regional corridors addressed in the Action Plan provide links between large geographic areas that support the movement of freight within and outside the region. Even though the Action Plan breaks out a plan for each county this is in the context of the diversity of manufacturing, distribution, inter-modal facilities, diverse land-use patterns, freight characteristics and movement on the transportation system. This demonstrates the importance of partnership planning and integration of strategies to meet both existing and future demands on the regional transportation system. There needs to be a regional perspective to guide future development, continuously monitor progress and point out adjustments needed as a result of changing conditions. This reflects movement of freight by air, railroad, marine and road.

- Rapid growth of freight and automotive traffic is a major challenge to the continued viability of the regional transportation system. As most corridors cross into other jurisdictions and involves regional and local roadways, the plan provides for the continuation of partnerships among governments and stakeholders to ensure successful planning and implementation of projects. This will ensure a seamless freight system that serves the region in which each mode performs the service function for which best meets the needs of goods movement.

Institutional Relationships

OCTA has expanded its role as regional partner in building coalitions to help meet the region's good movement challenges. For example, last year OCTA become a partner in Mobility 21, a Southern California region wide organization of public and private sector goods movement stakeholders. A mission of Mobility 21 is to advocate for Southern California's fair share of state and federal transportation funds.

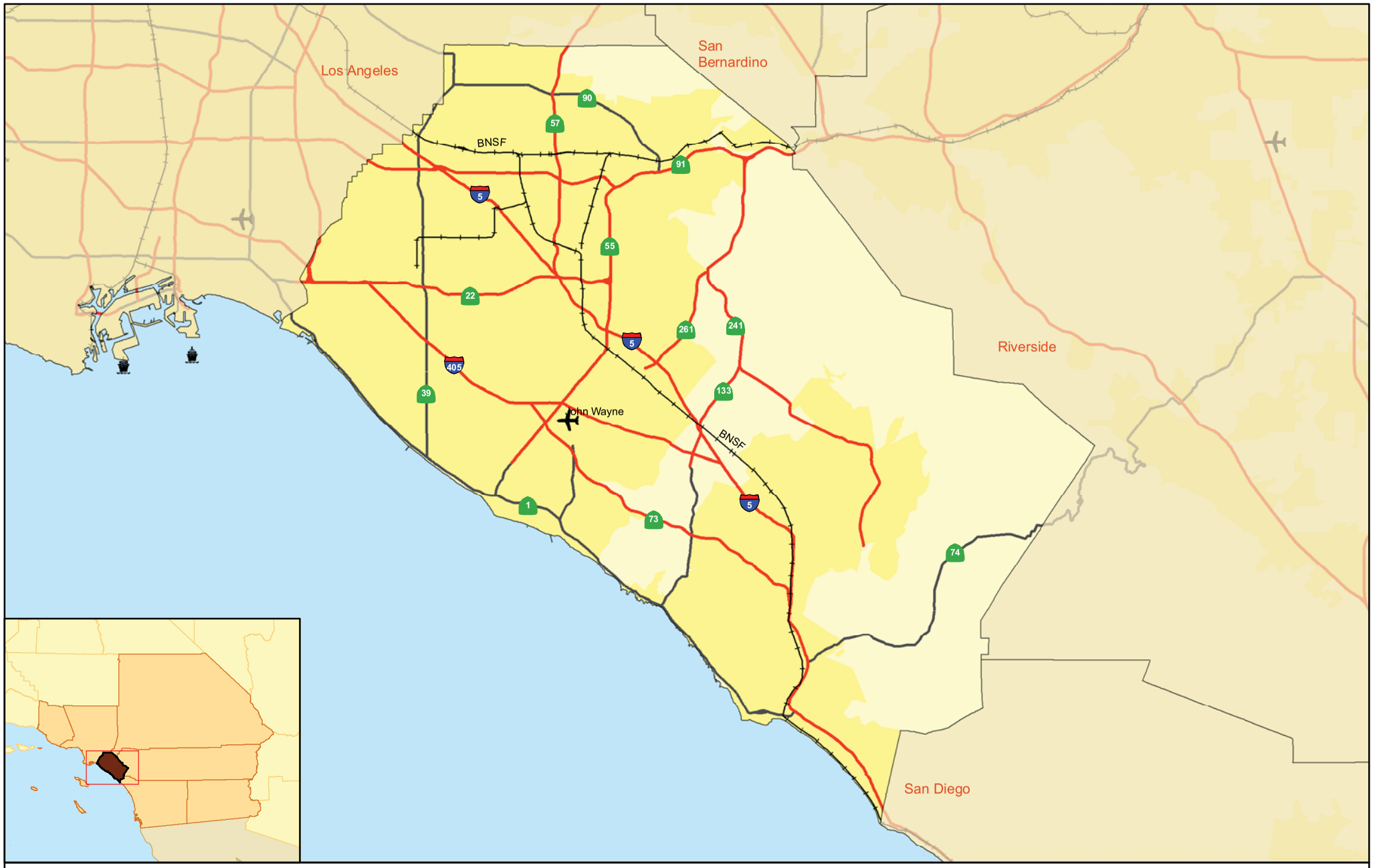
In January 2007, the Board held a Goods Movement Workshop, where experts in goods movement outlined for Board Members, the important goods movement challenges facing the county and the region.

In March 2007, the Board adopted a goods movement policy, one of whose major tenants was the recognition of the enhancements to the region's good movement systems i.e. expanded road and rail capacity while at the same time mitigating the impacts of the enhancement to local communities.

In October 2007, OCTA along with over twenty federal, state, local, and regional agencies signed the Southern California National Freight Gateway Cooperative Agreement. The purpose of the agreement was to "bring to the table" federal and state agencies such as the United States Environmental Protection Agency, the United States Department of Transportation, and the California Business Transportation and Housing Agency, to discuss such topics as air quality and international trade policy.

More recently, OCTA played a major role in the formation of the Southern California Trade Corridors Improvement Fund Consensus Working Group. Working together with other regional transportation agencies and the ports of Los Angeles, Long Beach, and Hueneme, the Los Angeles/ Inland Empire Trade corridor is currently in a position to receive and estimated $1.6 billion in goods movement projects, from Proposition 1B bond funding passed by the voters in November 2006.

Figure 1 shows Orange County and the primary infrastructure features in the county.



Airports
Ports
Railroad
Freeways
Highway
Urban Areas

Multi-County Goods Movement Action Plan
Orange County

0 5 10 20 Miles

N

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006

Figure 1

While Orange County has a significant level of goods movement activity, it is primarily a bridge for truck and rail traffic between Los Angeles and the Inland Empire. The goods movement story is well documented and appreciated in the county, starting with the comprehensive 1998 *Orange County Goods Movement Study*, followed by several subsequent goods movement efforts, including but not limited to the following:

- Alameda Corridor East Trade Corridor Plan, 2001 (Updated in 2006)
- Demonstration Projects and City Projects for Reauthorization of Transportation Equity Act 21, January 2003
- Analysis of Truck Volumes Along Key Corridors, May 2005
- Project Study Report for SR-57 Northbound Climbing Lane Widening, July 2005
- The OCTA Goods Movement Roundtable Effort, July 2005
- SR-91 Chokepoint Projects, 2006
- Orange County Gateway Project, 2006
- Goods Movement Action Plan, Business Transportation and Housing Agency and California Environmental Protection Agency, January 2007

Role

Ports/Air

Although Orange County is located on the coast, it does not have a maritime port. From a geographic perspective, the county does not have a physical feature conducive to a large port. In the 1830s, California rancheros shipped hides from Bahia Capistrano, now Dana Point, but this location never materialized into a major port[1]. However, the county transportation system provides accessibility from the ports of Los Angeles, Long Beach, and San Diego for movement of freight throughout the region.

Air cargo is dominated in the region by Los Angeles World Airport (LAX). The air cargo handler in Orange County is John Wayne Airport. Table 1 provides air cargo figures for the SCAG region counties. As mentioned in the table, LAX and Ontario provide the majority of air cargo in the region. Air Cargo tonnage handled at the John Wayne Airport dropped by 8% for the year 2007 (22,062 tons) compared to 2006 (24,033 tons)[2].

[1] History of Dana Point, http://homepage.mac.com/bridgeguys/UGlossary/DPhistory.html
[2] John Wayne Airport, http://www.ocair.com/newsandfacts/factsataglance.htm

Figure 2
John Wayne Airport

Source: John Wayne Airport and The Captured Image dba We Shoot.

Table 1
Air Cargo Activity 2003-2005 MCGMAP Study Area Airports (In Tons)

Airport	2003	2004	2005	2005 Market Share
Los Angeles (LAX)	2,022,076	2,115,314	2,137,188	75.20%
Ontario (ONT)	571,992	605,211	575,369	20.20%
Long Beach (LGB)	56,081	57,050	54,298	1.90%
Bob Hope (BUR)	47,634	49,633	52,867	1.90%
John Wayne (SNA)	15,816	20,796	24,103	0.80%
Total	2,713,599	2,848,004	2,843,825	100.00%

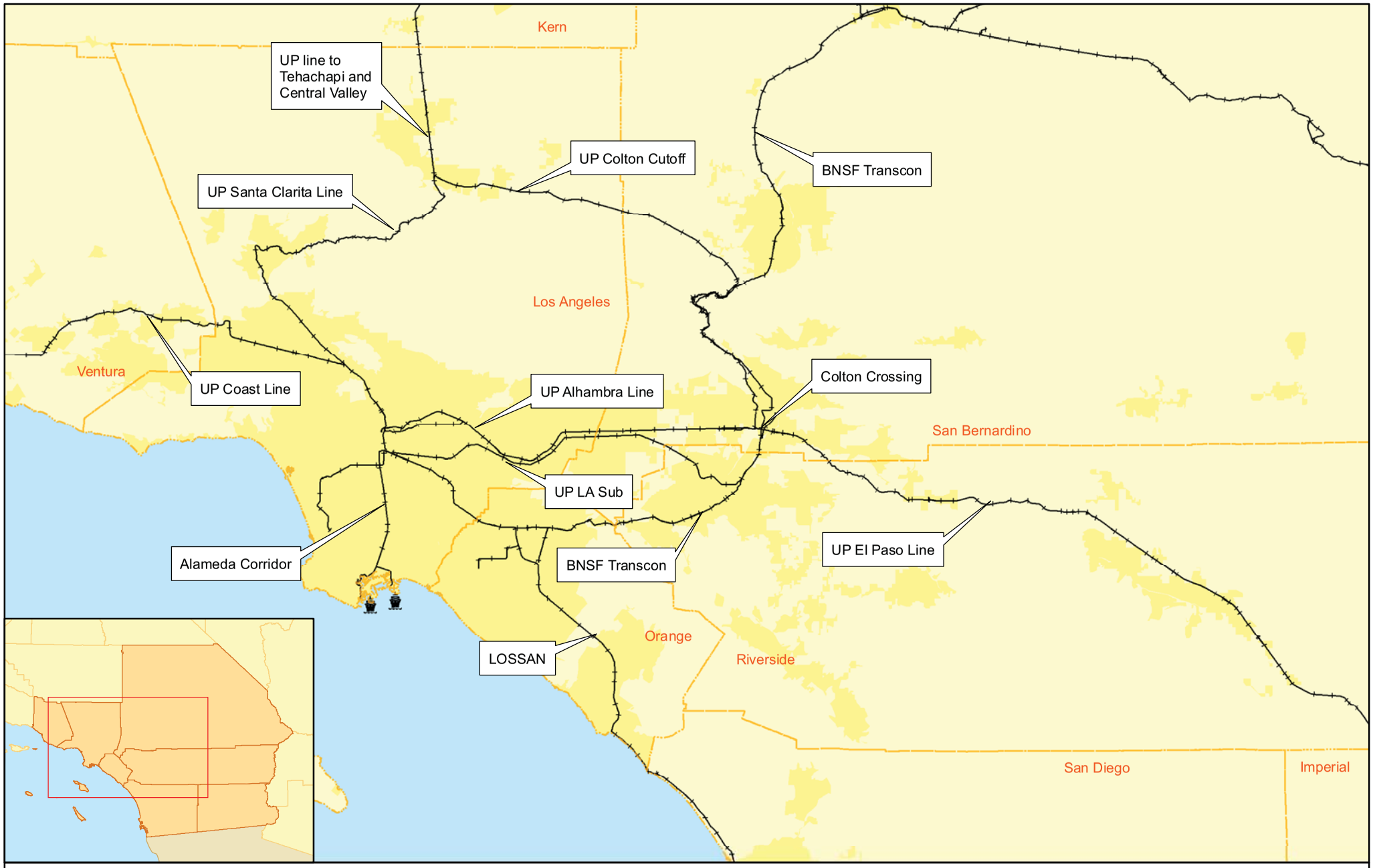
Source: SCAG Region Aviation Activity Report, 2003-2005

Rail

There are three railroad lines providing passenger and freight service in Orange County. The Orange County Transportation Authority (OCTA), by virtue of an operating agreement in 1992 with the Burlington, Northern and Santa Fe's (BNSF) predecessor, the Atchison, Topeka and Santa Fe, is the owner of the Orange and Olive subdivisions. The Orange subdivision stretches from the San Diego line to the junction with the BNSF in the City of Fullerton. Rail traffic on the Orange subdivision consists of the Metrolink Orange County Line and Inland Empire-Orange County (IEOC) Line service, Amtrak Pacific Surfline trains, and a minimal number of freight trains. The Olive subdivision stretches from just north of the City of Orange Metrolink station to the junction with the BNSF in the City of Placentia. Rail traffic on the Olive subdivision consists of IEOC trains and a minimal number of freight trains.

The BNSF is the owner of the San Bernardino subdivision in Orange County. The subdivision stretches from the Orange County/Riverside County Line near the City of Yorba Linda to the Orange County/Los Angeles in the City of Buena Park. The BNSF San Bernardino subdivision runs through the cities of Yorba Linda, Anaheim, Fullerton, Placentia, and Buena Park and is frequently referred to as the Orangethrope Corridor or Alameda Corridor East (ACE). Rail traffic on the subdivision consists largely of BNSF freight trains and a minimal number of Metrolink 91 line, IEOC line, and Amtrak trains.

The rail mainlines that operate through the MCGMAP region is shown in Figure 3.



Airports
Ports
Railroad
Urban Areas

Multi-County Goods Movement Action Plan
Railroad Lines

0 15 30 60 Miles

N

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

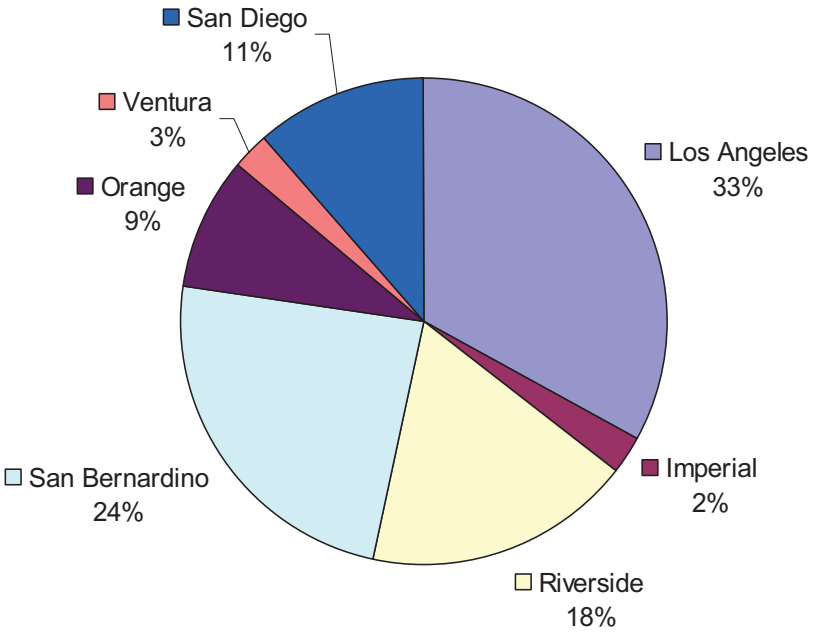
Sources:
StreetMap 2006
MCGMAP Tech Memo 3 2006

Figure 3

Trucks

Figure 4 shows the distribution of truck traffic in the region by county, measured in terms of truck miles of travel on the state highway system. Orange County accounts for approximately 9 percent of the total regional truck miles of travel, which means it ranks fifth (5th) out of the seven study area counties.

Figure 4
2003 Percentage of Truck VMT in the MCGMAP Study Area by County



Source: Truck Miles of Travel: California State Highway System 1988-2003, Caltrans 2005.

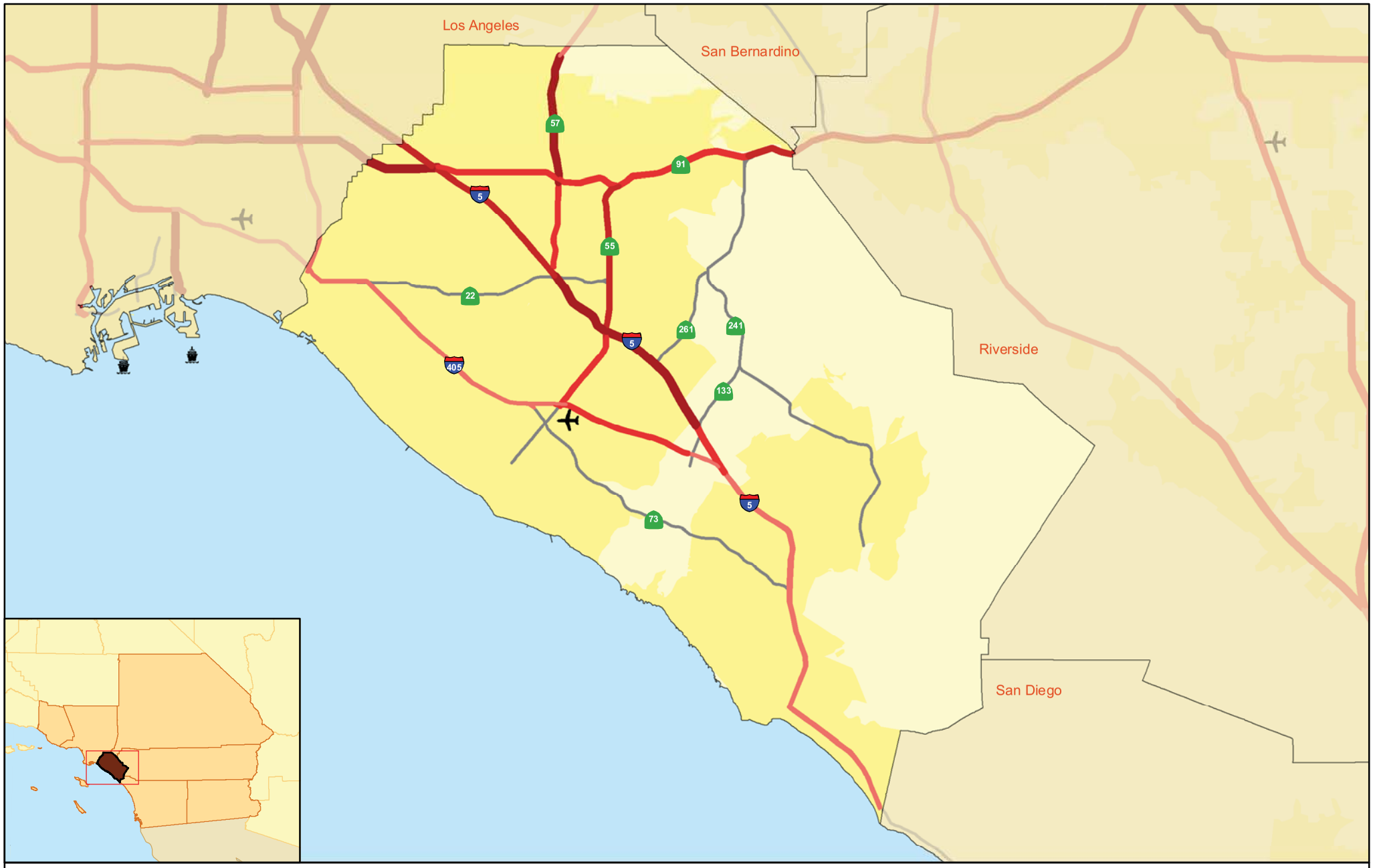
Orange County has significant truck volumes on a number of highway segments as shown in Table 2. Segments of I-5, I-405, SR-91, and SR-57 have Average Daily Trips (ADT) in excess of 20,000.

Table 2
Year 2003 Truck ADT

Route	Segments	County	Year 2003 Trucks[1]		Total ADT 2003
			N/E	S/W	
I-405	I-5 to SR-133	Orange	4,581	5,027	9,608
I-405	SR-133 to SR-55	Orange	6,827	6,802	13,629
I-405	SR-55 to SR-22	Orange	4,174	4,106	8,280
I-405	SR-22 to I-605	Orange	5,423	4,163	9,586
I-5	SR-55 to SR-57	Orange	10,764	11,252	22,016
I-5	SR-133 to SR-55	Orange	11,957	10,059	22,016
I-5	I-405 to SR-133	Orange	8,135	6,757	14,892
I-5	SR-73 to I-405	Orange	5,151	4,334	9,485
I-5	SD County Line to SR-73	Orange	5,188	4,269	9,457
SR-55	I-405 to I-5	Orange	7,186	6,734	13,920
SR-55	I-5 to SR-22	Orange	7,631	7,532	15,163
SR-55	SR-22 to SR-91	Orange	7,872	7,291	15,163
SR-57	I-5 / SR-22 to SR-91	Orange	7,272	7,688	20,400
SR-57	SR-91 to SR-60	Orange	10,404	9,996	20,400
SR-91	I-605 to I-5	LA/OR	12,092	13,188	25,280
SR-91	I-5 to SR-57	Orange	6,802	6,805	13,607
SR-91	SR-57 to SR-241	Orange	6,249	6,842	13,091
SR-91	SR-241 to I-15	RIV/OR	7,616	9,115	16,731

Source: Caltrans, Traffic and Vehicle Data Systems Unit, 2004 Truck, Wilbur Smith Associates, 2006
Note: 1. Trucks include all Heavy-Duty Trucks (Light HDT, Medium HDT, and Heavy HDT).

A map of ADT is provided in Figure 5. I-5 is a major north-south truck corridor and the SR-91 is a principal route from the ports of Long Beach and Los Angeles to warehouses in Orange County, warehouses in the Inland Empire, and points outside the study area to the east. These routes are critical infrastructure for goods movement and demonstrate Orange County's role as a bridge between other counties.



less than 5000
5000 - 10000
10000 - 15000
15000 - 20000
greater than 20000
Other Freeways

Ports
Airports
Urban Areas

Multi-County Goods Movement Action Plan
2003 Truck ADT

0 5 10 20 Miles

N

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Sources:
StreetMap 2006
Caltrans 2004
WSA 2006

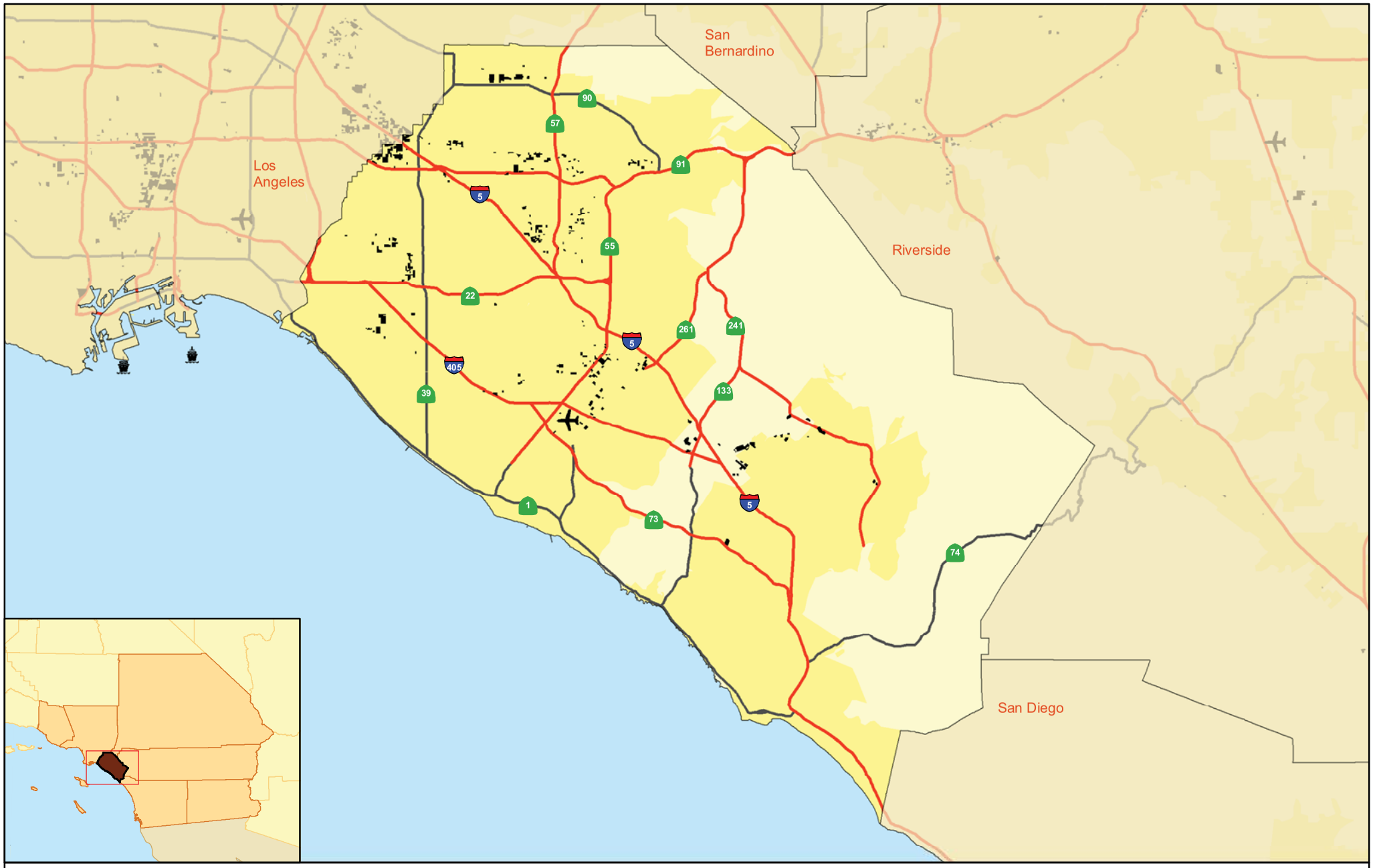
Figure 5

Warehousing

Orange County's proximity to the burgeoning warehousing and logistics centers in Los Angeles and through the Inland Empire, combined with a well-developed freeway system, has made it an attractive locale for warehousing activities. Orange County is the 10th largest industrial and office market in the country with an inventory of over 271 million SF[3]. The greatest concentration of warehousing and industrial activities is along the SR-91, SR-57, and I-5 corridors, as well as along the western boundary with Los Angeles County, as shown in Figure 6.

Continued growth in shipments of freight to the region and to other points in the U.S. have seen a burgeoning of warehousing and logistics centers in Los Angeles, Orange and the Inland Empire due to multiple distribution locations and a well developed and integrated freeway and local arterial system in the region. Some goods are carried cross-country using inter-modal transportation to save time and money. Inter-modal transportation encompasses any combination of transportation by truck, train, plane, or ship. Typically, trucks perform at least one leg of the trip. Trucking dominates the transportation of perishable and time-sensitive goods. In 2006 the Bureau of Labor Statistics indicated that nationwide there were over 28,000 local trucking establishments, 41,000 long distance trucking firms, specialized freight trucking such as refrigerated cars and flatbeds 48,000 companies and 14,000 warehousing and storage facilities. With the estimated 42,500 TEUs expected at our regions ports over the next 20 years, these regional warehousing activities are one link in an increasingly local, regional, and national global supply chain and distribution system.

[3] Society of Industrial and Office Realtors, 2005 Market Review and Outlook



Airports
Ports
Freeways
Highway
Urban Areas
Wholesaling/Warehousing

Multi-County Goods Movement Action Plan
Warehouse Land Use

0 5 10 20 Miles

N

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006
SCAG 2000 Land Use

Figure 6

County Specific Issues

The major goods movement related issues in Orange County are:

- Mainline Rail Capacity Issues
- At-Grade Rail Safety and Congestion
- Growing Truck and Vehicle Volumes on Orange County's Main Freeway Corridors
- Warehousing and Other Local Truck Related Traffic
- NAFTA Truck Traffic
- Corridor Convergence Issues
- Air Quality

The following section discusses these six goods movement concerns.

Mainline Rail Capacity Issues

Total passenger and freight train movements broken down by rail segments for the Year 2000 are presented in Table 3.

Table 3
Total Passenger and Freight Train Movements

Line Segment	Freight Total Through Train Movements per Peak Day (Year 2000)	Passenger Total Through Train Movements per Peak Day (Year 2000)
BNSF Hobart – Fullerton Jct.	50	46
BNSF Atwood – West Riverside	57	16
Metrolink Orange County Line	--	14
Metrolink Inland Empire – Orange County Line	--	10

Source: Inland Empire Railroad Main Line Study, Final Report, June 30, 2005.
Note: Any blank indicates the non-existence of train movements on that particular rail line.

The Table 4 shows BNSF freight traffic and passenger train volumes, for rail segments passing through Orange County. At Atwood, a Metrolink-owned line to Orange County diverges from the BNSF line. This line is used by BNSF through freight trains to/from San Diego. At Fullerton, another Metrolink-owned line to Orange County junctions with the BNSF line. This line does not see through freight train operations, but it does see heavy use by Amtrak and Metrolink passenger trains. The freight and passenger summary rail forecasts shown in Table 4 were derived from the Wilbur Smith Associates team forecast discussed in Tech Memo 4a. Freight volumes include inter-modal and carload traffic on the BNSF and UP mainlines. Passenger rail forecasts include Amtrak long distance trains, Amtrak Pacific Surfliner corridor trains

(Corridor), and Metrolink commuter trains. The forecasts were based on the most recent available data from BNSF, UP, Amtrak, and Metrolink.

Table 4
Peak-Day Rail Traffic for 2025
(Number of Trains per Day by Segment)

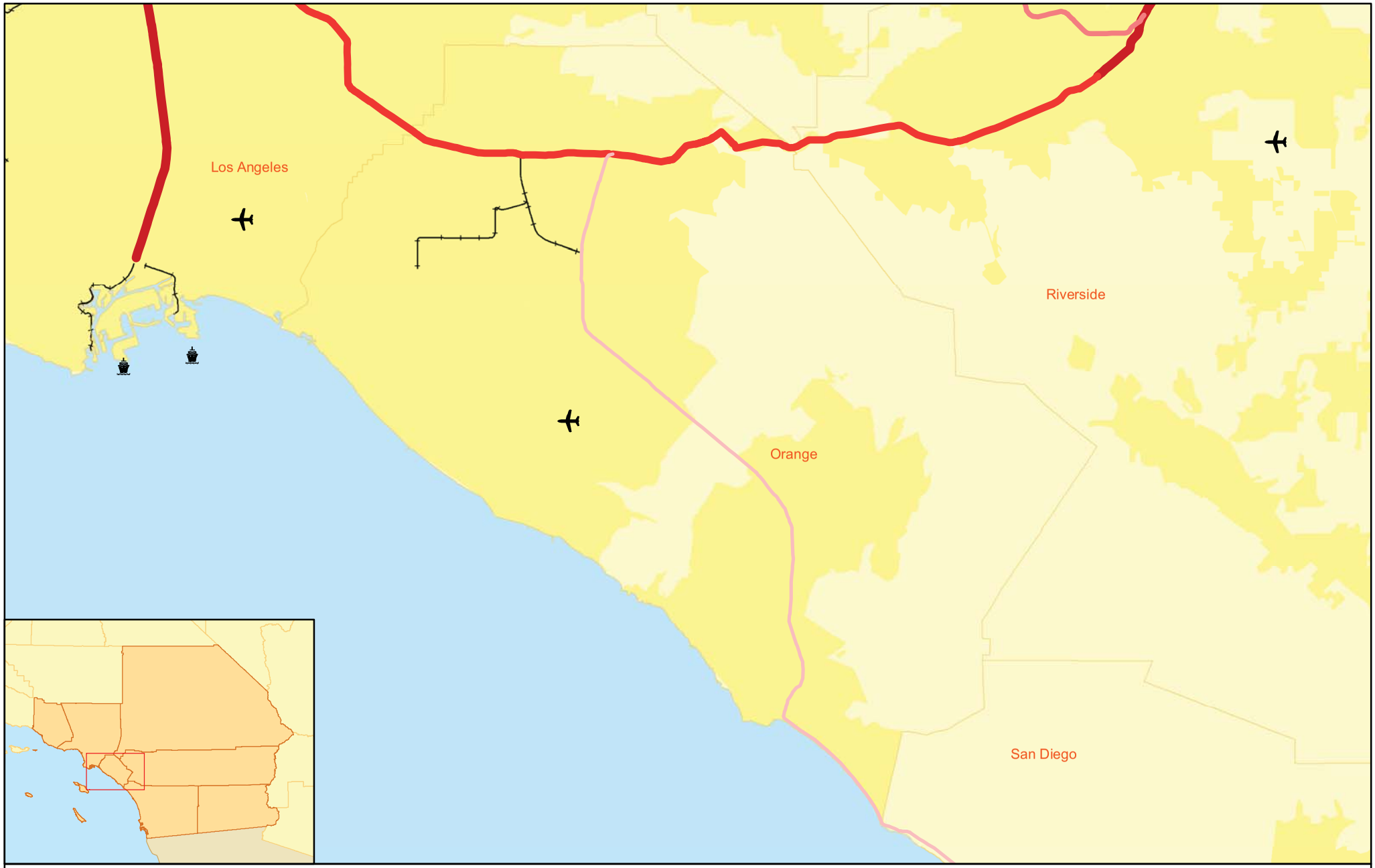
	Atwood-Fullerton	Atwood-Orange	Fullerton-Orange	Orange-Irvine/San Juan Capistrano/Oceanside/ San Diego
BNSF through freight	102	9	--	9
Passenger – Metrolink	26	40	48	88
Passenger – Corridor	--	--	32	32
Passenger - Amtrak	2	--	--	--
UP through freight	--	--	--	--
Year 2025 Total	**130**	**49**	**80**	**129**

Source: Wilbur Smith Associates, 2006
Note: Any blank indicates the non-existence of train movements on that particular rail line.

Figure 7 shows the increase in rail freight volumes by the year 2025 and, Figure 8 shows the increase in total rail volumes for the year 2025.

To accommodate projected freight rail traffic along the BNSF Transcon line, a 14.8 mile triple track project is under construction from the Hobart Yard in Los Angeles County to Fullerton (5 miles have been completed). The Metrolink commuter rail service shares the same tracks with BNSF. The commuter service is essential to linking residents with their jobs and other activities throughout the region. Metrolink plans to expand its service over the next decade. With the triple track project completion, there will be less negative impact on Metrolink and other passenger rail services throughout the County.

The key issue regarding this corridor is that the projected growth in both commuter and freight train traffic will lead to significant grade crossing delays and conflicts between commuter and freight trains. Absent enhancements in line capacity, these conflicts will result in train delays and safety concerns. The 2004 OCTA Commuter Rail Strategic Assessment, produced by Wilbur Smith Associates, supports the conclusion that the capacity of the BNSF's existing double track line through Orange County will prove insufficient to handle the projected increases in both commuter and freight traffic.



Airports
Ports
Urban Areas
Other Railroad

Trains per Day
0 - 18
19 - 37
38 - 112
113 - 160
161 - 212

Multi-County Goods Movement Action Plan
2025 Forecast Rail Freight Volume

0 3.5 7 14 Miles

N

Sources:
StreetMap 2006
WSA 2006

WilburSmith ASSOCIATES
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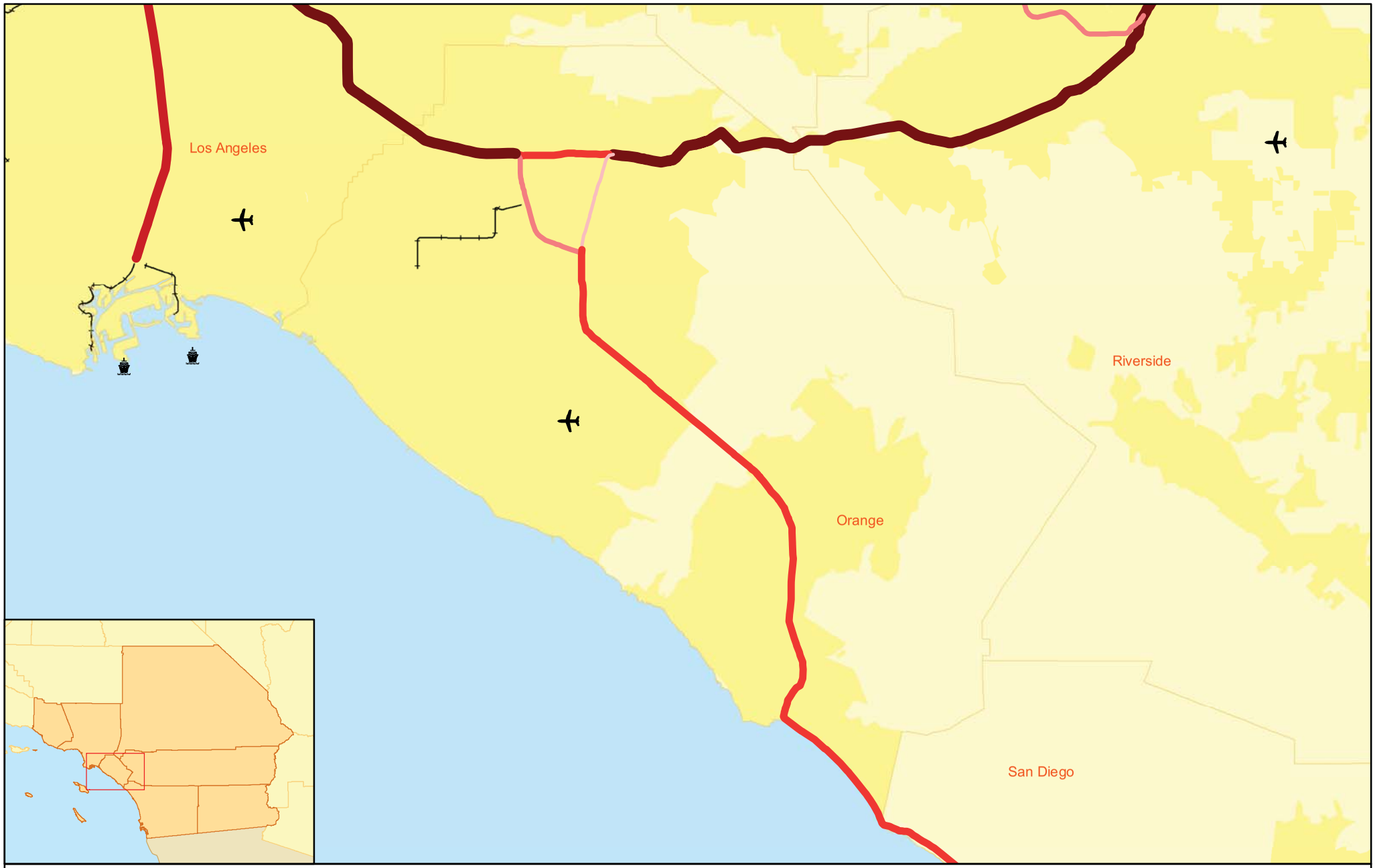
Figure 7



Airports
Ports
Urban Areas
Other Railroad

Trains per Day
27 - 49
50 - 81
82 - 130
131 - 162
163 - 255

Multi-County Goods Movement Action Plan
2025 Forecast Rail Volume

0 2.5 5 10 Miles

N

Sources:
StreetMap 2006
WSA 2006

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Figure 8

Proposed rail mainline enhancements in Orange County is included in the MCGMAP project list presented in this document. Orange County is included in the mainline improvements to BNSF rail. Preliminary infrastructure costs for triple tracking the BNSF Los Angeles/Fullerton segment and the BNSF Fullerton/San Bernardino segment were estimated at approximately $287 million.[4]

At-Grade Rail Safety and Congestion

Grade crossings are locations at which automotive traffic crosses railroad right-of-way (ROW) at-grade. Currently, more than 70 trains per day travel through the Orangethorpe rail corridor. This corridor, also called the Orange County Gateway, is centered at the intersection of the San Bernardino Subdivision and the Orange/Olive Subdivision in the Placentia/Anaheim area. By the year 2020, the number of trains running through this corridor is projected to increase to 150 trains per day. Currently, this train traffic halts vehicular and pedestrian traffic at the intersections it crosses. Since the trains have the right of way, an increase in traffic delay is unavoidable leading to driver and pedestrian safety concerns. In addition, delays for commuters and emergency-response traffic, as well as noise, vibration, and air pollution are all concerns for the people who live and work near the rail corridors. However, with the implementation of grade separation projects and quiet zones, these concerns can be mitigated.

Orange County is included in the MCGMAP project list with the grade separation improvements in the Alameda Corridor - East (ACE) Trade Corridor. According to the Alameda Corridor–East Trade Corridor Plan project funding summary, Orange County has approximately over $400 million in unfunded grade crossings[5].

Growing Truck and Vehicle Volumes on Orange County's Main Freeway Corridors

The freight industry in Orange County is well served by a highly developed freeway system. Segments of I-5, SR-91 and SR-57 have volumes in excess of 20,000 ADT. SR-55 has segments with volumes just over 15,000 ADT. I-405 between SR-22 and I-605 will experience truck volumes of more than 35,000 ADT by 2030. The area around Anaheim and Orange, where routes converge, show the highest concentration of truck activity largely due to a critical mass of warehouse, industrial, retail and entertainment land uses.

Currently, on SR-57, average daily truck volumes are as high as 20,000; representing 12 percent of total traffic during peak hours and 18 percent during midday. Northbound SR-57 experiences a significant level of delay due to the large percentage of existing truck traffic and a long climbing grade. The current average northbound freeway speed during evening peak periods is 10 miles per hour, which is defined as a failing level of service for freeways. The conditions will likely continue to deteriorate.

[4] BNSF Southern California Infrastructure Proposal 2006

[5] Alameda Corridor - East Completion – Funding Sources

Table 5 provides forecasts of truck volume growth based on the difference between base year (year 2003) and 2030 truck volumes derived from model runs conducted by SCAG. Travel demand model volumes typically don't exactly match existing counts, therefore Table 6 presents the post-processed truck volumes for the Year 2030. The post-processed volumes are the adjusted year 2030 volumes based on the calculated difference in forecast volumes for the base year (Year 2003) compared to available existing traffic counts.

Table 5
Year 2003 and Year 2030 Truck Volumes Derived from Model Runs

Route	Segments	SCAG Model 2003 Truck Volume	SCAG Model 2030 Truck Volume	Percent Change in Daily Truck Volume
SR-55	I-405 to I-5	10,854	13,859	28%
SR-57	SR-91 to SR-60	16,434	22,003	34%
SR-57	I-5 / SR-22 to SR-91	14,060	19,400	38%
I-5	SR-55 to SR-57	24,184	33,890	40%
SR-55	SR-22 to END	12,299	17,488	42%
SR-55	I-5 to SR-22	10,441	14,952	43%
I-405	SR-22 to I-605	27,022	38,744	43%
I-5	SR-133 to SR-55	19,633	29,760	52%
I-405	SR-133 to SR-55	10,469	16,021	53%
I-405	I-5 to SR-133	7,926	12,324	55%
I-405	SR-55 to SR-22	17,963	28,603	59%
I-5	I-405 to SR-133	16,120	26,635	65%
I-5	SR-73 to I-405	18,485	32,096	74%
SR-91	I-5 to SR-57	20,397	39,025	91%
SR-91	SR-57 to SR-241	18,613	36,060	94%
I-5	San Diego County Line to SR-73	15,947	34,549	117%

Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006
Note: 1. Trucks include all Heavy-Duty Trucks (Light HDT, Medium HDT, and Heavy HDT).

The following can be summarized from the above table:

- I-5 from the San Diego County line to SR-73 shows an increase of 117 percent from approximately 16,000 in 2003 to 35,000 daily volumes by 2030.
- Truck volumes on SR-91 from I-5 to SR-57 and SR-57 to SR-241 increase to more than 90 percent by 2030.
- By 2030, the daily truck volumes on I-5 from SR-73 and I-405 show an increase of about 75 percent from 18,000 in 2003 to 32,000.
- Segments of I-405 from SR-133 to SR-55, I-5 to SR-133 and SR-55 – SR-22 show an increase of more than 50 percent by 2030.

Table 6 compares the truck volumes on the region's highway system projected for the Year 2030. The table below shows the potential differences in future forecast volumes due to changes in existing volumes (based on the difference between existing traffic count data and travel demand model forecasted base year traffic volumes). The description below shows the formula used to calculate the post-processed truck volumes:

- (Existing Volumes – SCAG Model 2003 Volumes) + SCAG Model 2030 Volumes = Post-Processed 2030 Volumes

Table 6
Forecast Truck Volumes on Region's Highway System

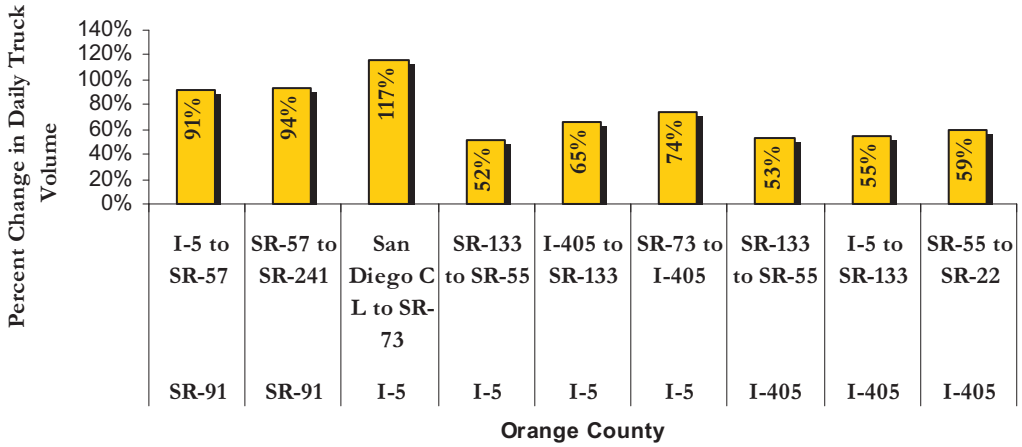
		SCAG Model 2030 Trucks[1]		Post-Processed Year 2030 Trucks	
Route	**Segments**	**N/E**	**S/W**	**N/E**	**S/W**
I-405	I-5 to SR-133	6,031	6,293	6,833	7,173
I-405	SR-133 to SR-55	8,112	7,909	9,695	9,487
I-405	SR-22 to I-605	21,716	17,029	11,852	9,456
I-5	SR-55 to SR-57	17,521	16,369	16,461	15,261
I-5	SR-133 to SR-55	16,375	13,385	17,669	14,474
I-5	I-405 to SR-133	15,214	11,420	14,543	10,863
I-5	SR-73 to I-405	17,914	14,183	13,097	10,000
SR-55	I-405 to I-5	7,367	6,492	8,950	7,975
SR-55	I-5 to SR-22	7,726	7,226	10,102	9,572
SR-55	SR-22 to END	9,162	8,326	10,649	9,703
SR-57	I-5 / SR-22 to SR-91	10,256	9,144	10,693	9,606
SR-57	SR-91 to SR-60	11,493	10,510	13,516	12,454
SR-91	I-5 to SR-57	17,162	21,863	13,767	18,468
SR-91	SR-57 to SR-241	16,481	19,578	13,761	16,777

Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006
Note: 1. Trucks include all Heavy-Duty Trucks (Light HDT, Medium HDT, and Heavy HDT).

When compared to Table 5, the table above shows how the difference in existing counts versus model forecasted base year counts affects the Year 2030 forecasted volumes. Table 6 shows that the SCAG model carries lower truck volumes on SR-55, SR-57, and parts of I-405. This indicates that SCAG forecasts are based on lower truck volumes than actually exist when compared to existing data for the above freeway sections. Whereas, on certain freeway sections like parts of SR-91, I-5, and I-405, the SCAG model projects higher truck volumes when compared to the post-processed counts.

Figure 9 displays truck growth of more than 50 percent for freeway segments in Orange County between 2003 and 2030 based on the SCAG model.

Figure 9
Truck Growth 2003-2030



Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006

The impact of increased truck traffic combined with similar growth rates in automotive traffic, will continue to stress Orange County's freeway system if additional capacity and operations improvements do not keep pace.

Orange County has an extensive list of highway improvement projects in the MCGMAP project list. There are more than 60 projects related to highways in the list, with an associated cost estimate of over $3.50 billion.

Warehousing and Other Local Truck Related Traffic

The County is the tenth largest industrial market in the country with an inventory of 271 million SF, compared to 379 million SF for the Inland Empire, which includes both Riverside and San Bernardino Counties.[6]

As a result of increasing land costs, industrial development has decreased over the past decade and has been displaced by new housing, as well as increasing amounts of research and development and technology space. This new "industrial" space includes more lab and office space and less assembly, manufacturing, and warehouse uses.

Following World War II, Orange County's industrial base began its growth along its northern boundary with Los Angeles County, and expanded south with the extension of I-5 and the overall expansion of the

[6] Source: The Grubb & Ellis Company market research report, Orange County 4Q 2007

freeway system. Large concentrations of industrial space displaced agricultural and dairy fields in Buena Park, Anaheim, Cypress, Fullerton, Brea, and La Habra. In the 1960's the Irvine Business Center spurred further industrial development around John Wayne Airport, creating a significant increase in new county businesses. The Irvine Spectrum, adjacent to the former El Toro Marine Base, contributed to significant growth in South Orange County beginning in the 1970's (initially with larger warehouse/distribution facilities and then transitioning to high-value added assembly and high technology space). Additional new development in South Orange County followed in Aliso Viejo, Santa Margarita, Foothill Ranch and southern portions of Tustin.

New industrial development is no longer concentrated in one geographical area, but is dispersed throughout the county. However, the amount of new construction is small compared to that of surrounding counties. Industrial construction in the fourth quarter 2007 for Orange County was only 704,000 SF compared to 23 million SF in the Inland Empire. Much of the new industrial space in Orange County, features higher office finishes with a smaller proportion of warehouse area. Buildings also tend to be smaller due to the high cost of land, which deters larger warehousing and distribution facilities.

The Orange County warehouse/distribution market comprises about 23 percent of the 271 million SF of county industrial space. At the end of the fourth quarter 2007, approximately 2.4 million SF, out of the total 62 million SF of warehouse/distribution space, 3.9 percent was vacant as shown in Table 7. Despite this low vacancy rate, the supply of this type of space is not expected to increase materially due to the high cost of land and the redevelopment of older industrial buildings for housing, office, retail centers, and business parks.

Table 7
Orange County Industrial Market – Fourth Quarter 2007

Property Type	Total SF	Vacant (SF/%)	Under Construction	Asking Rent ($/SF)
General Industrial	126,010,224	5,057,746	109,198	$0.83
Incubator Space	3,612,171	121,301	-	$0.91
R&D/Flex Space	79,796,408	3,261,902	158,660	$1.45
Warehouse/Dist.	61,990,321	2,427,355	436,017	$0.85
Total	271,409,214	10,888,305	703,875	

Source: The Grubb & Ellis Company market research report, Orange County 4Q 2007

NAFTA Truck Traffic

Trucking has been a contentious issue since the passage of the NAFTA agreement in 1994. Trucks carry over two-thirds of the trade between the U.S., Mexico, and Canada making it a dominant mode of freight transportation along the borders that service NAFTA trade. California is second only to Texas in truck based trade with Mexico, the value of which in 2004 was more than $3.6 billion, according to the U.S. Department of Transportation. I-5 is the main transportation corridor carrying about 80 percent of

California's imports from Mexico. Orange County is the second most congested county with most of the vehicle delays occurring on SR-91, I-405, and I-5. The movement of goods north-south on I-5 corridor passes through Orange County adding to the already existing traffic conditions. According to the 2003 Commercial/ Vehicle Board Crossing Survey from Caltrans District 11, an estimated 50,000 trucks have origins or destination (to/from) in Orange County. This estimate is based on roadside trucks surveys performed at border crossings. By 2017, the estimated number of trucks is expected to be 100,000 annually. The projected growth in freight traffic in addition to the auto traffic will likely continue to impact congestion along this key strategic corridor. In addition, trucks entering the U.S. from Mexico under NAFTA do not operate under the same stringent safety regulations as are required for U.S.-based trucking companies and operators. This raises potential safety concerns for other road users who have to share the same highways.

Corridor Convergence Issues

The corridor convergence issue relates to the inter-relationship between the various corridors that traverse the multi-county region. The impact of freight is multi-jurisdictional because goods move across jurisdictions utilizing various routes. Routing combinations can change based on a variety of performance measures used by drivers and traffic managers. Routing decisions can occur on a daily and long term basis, depending on the levels of sophistication of the various roadway users. Changing conditions on one route could increase or decrease traffic on another route. For Orange County, SR-91 comes into play as a part of the regional system. SR-91 is an alternative for local and regional truck traffic moving between major goods movement centers in and near the San Pedro Bay ports, the Inland Empire, and points east of California.

There is a significant interdependence among SR-91, I-710, I-605, I-10, and SR-60 truck corridors. First, SR-91 intersects with the I-110, I-710, and I-605 providing convenient means for truck and commuter traffic to switch between these major north-south corridors. Second, SR-91 follows an east-west pattern similar to the SR-60 and I-10 corridors, serving as a companion for east-west commercial and commuter traffic. However, according to the SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline Model, truck volumes on SR-91 between I-5 and I-15 escalate from 11,000 to more than 48,000 by 2030, an increase of 336 percent.

An issue at hand is the timing of improvements to this interconnected and interdependent network. Improvements to one corridor may shift the balance of traffic, causing a convergence of traffic toward the newly improved corridor. For example, if capacity improvements are made to SR-91 without similar improvements to the other aforementioned corridors, some portion of the existing and future truck traffic from the other corridors will likely converge onto SR-91. The same convergence effect will likely occur from any singular improvements made to the other corridors.

However, according to MCGMAP analysis of high priority freight corridors, the I-710, SR-60, and I-15 corridors were found to move efficiently in accommodating regional truck traffic to and from the international port of entry.

For the purposes of this project, the Modeling Working Group identified a set of projects and strategies for evaluation using the SCAG Regional Travel Demand Model. The initial objective was to perform a detailed evaluation of a set of projects and strategies that would have regional effects and could be compared across consistent criteria. Various east-west routes were evaluated as part of the process. Based on the earlier evaluation of system performance and land use (described in Tech Memo 6b), it was clear that a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15, offers the best performance for a dedicated truck lane system accessing warehouse and distribution land uses.

When examining traffic volumes, proximity to schools, residential land uses, and connectivity to warehouse/distribution land uses, SR-60 as an east-west connection between I-710 and I-15:

1. Would carry the highest truck volumes.
2. Would carry very high vehicle volumes (compared to other options).
3. Would affect the least number of schools.
4. Would affect the least amount of residential land uses.
5. Would provide the most connectivity to warehouse/distribution land uses.
    a. As stated in Tech Memo 6b, all truck lane bundles show comparable reductions in hours of delay for trucks; therefore, changes to congested hours of delay for trucks is not referenced.

For the purposes of this project, different scenarios were considered for the evaluation of projects and strategies as described in Tech Memo 6b, therefore additional detailed analysis should be carried out before proceeding.

Air Quality

Negative impacts to air quality in Orange County are generated from emission sources not only internal to the county. Prevailing winds carry the airborne pollution into the county. A primary concern is the community's well-being and the environmental effects of poor air quality. Goods movement emissions are a significant source of pollution in the study area.

The goods movement industry is heavily dependent upon diesel fuel for mobility and operations. As discussed in Tech Memo 5b, diesel fuel results in the emissions of diesel particulate matter (DPM), which has been identified as a toxic air contaminant (TAC) by the state's Office of Environmental Health Hazard Assessment (OEHHA). Diesel fuel is also a significant contributor of nitrogen oxides (NOx), the primary pollutant for ozone formation. Both DPM and NOx are linked to various health issues for susceptible populations like the young and the elderly; as well as people with cancer and asthma, preterm births and low birth weight babies. Due to the current dependency the goods movement industry has on diesel fuel, this action plan focuses on emission reduction.

Diesel locomotive engines are the primary source of DPM emissions associated with rail, with rail support equipment and switchers also contributing to diesel PM. Rail emissions data within SCAQMD is presented in Table 8.

Table 8
Estimated 2005 Annual Average Rail Emissions in SCAB

	Pollutant (Tons per Day)				
	NOx	SOx	PM10	PM2.5	CO
Rail	31.79	3.33	1.05	0.97	6.55
TOTAL All Sources	975.3	58.48	291.95	112.49	4100.19
Rail % of Total	3.3%	5.7%	0.4%	0.9%	0.2%

Source: South Coast AQMD 2003 Air Quality Management Plan

Emissions caused by vehicle delays at rail crossings contribute further to air quality issues relating to goods movement rail activity. The Leachman study established year 2000 baseline emissions generated from delayed vehicles at grade crossings as follows: 9.65 tons of ROG; 100.46 tons of CO; 13.85 tons of NOx; 0.54 tons PM10; and 0.09 tons of SOx.[7]

The goods movement mobile sources targeted for emission reduction include Ocean Going Vessels (OGVs, or ships), On-Road Heavy-Duty Vehicles (HDVs, or trucks), Cargo Handling Equipment (CHE), Harbor Craft (HC), and Railroad Locomotives (RL).

Orange County's Goods Movement Plan

The county has made significant progress towards investing in goods movement related improvements. In fact, the issues outlined earlier have been central to the county's goods movement strategy to date, specifically on improving safety and reducing congestion at rail grade crossings along key freeway corridors, and enhancing freight and passenger rail capacity along key highway freight corridors.

[7] Inland Empire Railroad Mainline Study – Final Report. Leachman and Associates LLC for Southern California Association of Governments. June 30, 2006.

Overall Orange County Goods Movement Plan – Capital Projects and Funding Mechanism

Table 9 reflects the projects originally submitted by OCTA to the MCGMAP. Other projects, in Table 10, were identified by Caltrans District 12 and OCTA, and Figure 10 shows the projects mentioned.

Table 9
Grade Separation Projects

Orange County Railroad Grade Separation Projects	Estimated Project Costs[1]
Project Description	**In $ Million**
Placentia Avenue Undercrossing (Placentia & Fullerton)	$ 39.3 ACE
Kraemer Blvd. Undercrossing (Placentia)	$ 45.9 ACE
Orangethorpe Avenue Overcrossing (Placentia & Anaheim)	$ 83.9 ACE
Tustin Avenue/Rose Drive Overcrossing (Placentia & Anaheim)	$ 63.4 ACE
Jefferson Street Overcrossing (Placentia & Anaheim)	$ 44.0 ACE
Van Buren Avenue Overcrossing (Placentia)	$ 35.5 ACE
Richfield Road Crossing (Placentia)	$ 69.8 ACE
Lakeview Avenue Overcrossing (Placentia & Anaheim)	$ 58.5 ACE
Kellogg Drive Undercrossing (Anaheim)	$ 53.3 ACE
State College Blvd (Fullerton)	$ 62.1 ACE
Raymond Avenue (Fullerton)	$ 63.7 ACE
Acacia (Fullerton)	$ 35.0 ACE
Sub Total	**$ 645. 0**
Sand Canyon Ave (Irvine)	$ 27.60 LOSSAN
Red Hill Avenue (Tustin)	$ 88.90 LOSSAN
State College Blvd (Anaheim)	$ 72.01 LOSSAN
17th Street (Santa Ana)	$ 65.52 LOSSAN
Grand Avenue (Santa Ana)	$ 46.01 LOSSAN
Santa Ana Blvd (Santa Ana)	$ 58.93 LOSSAN
Ball Rd. (Anaheim)	$ 65.0 LOSSAN
La Palma (Anaheim)	$ 65.0 LOSSAN
Lincoln (Orange)	$ 65.0 OLIVE
Katella (Orange)	$ 65.0 OLIVE
Sub Total	**$ 618.97**
Total	$ 1,263.97

Source: OCTA, 2006

Orange County Railroad Grade Separation Projects

April 14, 2008

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Figure 10

The above table represents grade separation projects in the County that are critical to the movement of freight and people within the county.

The following table is the list of projects compiled as part of the MCGMAP (Table 10).

Table 10
MCGMAP Projects in Orange County

Category	County	Description	Cost ($Mill's)
Modification of Delivery Hours	All	Extend Delivery Hours to 24 hours	TBD
Use of LCVs on Dedicated Facilities	All	Evaluate Use of LCVs on Dedicated Facilities	TBD
Data and Analytical Methods	All	Improve demand forecasts for labor and equipment across all modes/ Employ better trade and transportation forecasting	TBD
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	All	Enact expanded public-private partnership legislation/ design-build and design sequencing legislation	TBD
Mainline Rail Capacity Enhancement	LA/SBD/RIV/OR	Triple track BNSF Transcon; double track two UPRR corridors: LA to San Bernardino	$2,300.0
Rail Grade Separations and Grade Crossing Safety Upgrades	LA/SBD/RIV/OR	Alameda Corridor-East Trade Corridor Grade Separations	$3,456.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-91 - Eastbound Lane Addition from SR-241 to SR-71	$100
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-91 WB at Tustin Avenue provide one additional general purpose lane between SR-55 and SR-57	$62
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-91 - New Interchange at Fairmont Boulevard	$101
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-57 - Northbound lane from Katella Av. to Lincoln Av.	$60
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-57 - Northbound lane from Orangethorpe Av. to Lambert Rd.	$150
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-91 - Add fourth westbound lane between SR-57 and I-5	$175

Table 10
MCGMAP Projects in Orange County

Category	County	Description	Cost ($Mill's)
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-57 Northbound from Lambert Road to the SR-60 IC add truck climbing lane	$158.0
Truck Lanes/Facilities	OR	SR-91 - Add 5th GP lane in each direction between SR-55 and SR-241	$135.0
Application of ITS Technology for Vehicle Management and Routing	OR	SR-91 EB/WB from Truck scales - Add storage lane at truck weigh in motion station between Weir Canyon and Imperial Hwy. Includes ITS components.	$11.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, IC/Ramp modifications (acceleration lanes) at various locations on all routes to accommodate trucks. Include ITS components.	$130.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, At Crown Valley Parkway Ramp Improvements for SB Off-Ramp. Include ITS components.	$10.5
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, Re-construct southbound on-ramp and off-ramp at Alton Pkwy. Include ITS components.	$2.7
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 Add aux lane from Oso to Crown Valley and widen off-ramp. Include ITS components.	$9.5
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 Reconstruct northbound on-ramps, construct SB auxiliary lanes and widen arterial at Oso Parkway. Include ITS components.	$22.4
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 From Alicia Parkway through El Toro Road extend auxiliary lane through interchange. Include ITS components.	$9.1
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 Construct auxiliary lane from the Collector Distributor Rd to Bake Pkwy off-ramp to provide two lane off-ramps. Include ITS components.	$5.5
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 Construct auxiliary lane between the Collector Distributor Rd and Alton Pkwy off-ramp. Include ITS components.	$5.5
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, Construct auxiliary lane and add 2nd off-ramp lane from SB I-5/133 Branch Connector to Barranca Pkwy. Include ITS components.	$10.5

Table 10
MCGMAP Projects in Orange County

Category	County	Description	Cost ($Mill's)
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 Construct 2nd auxiliary lane and widen off-ramp at Jamboree Road. Include ITS components.	$7.4
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 Widen arterial eastbound and northbound loop-on-ramp at Jamboree Road. Include ITS components.	$3.5
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, Reconstruct Avenida Pico Interchange and widen arterial. Include ITS components.	$53.3
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, Mainline curve correction between Stonehill and SR-1. Include ITS components.	$57.2
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, New SB off-ramp at Stonehill. Include ITS components.	$43.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, Reconstruct the interchange at Ortega Hwy (SR-74). Include ITS components.	$73.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 construct new interchange at Crown Valley (Saddleback) and reconstruct interchange at Avery Parkway with collector distributor road between Crown Valley and Avery	$260.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, Reconstruct the interchange at Avery Pkwy and widen arterial. Include ITS components.	$39.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, Reconstruct the Interchange at La Paz Road and widen arterial. Include ITS components.	$30.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, Jeffrey Road and Walnut Avenue I-5 SB ramps Add eastbound shared second through lane/second right turn lane. Include ITS components.	$1.3
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5, Interchange improvement between 4th street off-ramp to north and Newport Avenue to south on the I-5, and 4th Street to the north and Edinger Avenue to the south on the SR-55. Include ITS components.	$176.0

Table 10
MCGMAP Projects in Orange County

Category	County	Description	Cost ($Mill's)
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 From the SR-57/SR-22 Interchange to SR-91 add a general purpose lane in each direction	$20.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 Reconstruct El Toro Road Interchange	$120.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 between SR-55 and the SR-133 (near El Toro "Y") add one general purpose lane in each direction and improve interchange in the vicinity	$319.2
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-5 between the vicinity of El Toro 'Y' to near SR-73 add new lanes in each direction	$315.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-39, Widen highway under freeway from three to four lanes SR-39 / I-405 Interchange. Include ITS components.	$17.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-55 19th Street to SR73 add auxiliary lanes. Include ITS components.	$10.5
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-55 Construct Aux Lane SB from Dyer to Edinger in the city of Santa Ana. Include ITS components.	$26.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-55 Construct Aux Lane NB from Dyer to Edinger in the city of Santa Ana. Include ITS components.	$44.2
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-55, I-5 to SR22 add aux lanes. Include ITS components.	$17.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-57, At SR-91 add 4th general purpose lane. Include ITS components.	$2.6
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-91, Lakeview interchange construct barrier-separated onramp (2 lanes) from SB Lakeview to WB SR-91. Include ITS components.	$6.5
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-91, Relocation of Weigh Stations in both directions. Include ITS components.	$26.0

Table 10
MCGMAP Projects in Orange County

Category	County	Description	Cost ($Mill's)
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-91. SR-241 to SR-71 add EB auxiliary lanes. Include ITS components.	$195.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-91 Eastbound add a lane between SR-55 (Lakeview and SR-241 and Westbound from SR-241 to Imperial Highway)	$96.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	SR-133: I-405 to I-5 add 1 general purpose lane in each direction and aux lanes. Include ITS components.	$83.2
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405, Sand Canyon Ave SB off-ramp add second drop lane from I-405 to the off-ramp. Include ITS components.	$3.0
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405, Widen on-ramp from 2-lane to 3-lane at WB Culver Dr. Include ITS components.	$2.7
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405, Modify ramp and add 2nd NB off ramp at Talbert interchange in Fountain Valley. Include ITS components.	$3.1
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405: Add SB auxiliary lane from SR-133 to Irvine Center Drive. Include ITS components.	$7.2
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405: Construct Sand Cyn SB on-ramp with an auxiliary lane to the SR-133 Collector Distributor Road. Include ITS components.	$5.6
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405, Construct SB auxiliary lane in between Jeffrey Road On-Ramp & Sand Canyon. Include ITS components.	$7.2
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405, Add NB Aux lane from Jeffery on-ramp to Culver Dr. off-ramp. Include ITS components.	$5.2
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405, Construct aux lane from Talbert to Ellis/Euclid in the City of Fountain Valley. Include ITS components.	$18.2
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405, Construct aux lane from Euclid to Brookhurst in the City of Fountain Valley. Include ITS components.	$23.8
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405, Construct NB auxiliary lanes from Brookhurst to Beach in the City of Fountain Valley. Include ITS components.	$26.3

Table 10
MCGMAP Projects in Orange County

Category	County	Description	Cost ($Mill's)
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405, Construct SB Auxiliary lanes from Magnolia to Brookhurst in the City of Fountain Valley. Include ITS components.	$24.5
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405: Widen and extend collector distributor road southerly to serve both SR-133 and Irvine Center Drive. Include ITS components.	$16.6
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405: SR-133 to SR-55, add 1 general purpose lane in each direction and auxiliary lanes. Include ITS components.	$26.3
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405: Reconstruct SB 405 connector to SR-133, braid with NB off-ramp from SR-133 to Barranca Parkway. Include ITS components.	$102.7
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-405: South Bristol Braid delete left turn access from NB Bristol to SB I-405. Provide right turn on-ramp from NB Bristol to SB I-405 via a new braid that provides direct access to NB SR-55. Include ITS components.	$69.0
Freight Corridor Capacity Enhancement and Operational Improvement	OR	I-405: Add a general purpose lane and auxiliary lane in each direction between SR-73 and I-605. Include ITS components	$1.3
Freight Corridor Capacity Enhancement and Operational Improvements	OR	I-605, Intersection Modification & ramp entrance Katella Ave on ramp to NB I-605. Include ITS components.	$2.0
Grand total		(highways only)	$3,533.3 billion

Source: Wilbur Smith Associates, 2007

The projects in Orange County are dominated by highways due to its importance as a linkage in the regional highway and rail systems. As discussed above, the MCGMAP list includes rail and grade crossing improvements.

The challenge ahead is funding. While the list of projects is likely to yield great benefits, it is no where near fully funded. In the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the Alameda Corridor East asked for $900 million but received funding for four projects totaling $167 million. Orange County received $31 million of that funding. Orange County also received $12.8 million for a grade separation on the BNSF Transcon at State College Boulevard in Fullerton. While some level of the requested federal funding was secured as part of SAFETEA-LU, the federal share fell far

short of the needed funding levels, increasing the burden for funding from other sources. With the passage of Proposition 1B in November 2006, $2 billion was made available state wide to fund goods movement – related projects. As part of partnership of regional transportation agencies, OCTA is positioned to receive as much as $217 million for goods movement projects.

In November 1990, Orange County voters approved Measure M, a half-cent local transportation sales tax for twenty years. All of the major projects promised to and approved by the voters are underway or complete. Funds that go to cities and the County of Orange to maintain and improve local streets and roads, along with transit fares reductions for senior and persons with disabilities will continue under Measure M until it ends in 2011.

However, in November 2006, the voters of Orange County approved the Renewed Measure M Investment Plan. The plan is a 30 year $11.8 billion program designed to reduce traffic congestion, upgrade key freeways (such as SR-91), fix major freeway interchanges, construct and maintain streets and roads, synchronize traffic signals countywide, and build a high capacity transit system. With the passage of Renewed Measure M, an estimate $4.87 billion, over a thirty year period will be invested in new freeway construction.

Next steps

The county's Goods Movement Action Plan moving forward should continue its focus on the larger challenges that lay ahead, particularly the institutional and funding challenges. In order to implement the goods movement projects that so far have made the list, the county will have to reach beyond the conventional approaches of securing funding.

1. **Build on Public-Private Funding Arrangements** – There are limitations to the amount of federal and state funding, so it is important to increase funding from public-private sectors. Implementing the mainline rail capacity enhancements together with the grade separations of railroad crossings, provides an opportunity for maximizing federal, state, and private sector involvement. Increasing mainline rail capacity could reduce truck trips, congestion and emissions related to over half of the international container market. The Alameda Corridor-East Trade Corridor includes over $4 billion in needed grade separations and crossing safety improvements.

2. **Continue with Multi-Jurisdictional Efforts** - The County should make every effort in continuing to participate in larger multi-jurisdictional efforts such as the MCGMAP and the Southern California Trade Corridors Improvement Fund Consensus Working Group. While multi-jurisdictional efforts are typically a longer term approach, the end result is likely to improve the county's chances of participating in the fruits of the effort, be they funding, operational, technological or policy based. The MCGMAP effort has greater weight than any single county effort. For example, the issue of corridor convergence identified earlier in this report can best be addressed by participating in the MCGMAP, making every effort to ensure that the improvements (or the lack thereof) to facilities in neighboring counties do not have a negative impact on the viability of Orange County facilities.

In addition to participating in external efforts, Orange County should continue to build on efforts to encourage coordinated, efficient, sustainable goods movement among jurisdictions within the county. This includes improving understanding of the policies and legislation related to urban goods movement, removing barriers to coordination, providing incentives towards coordination (including the relationship with commuter travel), communicating the role of goods movement, and illuminating areas for public/private investment in goods movement. This is reflected in OCTA's goods movement policy.

3. **Develop Non-Capital Based Approaches to Enhancing Service -** Orange County should focus on developing a non-capital based systems approach to managing goods movement demand throughout the county. The basis for this approach is brought out clearly when analyzing truck volumes throughout the county's system of freeways. I-5, SR-91, SR-55, SR-57, and SR-22 function as a system of freeways that serve goods movement. On any given day, a truck has the option of choosing a variety of route combinations going either east-west or north-south throughout the system. Nowhere are the system interactions more apparent than in the upper northwest part of the county, where the system of freeways is a candidate for managing goods movement demand across the entire sub-system. By applying demand management techniques (time-of-day policies particularly where I-5 intersects with the other aforementioned goods routes to the northwest of Orange County), the routing and demand for trucking can be better balanced to meet the supply of capacity.

4. **Pursue a Region-wide Public-Private Funding Approach** - A regional public-private funding approach is likely to make the most significant contribution to goods movement funding over the coming decades. As it stands, relying on federal and state funding is not enough. For example, the Alameda Corridor-East Trade Plan to fund much needed grade-separation projects, which will reduce congestion and emissions throughout the region, has an 86 percent funding gap totaling over $3.8 billion, and this is despite receiving state and federal funding. Moreover, the state's recently passed Proposition 1B provides an additional $19.925 billion in general obligation bonds funds. Even with these resources, there will not be enough funding to pay for all necessary infrastructure and mitigation projects. Given the limitations of federal and state funds, it must be recognized that self-help public-private funding arrangements will be the best way to complete the financing for critical projects. Again, although the benefits of regional efforts may be longer term, there are several on going efforts by the ports and SCAG that suggests a regional approach to public-private partnerships would be worthwhile. Based on SCAG's elasticity study, it is believed that several billion dollars could be raised through the implementation of container fees without impacting the competitiveness of the region, as long as the resources are used to improve goods movement capacity.

5. **Land Use Based Approaches** – The issue of local funding to mitigate the impact of goods movement on local communities is often overlooked. Orange County is experiencing conflicts between commercial and non-commercial land uses while nearing maximum build-out. There is a notable clustering pattern of land uses that generate freight traffic, particularly warehouse and industrial land uses. This clustering provides a basis for urban planners to develop land use

approaches towards managing the flow of goods at the local level. Land use based policies are an important part of concentrating goods movement demand onto those parts of the system designed to accommodate goods movement. Efforts should be made to develop a better understanding of the relationship between land use and urban goods movement, and to promote the development of land use policies that support coordinated urban goods movement. Specific land use aspects of goods movement that should be further explored are the effects of transportation on decisions to locate establishments, implications related to big box retail, preferential zoning to direct goods movement clustering, avoiding residential development next to railroad tracks, and proximity guidelines to reduce encroachment on logistics centers.

6. **State and Federal Profile** – The Orange County delegations should continue their efforts at garnering support for goods movement funding at the state and federal level.

Conclusion

The purpose of this section is to show a relationship between county projects and the recommended primary actions of the MCGMAP. The four action sets in the MCGMAP are:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility
- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

A brief description of each action set and how it relates to county activities and projects is provided below.

Action Set 1: Accelerate Regional Environmental Mitigation seeks to mitigate environmental impacts at three levels. The levels are a broad regional approach, regional conformity, and project specific mitigation. The regional approach is for broad strategic policies/efforts focusing on further reducing region-wide impacts. Regional conformity holds emissions to caps set in various plans through aggressive actions, implementing known technologies, and best practices. The project specific mitigation requires project sponsors to consider and disclose environmental impacts when planning projects and to address how potential impacts will be resolved. This part of the project development process is specified in the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

The freeway lane, rail grade separations and operational/safety improvements in the Orange County project list can improve system wide mobility and therefore reduce mobile source emissions. It should be noted that the projects may have local impacts that are not addressed within this regional goods movement framework except to the extent that they will need to meet CEQA/NEPA requirements.

Action Set 2: Relieve Congestion and Increase Mobility focuses on improving all aspects of the transportation system to improve region-wide mobility and safety. Specifically the action set seeks to:

- Increase intermodal lift capacity. Intermodal lift is defined as the transportation of freight by using two or more modes of transportation; for example, shipment of containers by rail to ship to truck.
- Increase mainline rail capacity
- Mitigate increase mainline rail capacity with the implementation of grade separate railroad crossings projects
- Improve highways through comprehensive innovative approaches
- Continue with general purpose highway improvements/safety and operational improvements

The freeway projects will provide market-segmented relief and increased mobility for freight moved by truck. Market-segment approach in this context refers to the location and or method of delivery of goods serving the market. The grade separations will reduce delays at grade crossings. Rail capacity will increase with the triple tracking of the BNSF lines through the county.

There is a long way to go to address all the issues associated with goods movement. Funding for most of these projects has yet to be obtained; however, the projects listed are moving Orange County in the right direction. The county is contributing to solving regional goods movement issues with these projects.

Action Set 3: Improve Operational Efficiency addresses two categories of actions. These are:

- Improve marine terminal productivity, truck turn times, and intermodal operations
- Improve highway operations through new technologies

These improvements would make the most of existing infrastructure by making the utilization more efficient.

Most of the projects in the Orange County portion of the MCGMAP project list that deal with highways specifically call for Intelligent Transportation Systems (ITS) components. These components will make the improvements work that much more efficiently. By including the ITS component not only are the efforts providing increased mobility but also they are improving operational efficiency. Improving highway operations through new technologies includes various applications. ITS integrate application of advanced technologies that utilize advanced computers, sensors, electronics, communications, and other technologies to improve the safety and efficiency of all modes of surface transportation for people, goods, information, and services including inter-modal transfers.

Strategies that could be employed on the transportation system include i.e. one-stop state, interstate and federal credentialing for all commercial vehicles traveling in California, integrated public agency goods and carrier data collection/tracking software for real-time data exchange and coordination of agency efforts, collision avoidance at highway-rail grade crossings, electronic bridge clearance system, commercial/vehicle locator system and supply change management utilizing technology based process monitoring.

Action Set 4: Develop Equitable Public/ Private Funding Strategy recognizes that implementation of the actions, projects, and programs with the associated mitigations will require a coordinated effort by the private and public sectors. The action set seeks to:

These improvements would make the most of existing infrastructure by making the utilization more efficient.

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Action Set 4: Develop Equitable Public/ Private Funding Strategy recognizes that implementation of the actions, projects, and programs with the associated mitigations will require a coordinated effort by the private and public sectors. The action set seeks to:

- Maximize the study area's fair share of state and federal funds
- Identify opportunities for project-specific user needs
- Establish institutional structure for managing user fees and revenues
- Initiate supportive legislation

Statistics, congestion, and the county's role as a bridge shows that goods movement is an important transportation issue in Orange County. The role of goods movement within Orange County and its surrounding counties is clear. However, given the recent experience surrounding the possible shortfall in expected federal resources for goods movement, and the allocation of these resources throughout the region, a serious effort must be made toward increased funding from non traditional sources. This may include tapping into the productivity gains and cost savings that go to the business and industrial sectors which use the county's transportation systems and services. Moreover, working in cooperation with neighboring counties is critical to increasing the realm of possible solutions. This effort has begun to bear result in the form of a regional effort to secure a fair share of Proposition 1B Trade Corridor's Improvement Funds (TCIF). As mentioned before, Orange County is positioned to receive an estimated $217 million in TCIF funds.

To maintain economic vitality, the region needs to provide a competitive advantage in terms of the speed and reliability of moving goods to U.S. markets while mitigating environmental impacts to the region. All the projects in the county ultimately are designed to insure that Southern California maintains if not enhances its economic position. Maintenance of the regions' economic vitality will be enhanced by the actions being done in Orange County. The economic vitality of the region will benefit from the actions underway and planned by Orange County.

Ongoing Collaboration

This county action plan is part of the comprehensive MCGMAP. The MCGMAP is the beginning of a more comprehensive regional approach to keep freight moving within and through the region and to reduce the environmental and community impacts caused by the movement of that freight. Going forward, stakeholders will play an integral role in the next steps in the areas of partnership and advocacy, environmental and community impacts, mobility and funding. Based on feedback from stakeholders and Action Plan recommendations, the MCGMAP project partners are committed to work towards:

- Greater Partnership and Advocacy
- Reduce Environmental and Community Impacts
- Increase Mobility
- Improve/Increase Funding

Multi-County Goods Movement Action Plan

Riverside County Action Plan

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
San Diego Association of Governments

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April 30, 2008

Table of Contents

INTRODUCTION **1**
- **Purpose** **1**
- **Background** **2**
- **Role** **4**
  - Ports/Airports 4
  - Rail 5
  - Trucks 7
  - Warehousing 10

COUNTY SPECIFIC ISSUES **12**
- **Air Quality** **13**
- **Grade Crossings** **14**
- **Vehicle Congestion** **16**
- **Mainline Rail Capacity** **22**
- **Distribution Locations** **25**
- **Funding** **26**

COUNTY ACTIONS **28**
CONCLUSIONS **28**

List of Tables

Table 1 – Year 2003 Truck ADT **8**
Table 2 – Truck Tons Handled by Riverside County's Freeway Network, 2003 ..... **10**
Table 3 – Summary of Warehouse and Industrial Space within the Inland Empire **12**
Table 4 – Grade Separation Project List **14**
Table 5 – Year 2003 and Year 2030 Truck Volumes Derived from Model Runs **16**
Table 6 – Forecast Truck Volumes on Region's Highway System **18**
Table 7 – MCGMAP Projects Riverside County **18**
Table 8 – Peak-Day Rail Traffic for 2025 (Number of Trains per Day by Segment) **22**
Table 9 – Total Passenger and Freight Train Movements **25**
Table 10 – High Priority Grade Separation Projects **27**

List of Figures

Figure 1 – Multi-County Goods Movement Action Plan Riverside County **3**
Figure 2 – March Global Port **4**
Figure 3 – Multi-County Goods Movement Action Plan Railroad Lines **6**
Figure 4 – 2003 Percentage of Truck VMT in the MCGMAP Study Area by County **8**
Figure 5 – Multi-County Goods Movement Action Plan 2003 Truck ADT **9**
Figure 6 – Multi-County Goods Movement Action Plan Warehouse Land Use **11**
Figure 7 – Cancer Risk from Airborne Toxics with Diesel Emissions **13**
Figure 8 – Truck Growth 2003-2030 ..... **17**
Figure 9 – Multi-County Goods Movement Action Plan 2025 Forecast Rail Freight Volume **23**
Figure 10 – Multi-County Goods Movement Action Plan 2025 Forecast Rail Volume **24**

Introduction

Purpose

This report outlines a Goods Movement Action Plan for Riverside County, California, part of a broader Multi-County Goods Movement Action Plan (MCGMAP) developed collectively by the Los Angeles County Metropolitan Transportation Authority (Metro), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), San Diego Association of Governments (SANDAG), Ventura County Transportation Commission (VCTC), Southern California Association of Governments (SCAG) and the California Department of Transportation (Caltrans). The MCGMAP contains strategies to support the efficient movement of goods without disproportionately impacting local communities, neither the environment nor the transportation network. The MCGMAP is also a regional framework for goods movement initiatives.

This report examines the key issues that impact Riverside County from a goods movement standpoint. It examines the plans and proposals that are being pursued to resolve the stated issues, and new specific actions and strategies that should become a focus for the county. It is important to note that this report builds on a large body of work that has been researched and developed over the past few years, all of which collectively address a comprehensive range of goods movement issues.

The Multi-County Goods Movement Action Plan has recommended four primary action sets for goods movement within the region. The action sets are:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility
- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

Current and future projects, relationships, and activities of Riverside County address these four primary action sets. The document concludes with an explanation of how the county's activities support these four action sets.

Other efforts will likely address new and existing issues as they arise. This report is intended to focus on specific actions to address the most significant goods movement issues for the county that have been presented to date. This report is not intended to be a full and complete glossary of every issue.

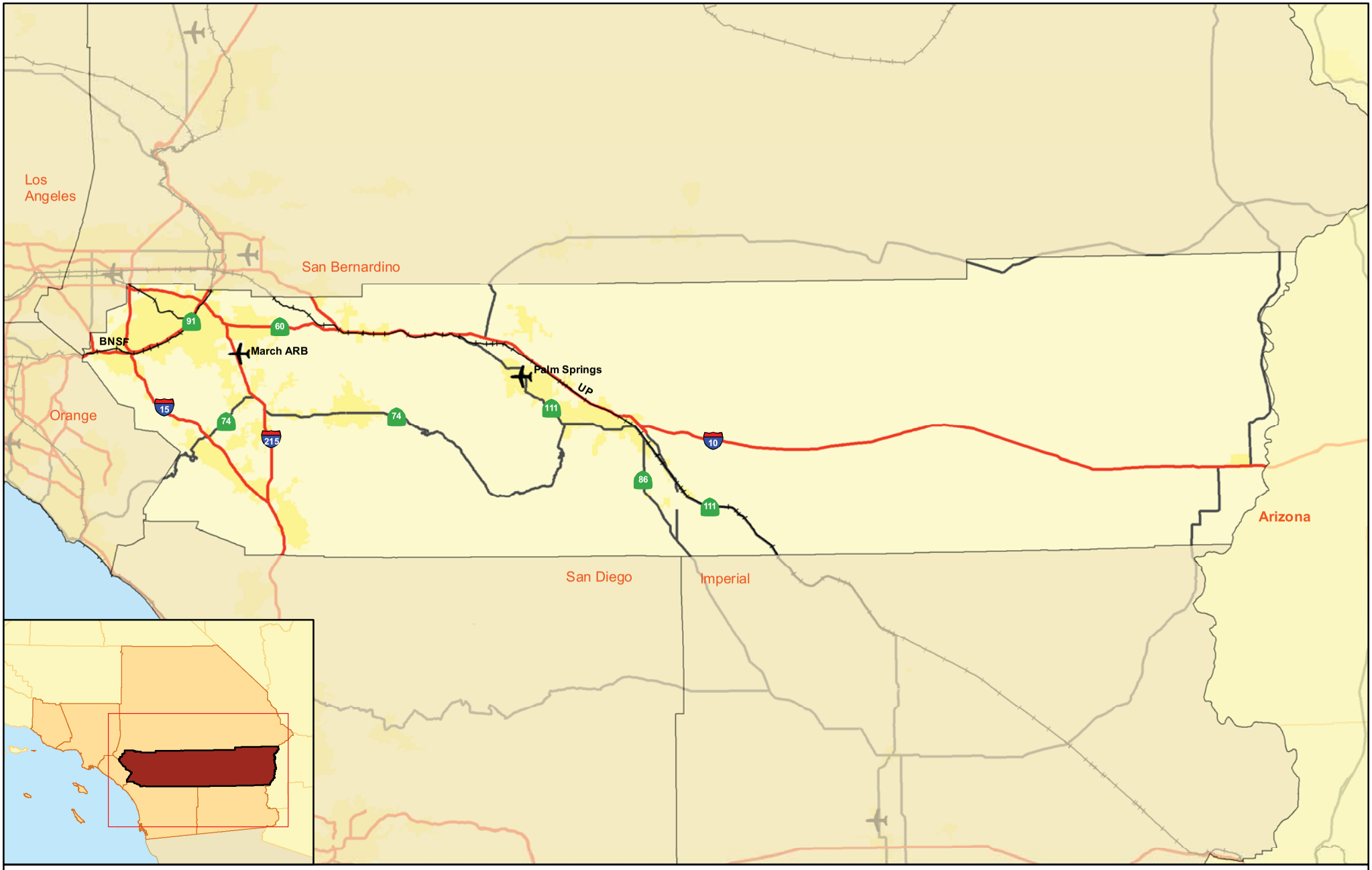
Background

Improving mobility has been a challenge to Riverside County due to rapid population growth and the imbalance of jobs and housing. This has increased commuter traffic between the Inland Empire, Los Angeles and Orange Counties. The growth in goods movement has exacerbated traffic congestion because trucks compete with passenger vehicles for space on roadways. The increase in warehousing and the growth in goods flow for truck and rail will further strain current transportation infrastructure in Riverside County.

Riverside County has participated in a number of goods movement-related studies in the past. These include the following:

- San Bernardino and Riverside County Truck and Recreational Vehicle Count and Analysis Study, March 2004
- SR-91 Alternatives Analysis, January 2003
- SR-60 Truck Lane Feasibility Study, February 2001
- Riverside County Bottom Line Goods Movement Report: Critical Goods Movement Issues for Riverside County, September 2006
- Grade Separation Funding Strategy: A Blueprint for Advancing Projects, September 2006

Figure 1 shows a map of Riverside County with major infrastructure features. Riverside is in the east-central portion of the MCGMAP region. It is bounded on the north by San Bernardino County, on the west by Orange County, and on the south by Imperial and San Diego Counties. Its eastern boundary is Arizona which represents a portion of the eastern MCGMAP region boundary.



Airports
Ports
Railroad
Freeways
Highway
Urban Areas

Multi-County Goods Movement Action Plan
Riverside County

0 15 30 60 Miles

N

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006

Figure 1

I-10 is the only major interstate highway that exits directly into Arizona.

The major rail operators in the county are the Burlington Northern Santa Fe (BNSF) Railway and the Union Pacific (UP) Railroad. Limited access highways are I-10, I-15, I-215, SR-60 and SR-91. These highways and infrastructure are in the western part of the county. UP's Yuma Subdivision mainline and SR-86 are in the eastern part of the county. SR-86 is federally designated as a NAFTA corridor.

Role

Ports/Airports

The landlocked county has no international border and two major airports. March Global Port is a commercial air cargo and distribution development site located on the south end of the March Air Reserve Base, in western Riverside County. The March Global Port is an air cargo operation recently partnered with DHL in a 16-year operating agreement to run a domestic cargo distribution system. March Global Port consists of a 13,300 foot runway and more than 350 acres of runway-accessible property available for development, which is the longest civilian runway in California. DHL started with six flights a day and is currently flying eight planes per day. The company's plan is to have 12 planes per day including several international flights.

Figure 2
March Global Port

Source: March Global Port LLC., 2006

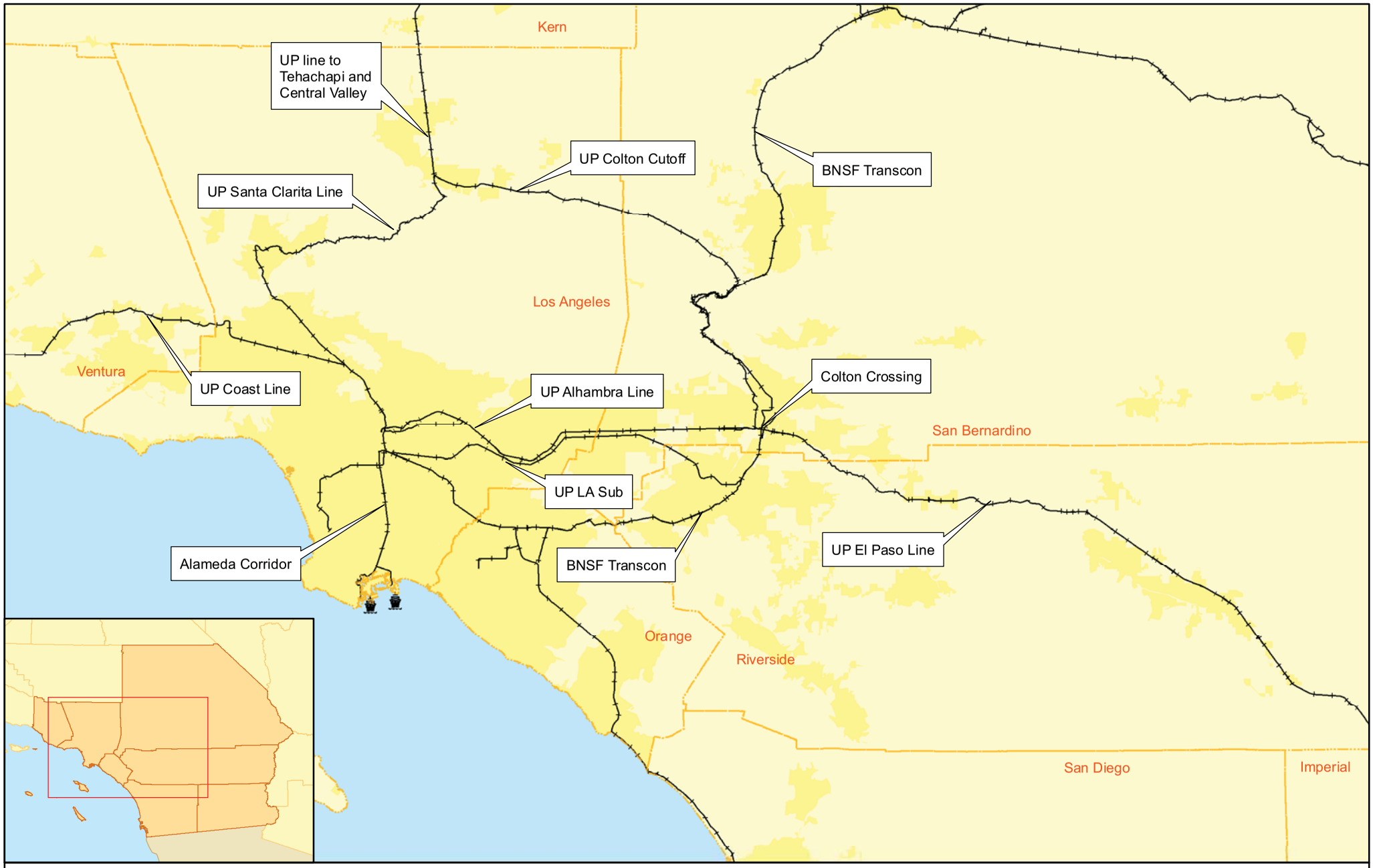
The other major airport in the county is Palm Springs International Airport in Palm Springs, CA, which is home to 14 airlines with 53 daily departures. In 2006, the airport experienced a 7.8 percent increase in passengers.

Rail

The county has three rail mainlines owned by BNSF and UP as shown in Figure 3. These include the BNSF Transcon, the UP Los Angeles Subdivision (UP LA Sub), and the UP El Paso Line. The BNSF Transcon is the artery linking the Los Angeles basin to all midwestern, southwestern and eastern markets on the BNSF rail system. UP LA Sub connects to the Sunset Corridor at Colton in the Los Angeles basin. UP El Paso Line is part of the UP Sunset Corridor which extends to El Paso. This route is designated as the primary intermodal line between the Los Angeles basin and eastern markets.

The UP LA Sub segment of the mainline connects with the UP El Paso Line via the BNSF Transcon Line between west Riverside and Colton. The UP El Paso Line exits south through Imperial County towards Yuma, Arizona, and the eastern side of the Salton Sea. The BNSF Transcon has a route exiting to the north into San Bernardino County. In 2003, 68 million tons of rail freight passed through Riverside County with less than five percent originating or ending locally[1]. Currently 85 freight trains per day pass through Riverside County[2].

[1] Critical Goods Movement Issues for Riverside County, RCTC, September 2006
[2] Alameda Corridor East – Riverside County Impacts and Needs, www.rctc.org



Airports
Ports
Railroad
Urban Areas

Multi-County Goods Movement Action Plan
Railroad Lines

0 15 30 60 Miles

N

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006
MCGMAP Tech Memo 3 2006

Figure 3

Metrolink commuter trains provide daily transportation to more than 9,000 passengers from Riverside to Los Angeles and Orange Counties. The Metrolink 91 Line service, from Riverside to Los Angeles via Fullerton, operates on the BNSF Transcon. The Metrolink Riverside Line service, from Riverside to Los Angeles via Pomona, operates on the UP Los Angeles Subdivision.

Currently, UP operates a rail yard and automobile distribution center in Mira Loma. Activities at the yard include receiving inbound rail cars, switching cars, loading and unloading automobiles, departing outbound rail cars, and storing automobiles. Facilities within the yard include classification tracks, a gate complex for inbound and outbound truck traffic, loading and unloading tracks, and various facilities supporting railroad and contractor operations. Domestically manufactured automobiles purchased in the SCAG region are primarily distributed from UP's Mira Loma facility. This facility serves GM, Ford, Chrysler and some foreign manufacturers with production plants in the U.S., such as Isuzu and Toyota. Annual volume at Mira Loma is about 900,000 units and is transported on nearly 70,000 railcars[3].

Almost all freight rail traffic in the county is caused by passing trains. In 2003, three million tons of rail freight moved to or from destinations in the county, and 68 million tons of rail freight passed through the county[4]. The increase in rail freight traffic will have significant implications relating to safety, environmental issues, community impact, financial concerns, and traffic congestion. The county has 61 highway-rail crossings that are not grade-separated. These crossings cause delay for drivers and result in pollution from idling automobiles and trucks.

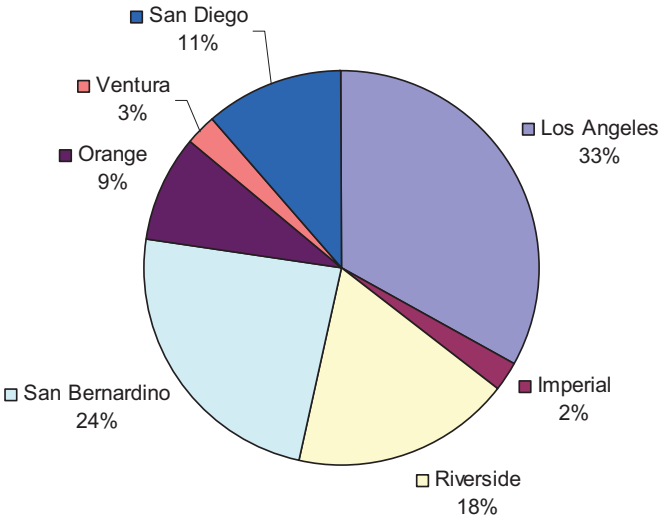
Trucks

Figure 4 depicts the regional distribution of truck traffic by county, measured in truck miles of travel on the state highway system. Riverside County accounts for 18 percent of the total regional truck miles of travel, ranking third after Los Angeles and San Bernardino Counties.

[3] Per Honda North America discussions, 2005.

[4] Critical Goods Movement Issues for Riverside County, RCTC, September 2006

Figure 4
2003 Percentage of Truck VMT in the MCGMAP Study Area by County



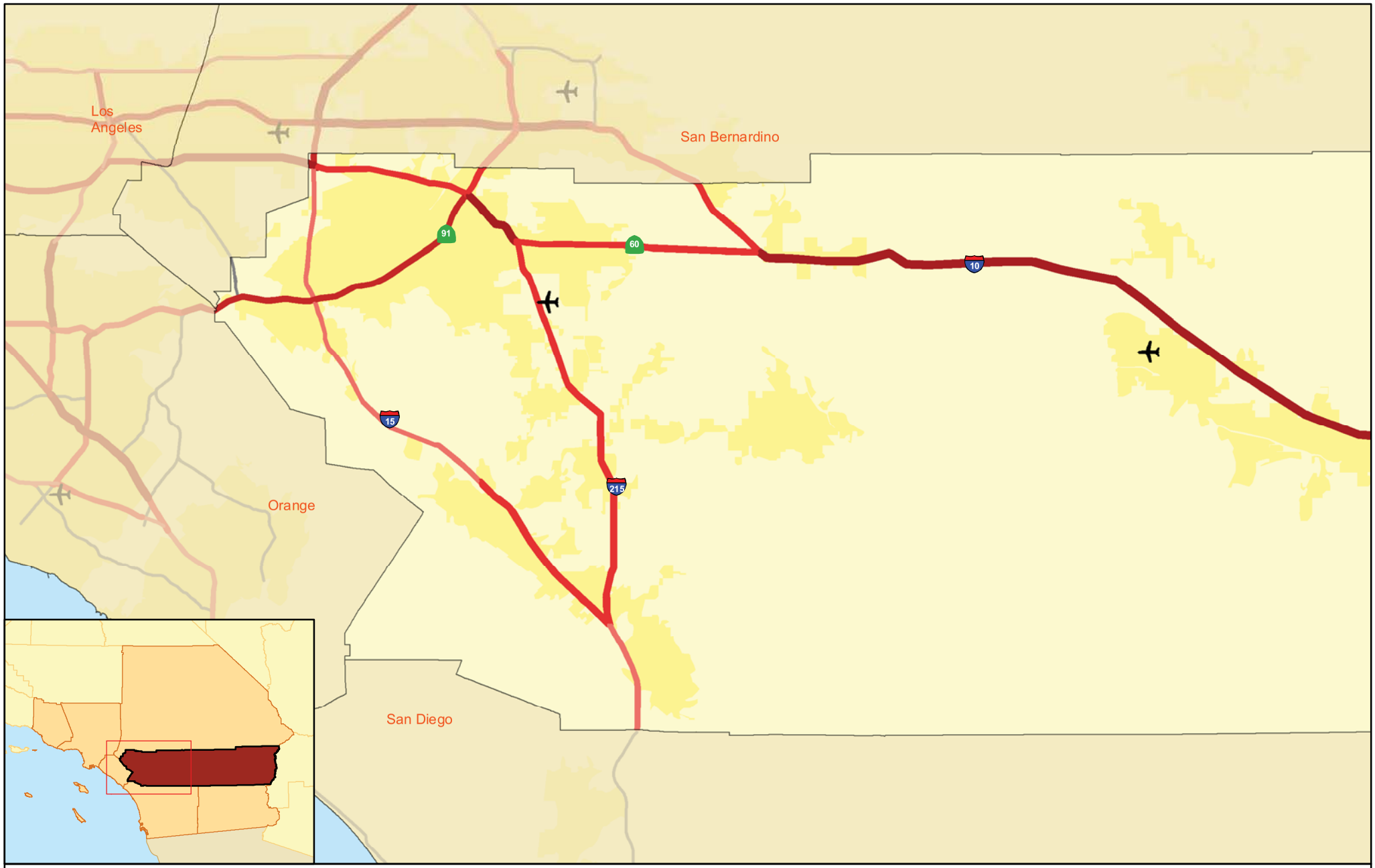
Source: "Truck Miles of Travel: California State Highway System 1988-2003," California Department of Transportation (Caltrans) 2005

Table 1 shows the 2003 truck volumes on the county's freeway segments. Some of the heavily-used truck corridors in the county include SR-91, SR-60, I-15, and I-10 which are shown in Figure 5.

Table 1
Year 2003 Truck ADT

Route	Segments	County	Year 2003 Trucks ADT N/E	Year 2003 Trucks ADT S/W	Total ADT 2003
I-15	SR-60 to I-10	San Bernardino/Riverside	8,512	9,446	17,958
I-15	SR-91 to SR-60	Riverside	9,877	8,081	17,958
I-15	SR-74 to SR-91	Riverside	5,946	4,040	9,986
I-215	SR-60 to I-10	Riverside	5,167	5,849	11,016
SR-60	SR-57 to I-15	Riverside	10,771	13,569	24,340
SR-60	I-15 to I-215	Riverside	8,221	6,629	14,850
SR-60	I-215 to I-10	Riverside	6,738	6,072	12,810
SR-91	SR-241 to I-15	Riverside	7,616	9,115	16,731
SR-91	I-15 to I-215	Riverside	7,148	8,001	15,149
I-10	SR-60 to SR-86	Riverside	12,337	11,388	23,725
I-10	SR-86 to SR-78	Riverside	4,590	4,410	9,000
I-10	SR-78 to Arizona State Line	Riverside	4,508	4,692	9,200
SR-86	SR-195 to SR-111	Riverside	967	1,048	2,015

Source: Caltrans, Traffic and Vehicle Data Systems Unit, 2004 Truck; Wilbur Smith Associates, 2007



less than 5000
5000 - 10000
10000 - 15000
15000 - 20000
greater than 20000
Other Freeways

Ports
Airports
Urban Areas

Multi-County Goods Movement Action Plan
2003 Truck ADT

0 10 20 40 Miles

N

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ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006
SCAG 2004
WSA 2006

Figure 5

In 2003, 104 million tons of goods were shipped through Riverside County and 35 percent (36 million tons) was shipped via trucks. Table 2 shows the truck tons handled by the county's freeway network. These figures do not include local pick-up and delivery.

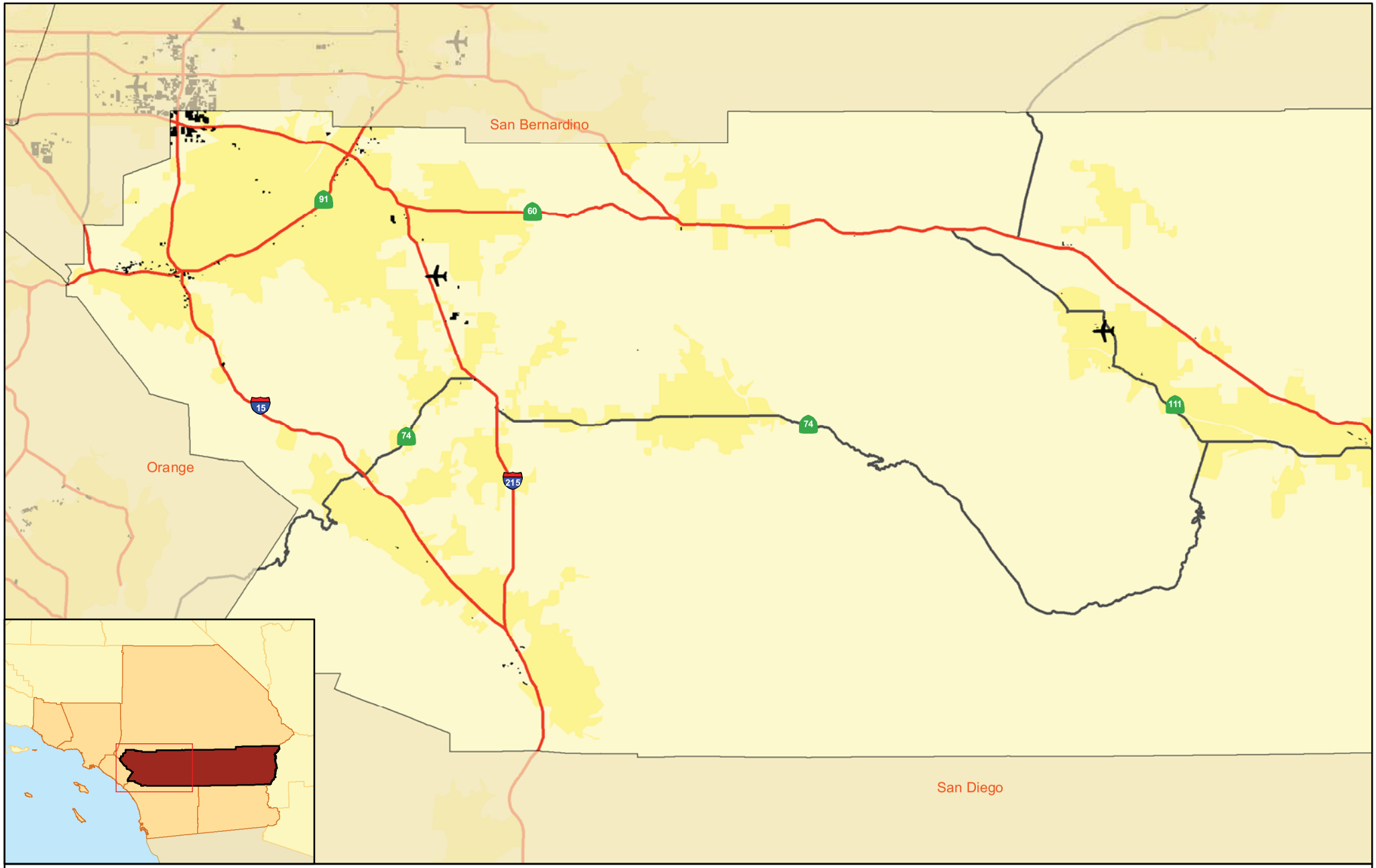
Table 2
Truck Tons Handled by Riverside County's Freeway Network, 2003

	Truck Tons (Million)
Truck tons through County	36.3
Inbound Truck tons to freight facilities	8.4
Outbound Truck tons from freight facilities	5.1
Subtotal	49.8
Truck tons to or from a final origin or destination	58.5
Total Truck Tons	109.4

Source: Critical Goods Movement Issues for Riverside County, RCTC, September 2006

Warehousing

Figure 6 shows the location of warehouse facilities in Riverside County. As the map indicates, there is a large concentration of warehouses centered near the I-15 between San Bernardino and Riverside Counties. There are also many warehouses along SR-91 between SR-71 and I-15.



Airports
Ports
Freeways
Highway
Urban Areas
Wholesaling/Warehousing

Multi-County Goods Movement Action Plan
Warehouse Land Use

0 5 10 20 Miles

N

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Sources:
StreetMap 2006
SCAG 2000 Land Use

Figure 6

The Inland Empire (essentially defined as San Bernardino and Riverside Counties) has an especially strong warehouse and industrial market. This area is attractive to warehousing and distribution centers because it has land available for large (one million plus SF) facilities. Such areas are increasingly rare in counties to the west of the Inland Empire.

Development of new warehousing and distribution centers is spreading from the west end of the county. The types and sizes of warehouses include large private and contract warehouses, as well as distribution centers. These facilities tend to range from 500,000 SF to 1.7 million SF. As land becomes scarcer in Los Angeles, large new facilities are being constructed farther east in cities such as Moreno Valley, Fontana, Perris, and along I-15 toward Las Vegas.

Table 3 below illustrates a summary of warehouse and industrial space in this area.

Table 3
Summary of Warehouse and Industrial Space within the Inland Empire

Market	Net Rentable Area (SF)	Vacancy Rate %	SF Net Absorption	SF Under Construction	Avg. Asking Lease Rate/SF	Availability Rate %
Inland Empire East[i]	93,228,068	2.1%	2,332,258	12,758,664	$0.42	5.0%
Inland Empire West[ii]	209,641,170	1.8%	3,193,453	9,074,069	$0.37	5.7%
TOTAL – Inland Empire	302,869,238	1.9%	5,525,711	21,832,733	$0.39	5.5%

Source: NAIOP/CBRE 3Q2005
Notes:
[i] Inland Empire east include Rialto, San Bernardino, Redlands, Colton, Riverside, Corona, Moreno Valley and Perris.
[ii] Inland Empire west includes Rancho Cucamonga, Ontario, Chino, Mira Loma and Fontana

County Specific Issues

The county has indicated a number of key goods movement issues. In general, these deal with air quality, grade crossings, congestion, passenger capacity, distribution locations, and funding.

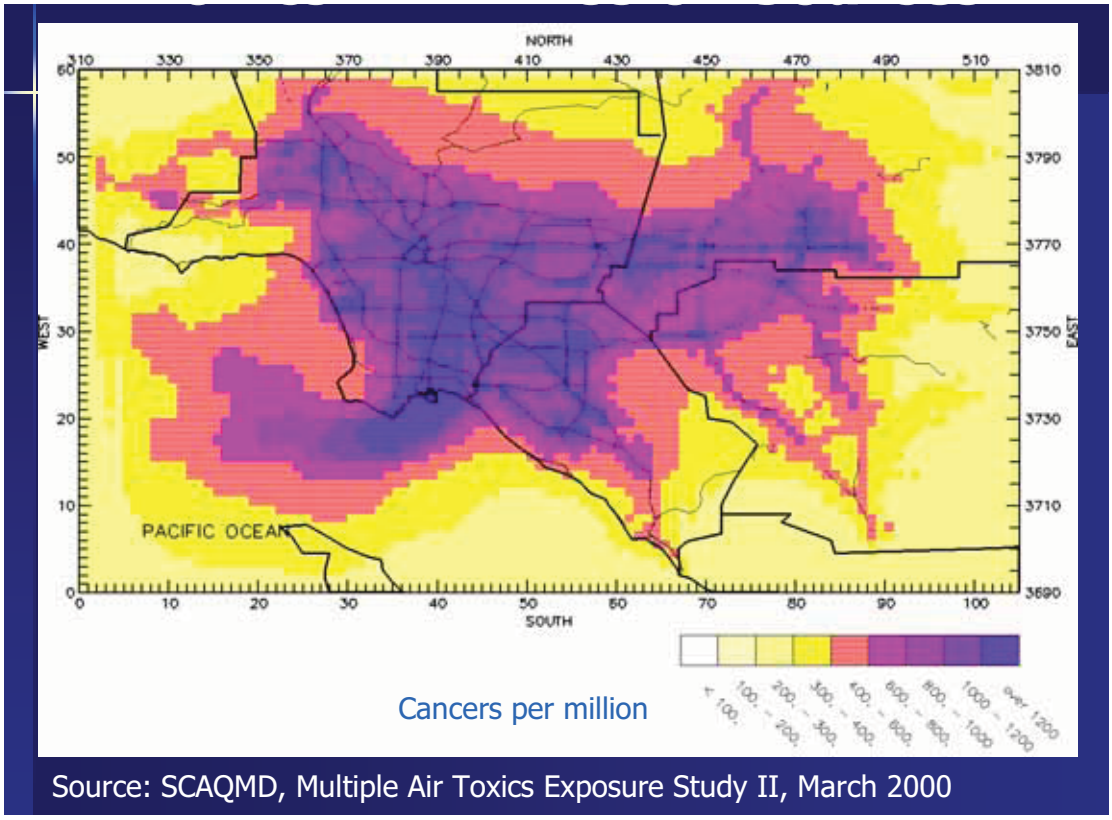
Air Quality

Negative Impacts to air quality in Riverside County are generated from emission sources to the west, as well as sources internal to the county. Prevailing winds carry the airborne pollution into the county. A primary concern is the community's well-being and the environmental effects of poor air quality. Goods movement emissions are a significant source of pollution in the study area.

The goods movement industry is heavily dependent upon diesel fuel for mobility and operations. As discussed in Tech Memo 5b, diesel fuel results in the emissions of diesel particulate matter (DPM), which has been identified as a toxic air contaminant (TAC) by the state's Office of Environmental Health Hazard Assessment (OEHHA). Diesel fuel is also a significant contributor of nitrogen oxides (NOx), the primary pollutant for ozone formation. Both DPM and NOx are linked to various health issues for susceptible populations like the young and the elderly; as well as cancer, asthma, preterm births and low birth weight babies. Due to the current dependency of the goods movement industry on diesel fuel, this action plan focuses on emission reduction.

Figure 7 displays the cancer risk from airborne toxics with diesel emissions. The largest impact is predominantly in the western regions of the county.

Figure 7
Cancer Risk from Airborne Toxics with Diesel Emissions



Source: SCAQMD, Multiple Air Toxics Exposure Study II, March 2000

The goods movement mobile sources targeted for emission reduction include Ocean Going Vessels (OGVs, or ships), On-Road Heavy-Duty Vehicles (HDVs, or trucks), Cargo Handling Equipment (CHE), Harbor Craft (HC), and Railroad Locomotives (RL).

Grade Crossings

Train volumes are expected to increase due to projected volume increases at the ports of Los Angeles and Long Beach. BNSF estimates that the number of trains operating between west Riverside and Colton (the BNSF Transcon segment shared with the UP) will increase 37 percent by 2010. Currently, 85 freight trains pass through the county every day. By the year 2020, this number is expected to increase to 169[5]. Delays to daily through traffic caused by freight trains are a major concern to the county.

The 61 at-grade Alameda Corridor-East (ACE) crossings cause conflicts between rail and highway traffic and are located on mainlines of the UP and the BNSF Transcon railroads. The average rail crossing gate can be down for as long as two hours a day. In total, at-grade crossings delay Riverside County motorists 603 hours daily. This extra idling time is estimated to generate 45 tons of additional pollutants annually[6].

There are plans for grade separations in the Alameda Corridor-East Trade Corridor. Table 4 shows a grade separation project list that was updated in April 2006. The priority groups (1-5) indicated in the table below was identified with help from multiple jurisdictions. Factors including safety, delay, noise, and emissions were considered.

Table 4
Grade Separation Project List

Rail Line	Cross Street	Jurisdiction	Priority Group
UP (LA SUB)	Jurupa Road	Riverside County	1
BNSF & UP (SB SUB)	Chicago Ave	Riverside	1
BNSF (SB SUB)	Magnolia Ave	Riverside County	1
BNSF & UP (SB SUB)	3rd Street	Riverside	1
BNSF (SB SUB)	McKinley Street	Corona	1
BNSF & UP (SB SUB)	Columbia Ave (BNSF)	Riverside	1
UP (LA SUB)	Magnolia Ave	Riverside	1
UP (El Paso)	Sunset Ave	Banning	1
UP (LA SUB)	Riverside Ave	Riverside	1
BNSF & UP (SB SUB)	Iowa Ave (BNSF)	Riverside	1
BNSF (SB SUB)	Adams Street	Riverside	1
BNSF (SB SUB)	Auto Center Dr	Corona	2
UP (El Paso)	Hargrave Street	Banning	2

[5] Alameda Corridor East – Riverside County Impacts and Needs, www.rctc.org
[6] Ibid

Table 4
Grade Separation Project List

Rail Line	Cross Street	Jurisdiction	Priority Group
UP (LA SUB)	Clay Street	Riverside County	2
BNSF (SB SUB)	Smith Ave	Corona	2
BNSF & UP (SB SUB)	7th Street	Riverside	2
BNSF (SB SUB)	Tyler Street	Riverside	2
UP (El Paso)	22nd Street	Banning	2
UP (El Paso)	Ave 48/Dillon Road	Indio/Coachella	2
BNSF & UP (SB SUB)	Center Street	Riverside County	2
UP (El Paso)	San Gorgonio Ave	Banning	2
UP (LA SUB)	Streeter Ave	Riverside	2
UP (LA SUB)	Jurupa Ave	Riverside	2
BNSF & UP (SB SUB)	Palmyrita Ave (UP)	Riverside	2
BNSF & UP (SB SUB)	Spruce Street (BNSF)	Riverside	2
BNSF (SB SUB)	Madison Street	Riverside	2
UP (LA SUB)	Brockton Ave	Riverside	2
BNSF (SB SUB)	Mary Street	Riverside	2
BNSF (SB SUB)	Pierce Street	Riverside	3
UP (El Paso)	Ave 62	Riverside County	3
BNSF (SB SUB)	Railroad Street	Corona	3
UP (LA SUB)	Panorama Road	Riverside	3
BNSF (SB SUB)	Buchanan Street	Riverside	3
UP (LA SUB)	Bellgrave Ave	Riverside County	3
UP (El Paso)	Ave 66	Riverside County	3
UP (LA SUB)	Palm Ave	Riverside	3
UP (El Paso)	Ave 52	Coachella	3
UP (El Paso)	California Ave	Beaumont	3
UP (El Paso)	San Timoteo Canyon Road	Calimesa	3
BNSF (SB SUB)	Washington Street	Riverside	4
UP (El Paso)	Apache Trail	Riverside County	4
UP (LA SUB)	Rutile Street	Riverside County	4
BNSF (SB SUB)	Jefferson Street	Riverside	4
BNSF & UP (RIV)	Cridge Street	Riverside	4
UP (El Paso)	Viele Ave	Beaumont	4
BNSF (SB SUB)	Cota Street	Corona	4
UP (El Paso)	Broadway	Riverside County	4
UP (LA SUB)	Mountain View Ave	Riverside	4
UP (El Paso)	Airport Drive	Riverside County	4
BNSF & UP (SB SUB)	Main Street	Riverside County	4
BNSF (SB SUB)	Jackson Street	Riverside	4
UP (El Paso)	Pennsylvania Ave	Beaumont	4
BNSF (SB SUB)	Joy Street	Corona	4

Table 4
Grade Separation Project List

Rail Line	Cross Street	Jurisdiction	Priority Group
BNSF (SB SUB)	Harrison Street	Riverside	4
UP (El Paso)	Tipton Road	Palm Springs	4
BNSF (SB SUB)	Radio Road	Corona	5
BNSF (SB SUB)	Jane Street	Riverside	5
UP (El Paso)	Ave 54	Coachella	5
UP (El Paso)	Ave 58	Riverside County	5
BNSF (SB SUB)	Sheridan Street	Corona	5
BNSF (SB SUB)	Gibson Street	Riverside	5

Source: RCTC ACE Trade Corridor Grade Crossing Separation Need List, April 2006

Vehicle Congestion

Congestion was classified as a critically important issue by representatives of Riverside County agencies in a survey conducted for the MCGMAP.

Table 5 provides forecasts of truck volumes in 2030 derived from model runs conducted by SCAG.

Table 5
Year 2003 and Year 2030 Truck Volumes Derived from Model Runs

Route	Segments	SCAG Model 2003 Truck Volume	SCAG Model 2030 Truck Volume	Percent Change in Daily Truck Volume
I-215	SR-60 to I-10	8,193	20,070	145%
SR-60	SR-57 to I-15	19,548	27,634	41%
SR-60	I-15 to I-215	11,117	19,744	78%
SR-91	I-15 to I-215	11,449	24,319	112%
SR-91	SR-241 to I-15	22,320	48,154	116%
I-15	SR-60 to I-10	11,912	20,228	70%
I-15	SR-91 to SR-60	10,666	17,519	64%
I-15	SR-74 to SR-91	11,009	22,093	101%
SR-86	SR-195 to SR-111	7,231	6,871	-5%

Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006

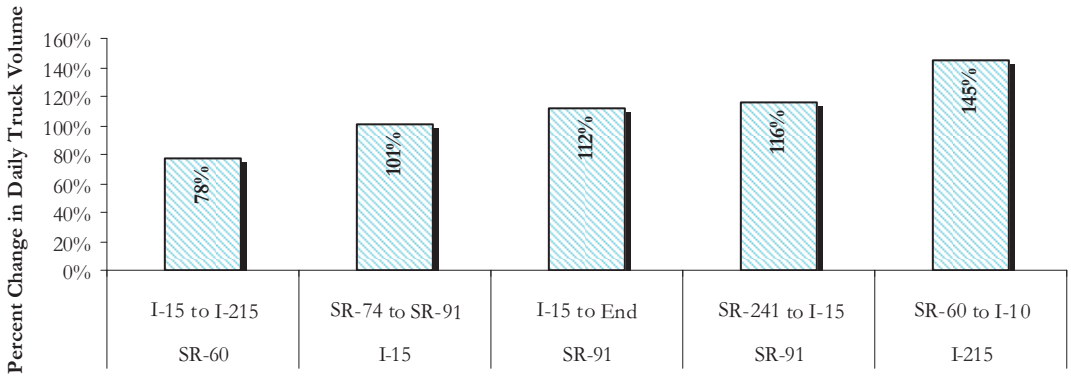
The following can be summarized from the above table:

- I-215 from SR-60 to I-10 shows an increase of 145 percent from 8,000 in 2003 to more than 20,000 daily volumes by 2030

- By 2030, the daily truck volumes on SR-60 between I-15 and I-215 show an increase of more than 75 percent from 11,000 in 2003 to about 20,000
- Truck volumes on SR-91 from I-15 to I-215 and SR-241 to I-15 increase to more than 100 percent by 2030
- I-15 will experience significant increase in truck volumes between SR-74 and SR-91, an increase of more than 100 percent

Figure 8 displays truck growth of more than 75 percent for freeway segments in Riverside County between 2003 and 2030.

Figure 8
Truck Growth 2003-2030



Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006

Table 6 compares the truck volumes on the region's highway system projected for the Year 2030. The table below helps determine potential differences in future forecast volumes due to changes in existing volumes.

Table 6
Forecast Truck Volumes on Region's Highway System

		SCAG Model 2030 Trucks		Post-Processed Year 2030 Trucks	
Route	**Segments**	**N/E**	**S/W**	**N/E**	**S/W**
I-15	SR-60 to I-10	10,572	9,656	13,438	12,836
I-15	SR-91 to SR-60	10,163	7,357	9,787	7,053
I-15	SR-74 to SR-91	14,194	7,899	13,584	7,485
I-215	SR-60 to I-10	9,936	10,134	11,260	11,634
SR-60	SR-57 to I-15	12,740	14,894	14,860	17,565
SR-60	I-15 to I-215	8,796	10,948	10,862	12,615
SR-91	SR-241 to I-15	22,131	26,023	19,587	22,978
SR-91	I-15 to I-215	11,310	13,009	13,055	14,963

Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006

Table 6 shows that the SCAG model carries lower truck volumes on I-215, SR-60, SR-91 and I-15. This indicates that SCAG forecasts are based on lower truck volumes than actually exist when compared to existing data.

As shown in the County Project List in Table 7, a number of freeway improvement projects are planned within Riverside County for corridors along I-10, I-15, SR-86, and SR-60. The projects range in scale from the widening of on/off-ramps along SR-60 and the addition of various auxiliary lanes along each corridor, to the construction of a new interchange at the intersection of I-10 and SR-60. There are 31 projects in Riverside County dealing with freeway and roadway improvements, listed below.

Table 7
MCGMAP Projects Riverside County

Category	County	Description	Cost ($Millions)
Truck Lanes/Dedicated Freight Guideway System	RIV	I-10 from San Bernardino County Line (R0.0) to Banning city limits (12.9) - Add eastbound truck climbing lane.	$75.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	On I-10 at & E/O Apache Trail - Construct new Morongo Pkwy IC (4 lns, ramps - 2 lns), construct aux lane, widen apache trail 3 to 5 lns, widen seminole dr 2 to 5 lns (ea: oa650g).	

Table 7
MCGMAP Projects Riverside County

Category	County	Description	Cost ($Millions)
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	On I-10 near Rancho Mirage from 1.5 km east to 0.9 km west of Ramon Rd IC - Construct Bob Hope Dr extension (6 lanes) with a new diamond IC plus modify Ramon Rd IC and ramps.	
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-10 from Calimesa @ County Line Rd (R4.0) to 500 meters e/o Sandlwood Dr I/C (R4.3) - Replace Bridge, Ramps, Construct Auxiliary Lanes, and Realign Calimesa Rd. (EA 0A710K).	$60.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-10 at Ave 50 - Construct new interchange.	$19.5
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-10 McNaughton Pkwy (approx. 3.38 mi e/o Dillon Rd) - Construct interchange.	$20.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-10 at Portola Ave between Dinah Shore & Varner - Construct new IC (4 lanes) and ramps incl. bridge over UPRR & Varner realignment.	$19.8
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-10 at Monterey Ave - Reconfigure IC, add 1 NB lane, construct new WB entry loop ramp from Monterey & WB entry ramp from Varner, realign/relocate WB exit ramp.	$4.3
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	At I-15/Weirick Road IC in Corona - Widen ramps 1 to 2 lanes, widen Weirick Road 2 to 4 lanes from Temescal Canyon Rd. to I-15, and install signals at ramps/Weirick Rd.	
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-15/cajalco road, widen Cajalco rd i/c widen 2 to 4 lns from Temescal Canyon Rd to Bedford Canyon Rd and widen ramps 1 to 2 lanes.	
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	At I-15/El Cerrito Rd IC in Corona - Widen on/off ramps 1 to 2 lanes, widen 2 to 4 lanes El Cerrito Rd between ramps, install signals, realign Bedford Canyon Rd and add soundwalls.	
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	On I-15 at Ontario Ave, widen SB off & NB on ramps 2 to 3 lns, & widen Ontario 4 to 6 lns (Compton Ave to State St) & install signals.	
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	In Riverside County at I-15/Limonite Ave IC - widen ic 4 to 6 lns, ramps 1 to 2 lns, & widen Limonite Ave from Hamner to Wineville 4 to 6 lns (approx 1 mi).	
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	At I-15 and Clinton Keith Road widen overcrossing from 2 to 4 lns and widen ramps from 1 to 2 lns.	

Table 7
MCGMAP Projects Riverside County

Category	County	Description	Cost ($Millions)
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-86 S at Ave 50 - Construct interchange.	$9.3
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-86 S at Ave 52 btwn La Hernandez and Polk - Construct new interchange.	$19.7
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-86 at Ave 54 btwn SR-111 & Fillmore - Construct bridge/interchange w new SR-86.	$11.2
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-86 S at Airport Blvd/Ave 56 btwn Orange & Fillmore - Construct new interchange (Spread-Diamond).	$17.8
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-86S/Airport Blvd. (Ave. 56) construct new IC (three lanes OC: 1 lane each direction + 1 median lane) and ramps (1 lane) from approx. Desert Cactus Dr. Ave. 57.	$27.8
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-86 S at SR-195 (Avenue 66) R10.63/R11.43 - Near Mecca, construct new interchange.	$19.4
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-86 S Tyler St w/o SR-86S Tyler St e/o SR-86S - Construct new interchange.	$19.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-60 at Etiwanda Ave btwn San Sevaine Wy & Iberia St - Widen ramps 1 to 2 lanes. 0.1 mi.	$0.2
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-60 from 0.4 mi e/o I-15/SR-60 IC to 0.2 mi e/o Main St - Add auxiliary lanes both directions.	$5.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	On I-10 at Indian Ave near Palm Springs - Widen overcrossing 2 to 6 lns from 20th Ave North of I-10 & Garnet ave South of I-10 & ramps 1 to 2 lns (tea21-#377) (ea# 45570).	
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	On I-10 at Date Palm IC in Cathedral City - Widen overcrossing from 2 to 6 lns and ramps from 1 to 2 lns.	
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	At I-10 and Jefferson St IC, modify/widen existing IC from 2 to 6 lanes.	
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-10 from Monterey Ave (44.5) to Dillon Rd (58.9) - Add 1 MF lane each direction (EA 0A030K).	$71.0

Table 7
MCGMAP Projects Riverside County

Category	County	Description	Cost ($Millions)
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-10/SR-60 New interchange construction	$100.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-60/10 Truck Climbing Lane	$55.3
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-60 at Milliken Ave between Etiwanda Ave & Wineville Rd - Widen ramps 1 to 2 lanes. 0.1 mi.	$0.1
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	March Inland Cargo Port Airport I-215/Van Buren Blvd Ground Access Improvement Project.	$97.6
Grade Separations	RIV	Grade Separations	$1,048.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-86 NAFTA Corridor Interchange Construction	$150.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-60 Construct Truck Climbing Lane through Badlands to I-10	$114.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-215 Widening to San Bernardino County Line	$1,600.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	SR-91 Widening to SR-241 to Pierce	$1,000.0
Freight Corridor Capacity Enhancement and Operational Improvements	RIV	I-10 Riverside County Line to SR-60	$200.0

Source: Wilbur Smith Associates, 2007

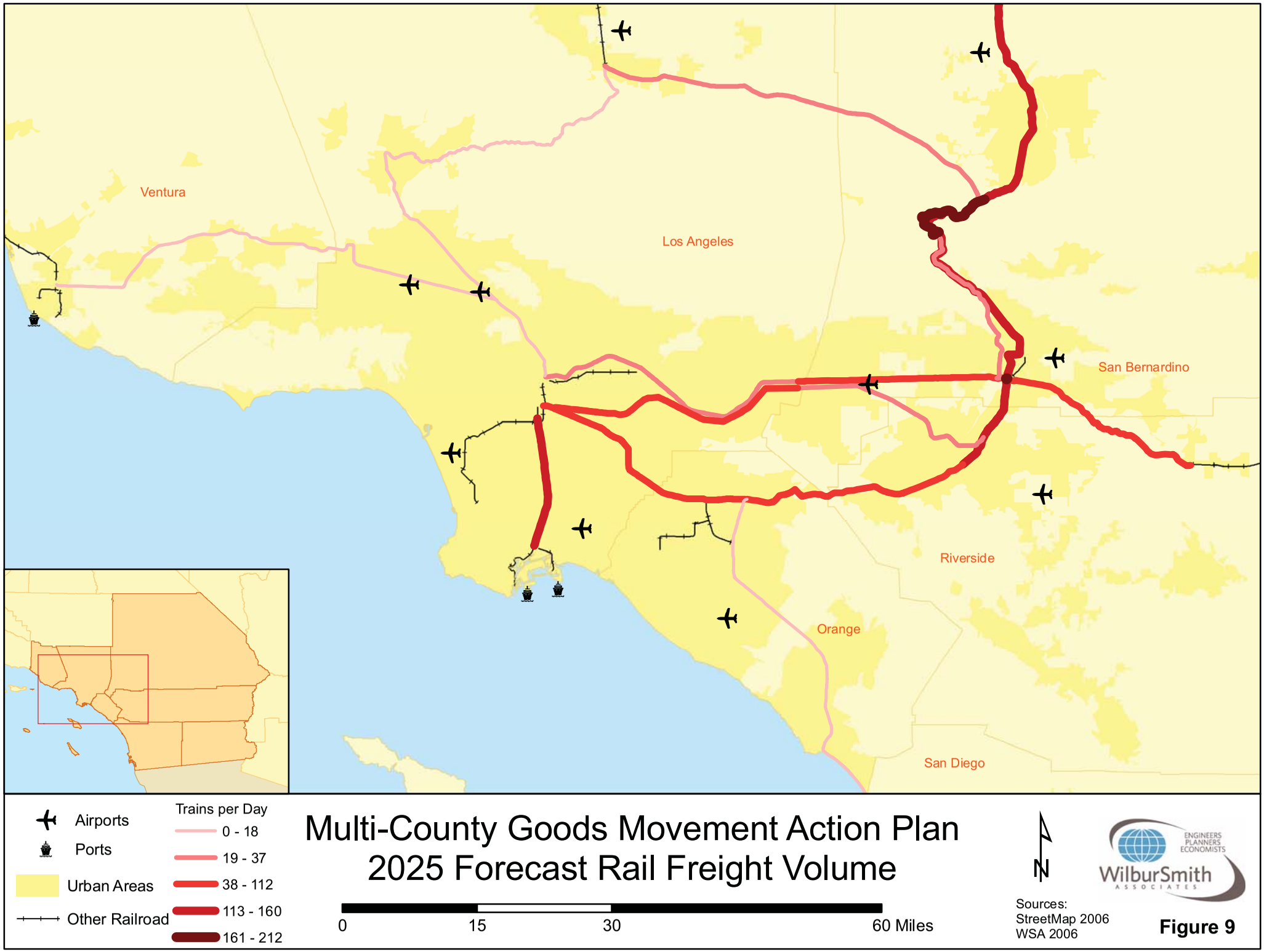
Mainline Rail Capacity

According to the 2002 Los Angeles-Inland Empire Railroad Mainline study, there were 57 daily BNSF trains between Riverside and Colton in the year 2000. The table below shows that BNSF freight traffic could increase by over 100 percent (121 daily trains by 2025) on the same segment. Including UP freight trains and passenger train volumes (Amtrak and Metrolink), total daily trains will increase 69 percent from 103 in 2000 to 174 in 2025. Figure 9 shows the increase in rail freight volumes by the year 2025.

Table 8
Peak-Day Rail Traffic for 2025
(Number of Trains per Day by Segment)

	Atwood-Riverside	Riverside-Colton
BNSF through freight	121	121
Passenger	62	36
UP through freight	--	17
Year 2025 Total	**183**	**174**

Source: "The Los Angeles-Inland Empire Railroad Mainline Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC), 2002.
Note: UP volume between Riverside and Colton on the BNSF was updated to 73 trains in the 2005 "Inland Empire Railroad Mainline Study Final Report", prepared for the Southern California Association of Governments (SCAG). Accordingly, total daily trains would reach 230 in 2025 on that segment.



Multi-County Goods Movement Action Plan
2025 Forecast Rail Freight Volume

Figure 9

Airports
Ports
Urban Areas
Other Railroad

Trains per Day
27 - 49
50 - 81
82 - 130
131 - 162
163 - 255

Multi-County Goods Movement Action Plan
2025 Forecast Rail Volume

0 15 30 60 Miles

N

Sources:
StreetMap 2006
WSA 2006

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Figure 10

UP plans to reroute the Riverside – Los Angeles commuter train service to the Alhambra Line at Pomona. The Riverside Metrolink service presently operates to Los Angeles on the LA Sub Line. In addition, UP would shift many of the freight trains now operating to Riverside on the LA Sub Line to the Alhambra Line at Pomona. These changes would create a freight-only route, and a mixed freight/passenger route, greatly increasing operational efficiency for UP. None of these changes are budgeted and the reroute of Metrolink trains will require a new agreement with the commuter train agency.[7]

These operational changes would improve operational efficiency. Passenger service improvements would serve to maintain regional economic vitality by providing better access to Los Angeles employment centers.

Distribution Locations

Currently, UP operates a rail yard and automobile distribution center in Mira Loma. Activities at the yard include receiving inbound rail cars, switching cars, loading and unloading automobiles, departing outbound rail cars, and storing automobiles. Facilities within the yard include classification tracks, a gate complex for inbound and outbound truck traffic, loading and unloading tracks, and various buildings and facilities supporting railroad and contractor operations.

Community groups and residents have expressed concern over the diesel emissions created by the yard and its proximity to the Jurupa Valley High School. The yard does represent a major intermodal facility. Total passenger and freight train movements for the UP Los Angeles Sub Line from Mira Loma to West Riverside are presented in Table 9.

Table 9
Total Passenger and Freight Train Movements

Line Segment	Freight Total Through Train Movements per Peak Day (Year 2000)	Passenger Total Through Train Movements per Peak Day (Year 2000)
BNSF Hobart – Fullerton Jct.	50	46
BNSF Fullerton Jct. – Atwood	50	5
BNSF Atwood – West Riverside	57	16
BNSF/UP West Riverside – Colton	92	11
BNSF/UP Colton – San Bernardino	121	11
Lines over Cajon Pass (including BNSF/UP Cajon Line and UP Palmdale Line)	93	2
UP Mira Loma – W. Riverside plus	**64**	**14**
UP West Colton – Colton UP El Paso Line	2	2

Source: Inland Empire Railroad Mainline Study, Final Report, June 30, 2005.

[7] UPRR 2001 Presentation to SCAG

There are no projects in the MCGMAP region that directly relate to the Mira Loma facility. Any improvements to land use and pollution concerns would address the Action Set "Accelerate Regional Environmental Mitigation."

Increasing cargo capacity at March GlobalPort should assist the Action Set "Improve Operational Efficiency." March GlobalPort can handle more than 1.2 million tons of cargo per year, which is about 14 percent of the regional volume and 20 percent of the international volume predicted for 2016[8].

Funding

The county has developed various funding strategies for advancing projects.

The need for grade separation funding is particularly acute. The existing 61 railroad crossings were ranked into five priority tiers, out of which 28 crossings were ranked in the top two tiers as the highest priority for funding. The cost of constructing grade separations at these 28 locations is currently estimated at $815.8 million, with $199 million currently committed from various funding sources. This results in $616.8 million of funding deficit for all 28 projects. A plan to fund 18 of the 28 crossings for a total project cost of $560.8 million is underway. Among the 18 high-priority projects, eight are located on UP mainline tracks and 10 are on BNSF mainline tracks (five of which UP operates). The table below lists the 18 high-priority projects.

[8]March Global Port LLC., 2006

Table 10
High Priority Grade Separation Projects

Cross Street	Jurisdiction	Total Project Cost (Millions)	Priority Group
Columbia Ave (BNSF&UP)	Riverside	$21.00	1
Sunset Ave (UP)	Banning	$21.00	1
Avenue 48/Dillon Road (UP)	Indio/Coachella	$16.10	2
Jurupa Ave (UP)	Riverside County	$21.70	2
Chicago Ave (BNSF &UP)	Riverside	$48.70	1
Magnolia Ave (BNSF)	Riverside County	$26.70	1
3rd Street (BNSF & UP)	Riverside	$31.70	1
McKinley Street (BNSF)	Corona	$109.20	1
Magnolia Ave (UP)	Riverside	$27.20	1
Iowa Ave (BNSF & UP)	Riverside	$19.00	1
Adams Street (BNSF)	Riverside	$24.00	1
Auto Center Dr (BNSF)	Corona	$27.00	2
Clay Street (UP)	Riverside County	$25.00	2
Center Street (BNSF & UP)	Riverside County	$36.30	2
Streeter Ave (UP)	Riverside	$33.70	2
Madison Street (BNSF)	Riverside	$19.00	2
Jurupa Road (UP)	Riverside County	$26.50	1
Riverside Ave (UP)	Riverside	$27.00	1
Total		$560.80	

Source: Grade Separation Funding Strategy, RCTC, September, 2006

Representatives from the Riverside County Transportation Commission have suggested adopting funding strategies similar to the Chicago Region Environmental and Transportation Efficiency (CREATE) Program. The CREATE Program is a partnership between the state of Illinois, city of Chicago, Metra (a Commuter Rail System in Chicago) and the nation's freight railroads. CREATE is a multi-modal program (freight rail, passenger rail and highway) to provide critical improvements to increase efficiency of rail infrastructure and quality of life for Chicago-area residents. A similar coordination of governmental and private agencies within Riverside County could be employed in a holistic approach to address critical rail projects.

To address the CREATE Program, the Federal Highway Administration (FHWA) Illinois Division Office, in cooperation with the Illinois Department of Transportation and the Chicago Department of Transportation, developed the Systematic, Project Expediting, and Environmental Decision-making (SPEED) Strategy. The SPEED Strategy supports systematic decision-making, provides an expeditious method of moving low risk component projects forward, and assesses potential environmental impacts in a proportional, graduated way.

Market-based mechanisms are currently being considered by different agencies to fund infrastructure and environmental improvement at ports. One such mechanism is a container fee

applied to each shipping container received at the port. This would generate funds to help pay for road and rail improvements and clean-air programs tied to port trade.

One important potential source of funding is State General Obligation bonds from Proposition 1B, which was approved by California voters in November of 2006. The Trade Corridor Infrastructure Fund (TCIF) within Proposition 1B is intended to fund "Trade Corridors of National Significance" and other corridors with high volumes of freight movement. Prop 1B requires the County Transportation Commission (CTC) to use plans adopted by regional transportation planning agencies, including MCGMAP. Funding issues and county plans address the MCGMAP Action Set "Negotiate Fair Share Public/Private Financing."

County Actions

County actions related to the MCGMAP are provided in Table 8. A major focus in Riverside County is to "Relieve Congestion and Increase Mobility."

Conclusions

Riverside County plays a major role in moving goods through the MCGMAP region. Goods movement related impacts are currently disproportionately higher than benefits seen by the county at this time. As a result, the region has identified several major impact mitigation strategies as regional priority projects.

Freight rail through traffic is an especially high priority problem in the region. Delays at grade crossings are significant, and competition between freight trains and commuter trains for limited rail capacity has a significant effect on county residents. Air pollution impacts from growing freight rail also need to be addressed.

Riverside County has relatively high truck volumes on major east-west facilities. The county has a higher fraction of heavy-truck traffic than most of the other MCGMAP counties. If current trends continue, growth in warehouse and distribution land uses (and associated economic benefits) are likely to favor the I-15 corridor in San Bernardino County as compared to Moreno Valley. Thus, Riverside County may benefit less from logistics activity in the region than its share of through traffic would suggest possible.

Based on the above observations, several high priority regional projects are targeted for Riverside County. The projects and actions currently underway or being planned in Riverside County fall within the four actions of the MCGMAP. There is a relationship between county projects developed independent of a regional plan and the recommended primary actions of the MCGMAP. To reiterate, the four action sets in the MCGMAP include the following:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility

- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

A brief description of each action set and how the county-specific actions serve their greater purpose is provided below.

Action Set 1: Accelerate Regional Environmental Mitigation seeks to mitigate environmental impacts at three levels: a broad regional approach, regional conformity, and project specific mitigation. The regional approach is for broad strategic policies and efforts focusing on further reducing region-wide impacts. Regional conformity holds emissions to caps set through aggressive actions and implementing high-level technology and best practices. The project specific mitigation requires project sponsors to consider and disclose environmental impacts when planning projects and to address how potential impacts will be resolved. This part of the project development process is specified in the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

Freeway lane and capacity improvements as well as operational and safety improvements will improve mobility and therefore reduce emissions. The proposed grade separation projects will also greatly reduce pollution from idling cars. These projects will assist Riverside County in continuing to meet conformity goals. Projects may have local impacts that are not addressed within this regional goods movement framework.

Action Set 2: Relieve Congestion and Increase Mobility focuses on improving all aspects of the transportation system to improve region-wide mobility and safety. This action set seeks to achieve the following:

- Increase intermodal lift capacity
- Increase mainline rail capacity
- Grade separate railroad crossings
- Improve highways through comprehensive and innovative approaches
- Continue with general purpose highway improvements / safety and operational improvements

The freeway projects, the mainline rail improvements, and the intermodal facilities will provide congestion relief and increase mobility. All modes of freight transport benefit from these projects. The construction of railroad grade separations will help reduce traffic delay at crossings.

Action Set 3: Improve Operational Efficiency addresses the following action categories:

- Improve marine terminal productivity, truck turn times, and intermodal operations
- Improve highway operations through the use of new technology

These improvements would make existing infrastructure more efficient. Projects like improving freeway capacity and grade separations lead to improved operational efficiency.

Action Set 4: Develop Equitable Public/Private Funding Strategy recognizes that implementation of the actions, projects, and programs with mitigations will require a coordinated effort by private and public sectors. The action set seeks to achieve the following:

- Maximize the Study Area's Fair Share of State and Federal Funds
- Identify Opportunities for Project-Specific User Fees
- Establish Institutional Structure for Managing User Fees and Revenues
- Initiate Supportive Legislation

Riverside County is addressing these issues. Developing funding strategies for grade separations is a major step in addressing the distribution of funds. To adequately address fair share, it is important to increase the knowledge of agencies regarding the issues as this study has done.

All the projects in the county ultimately are designed to insure that Southern California maintains, if not enhances, its economic position. Maintenance of the regions economic vitality will be enhanced by the actions being done in Riverside County.

Multi-County Goods Movement Action Plan

San Bernardino County Action Plan

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
San Diego Association of Governments

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April 30, 2008

Table of Contents

INTRODUCTION 1
Purpose 1
Background 1
Role 5
Ports/Airports 5
Overland Transport 6
Rail 7
Trucks 9
Warehousing 10
COUNTY SPECIFIC ISSUES 13
Colton Crossing 13
Rail Mainline Capacity 14
Grade Separation 18
Intermodal Capacity 22
Roadway Capacity 22
Goods Movement Projects 24
Freeway Interchanges – Warehouse Districts 24
Air Quality 25
The Future 29
COUNTY ACTIONS 30
CONCLUSIONS 30

List of Tables

Table 1 – Air Cargo Activity, 2003 6
Table 2 – Year 2003 Truck ADT 10
Table 3 – Summary of Warehouse and Industrial Space within the Inland Empire 13
Table 4 – 2025 Forecast of Trains per Day by Segment 15
Table 5 – ACE Grade Separation Projects 19
Table 6 – Year 2003 and Year 2030 Truck Volumes Derived from Model Runs 22
Table 7 – Forecast 2030 Truck Volumes on Region's Highway System 24
Table 8 – MCGMAP Projects San Bernardino County 25

List of Figures

Figure 1 – Multi-County Goods Movement Action Plan San Bernardino County 3
Figure 2 – Multi-County Goods Movement Action Plan Southwest San Bernardino County 4
Figure 3 – Multi-County Good Movement Action Plan Railroad Lines 8
Figure 4 – 2003 Percentage of Truck VMT in MCGMAP Study Area by County 9
Figure 5 – Multi-County Goods Movement Action Plan 2003 Truck ADT 11
Figure 6 – Multi-County Goods Movement Action Plan Warehouse Land Use 12
Figure 7 – Multi-County Goods Movement Action Plan 2025 Forecast Rail Freight Volume 16
Figure 8 – Multi-County Goods Movement Action Plan 2025 Forecast Rail Volume 17
Figure 9 – Truck Growth 2003-2030 23
Figure 10 – Truck Growth 2003-2030 on I-15 23

Introduction

Purpose

This report outlines a Goods Movement Action Plan for San Bernardino County, California, part of a broader Multi-County Goods Movement Action Plan (MCGMAP) developed collectively by the Los Angeles County Metropolitan Transportation Authority (Metro), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), San Diego Association of Governments (SANDAG), Ventura County Transportation Commission (VCTC), Southern California Association of Governments (SCAG), and the California Department of Transportation (Caltrans). The MCGMAP contains strategies to support the efficient movement of goods without disproportionately impacting local communities, the environment, or the transportation network. The MCGMAP is also a regional framework for goods movement initiatives.

This report examines the key issues that impact San Bernardino County from a goods movement standpoint. It also examines the plans and proposals that are being pursued to resolve the stated issues, and new specific actions and strategies that should become a focus for the county. It is important to note that this report builds on a large body of work that has been researched and developed over the past few years, all of which collectively address a comprehensive range of goods movement issues.

The Multi-County Goods Movement Action Plan has recommended four primary action sets for goods movement within the region. The action sets are:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility
- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

Current and future projects, relationships, and activities of San Bernardino address these four primary action sets. The document concludes with an explanation of how San Bernardino County's activities support these four action sets.

Other efforts will likely address new and existing issues as they arise. This report is intended to focus on specific actions to address the most significant goods movement issues for the county that have been presented to date. This report is not intended to be a full and complete glossary of every issue. In addition, the full MCGMAP contains information important to the understanding of goods movement in San Bernardino County.

Background

San Bernardino County has been involved in several plans that examine goods movement as shown in the list below:

- I-15 Comprehensive Corridor Study, December 2005
- Subregional Freight Movement Truck Access, July 2004
- The Inland Empire Airports Ground Access Plan, June 2004
- East Valley Traffic and Truck Study, December 2003
- Inland Goods Movement Corridor Study: Rail Crossing Improvement Plan, August 2000
- Regional Railroad Consolidation Study, November 1995
- SR-60 Truck Lane Feasibility Study, February 2001

Figure 1 presents a map of San Bernardino County, and Figure 2 shows the southwest corner of the county. The southwest corner has the vast majority of the infrastructure.

Airports
Ports
Railroad
Freeways
Highway
BNSF Intermodal Facility
Urban Areas

Multi-County Goods Movement Action Plan
San Bernardino County

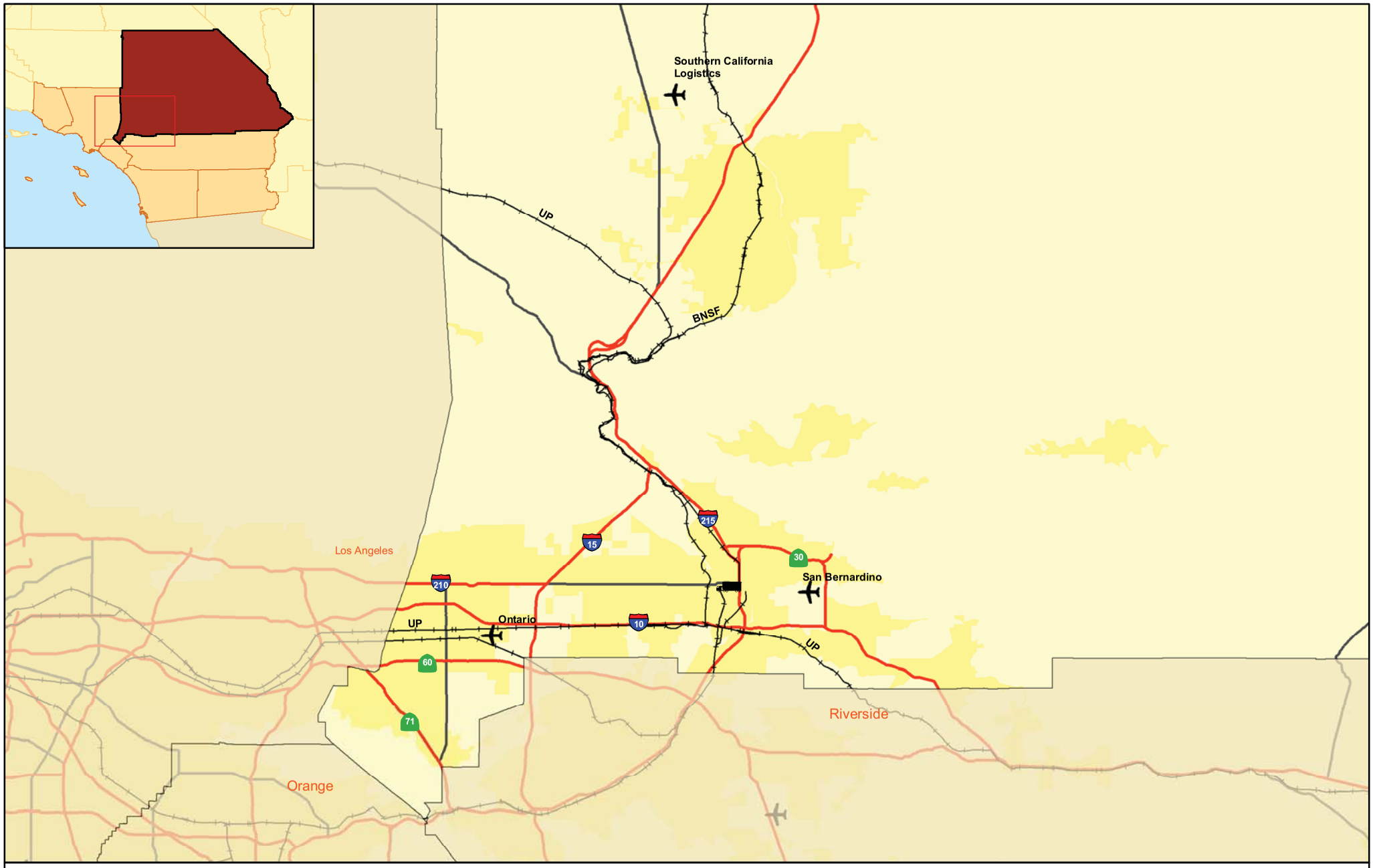
0 35 70 140 Miles

N

Sources:
StreetMap 2006

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Figure 1



Airports
Ports
Railroad
Freeways
Highway
BNSF Intermodal Facility
Urban Areas

Multi-County Goods Movement Action Plan
Southwest San Bernardino County

0 10 20 40 Miles

N

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006

Figure 2

San Bernardino County represents the northeast portion of the MCGMAP Region. San Bernardino has the largest area of any county in the United States and it makes up nearly half (47 percent) of the MCGMAP Region. It is bounded on the south by Riverside County and on the west by Los Angeles County. A short boundary with Orange County exists in the southwest corner of the county. To the north of the county are inland areas of California and to the east are Nevada and Arizona.

The two major rail operators in the county are Burlington Northern Santa Fe (BNSF) Railway and Union Pacific (UP) Railroad. Limited access freeways are I-10, I-15, I-40, I-210, I-215, SR-259, SR-30, SR-60, and SR-71.

San Bernardino County has no navigable rivers or seaports. BNSF has one intermodal facility in San Bernardino (see Figures 1 and 2). Air cargo is currently being brought into Ontario International Airport. The Southern California Logistics Airport has plans for air cargo development, and there is currently very limited service at the San Bernardino International Airport.

Role

Ports/Airports

There are no ports for waterborne transport but there are air cargo facilities in the county. Ontario International Airport is one of the commercial airports dealing with air cargo.

Ontario International Airport (ONT) - ONT is located in San Bernardino County. It is the center of a rapidly developing freight movement system that includes the airport, two railroads, four major freeways (I-10, I-15, SR-60, and SR-71), an expanding industrial/distribution complex, and a network of freight forwarders. ONT currently consists of 1,463 acres; about a third of which are available for future development. The site is well-suited for the development of air cargo and supporting facilities. It is near airfield access ways, public roadways, and major interstate highways.

The airport is one of four owned and operated by the Los Angeles World Airports (LAWA). The airport consists of the following cargo specific facilities and uses:

- Two parallel runways
- 96,000 SF of cargo building and office space to support all-cargo, airline belly cargo, and air mail
- 12 major U.S. air freight carriers including Air Transport International, Airborne Express, Ameriflight, DHL, Empire Airways, Evergreen, Express Net, Federal Express, Kalitta Air, West Air, Union Flights and UPS

The West Coast hub for UPS utilizes ONT as its base of operation, with facilities located both on and adjacent to airport property. It currently processes approximately 70 percent of all cargo at the airport. The U.S. Postal Service (USPS) also utilizes hangar space to process all first class mail

passing through ONT. The other air freight carriers maintain operating facilities along the south edge of the airport.

UPS also has a 156-acre West Coast distribution center adjacent to the airport with access to the ONT airfield. There is available property for further development adjacent to and between the existing terminals. Passenger terminal and cargo facilities can also be added on the west side. Developable property is also available on the south side of the airport.

Ontario airport handled 605,132 tons of cargo in 2004, nearly a six percent increase from 2003. ONT ranks as the second largest air cargo operation in the MCGMAP region behind LAX.

Table 1
Air Cargo Activity, 2003

	Air Cargo (tons)		
Airport	**Inbound**	**Outbound**	**Total**
Ontario International (ONT)	240,881	254,298	495,179

Source: Bureau of Transportation Statistics, Air Carrier Statistics T-100 database.

Southern California Logistics Airport - Another emerging air cargo complex is the Southern California Logistics Airport (VCV) located in Victorville, which has facilities for air cargo, rail intermodal, trucking, warehousing operations, and planned industrial space. Overall, VCV has developed a master plan for more than 64 million SF of commercial space. It consists of two intercontinental runways: a 15,050-foot runway, allowing the heaviest aircraft direct, non-stop access to any destination in the world, and a 10,000-foot runway.

San Bernardino International Airport (SBD) also has potential for air cargo. SBD has a 10,000-foot runway and currently has sporadic cargo flights from Custom Air Transport, HeavyLift, and Kitty Hawk.

Overland Transport

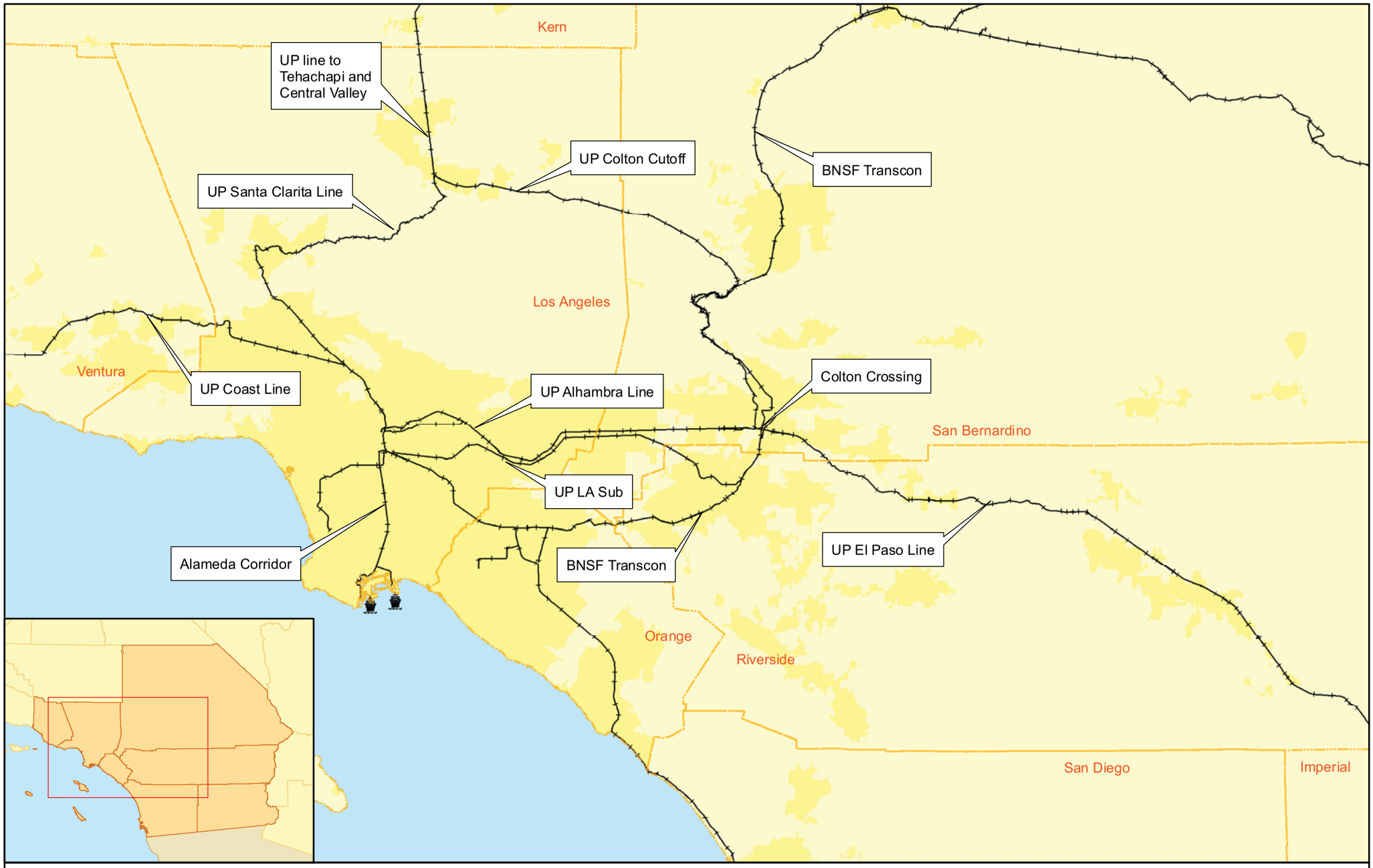
The Cajon Pass is key in making San Bernardino County the gateway to the U.S. The Cajon Pass is a break in the Traverse Ranges, an unusual set of mountain ranges in the United States as they bear east-west as opposed to the more typical northeast-southwest. The configuration of these ranges present a major physical barrier for the MCGMAP Region and the principal break for access to most of the U.S. is the Cajon Pass. The pass is between the San Gabriel Mountains to the west and the San Bernardino Mountains to the east.

Historically this has been a major route. Route 66, the original east-west highway to Los Angeles, used this pass. Route 66 is no longer a U.S. highway, but I-15 has replaced it in the pass and I-40 follows much of the historic Route 66.

Rail

The county has rail lines owned by BNSF and UP as shown in Figure 3. The BNSF Transcon is the BNSF artery linking the Los Angeles Basin to all Midwestern, Southwestern, and Eastern markets on the BNSF rail system. The BNSF Transcon in the Los Angeles Basin runs from San Bernardino to downtown Los Angeles via Placentia, where it connects to the triple track Alameda Corridor and to the POLA and POLB. UP has two lines running east-west from the Los Angeles Basin. One is the Sunset Corridor, which extends to El Paso, Texas and beyond, and the other is the South-Central Line, which extends to Las Vegas, Nevada and beyond. The two lines cross at Colton, at a point appropriately called the Colton Crossing. Metrolink's San Bernardino Line runs on a combination of former Southern Pacific Transportation Company (SP) and Atchison, Topeka & Santa Fe Railway (ATSF) Lines now owned by Metro and the San Bernardino Associated Governments.

The county has one intermodal facility. The BNSF San Bernardino intermodal facility is situated in San Bernardino. A 2003 Alameda Corridor Transportation Authority (ACTA) study estimated that 60 percent of all eastbound domestic containers transported from San Bernardino were filled with cargo from the San Pedro Bay ports. This cargo had been taken out of the standard marine container and transloaded or warehoused before being transported to the San Bernardino facility in a domestic trailer or container. The volume of BNSF's San Bernardino intermodal facility is 100 percent domestic. Trailers and containers handled at the facility move only between points in North America due to its distance from the port area. Ocean carriers can avoid a lengthy and costly truck haul of intermodal containers to San Bernardino by using on-dock or near-dock facilities.



Airports
Ports
Railroad
Urban Areas

Multi-County Goods Movement Action Plan
Railroad Lines

0 15 30 60 Miles

N

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

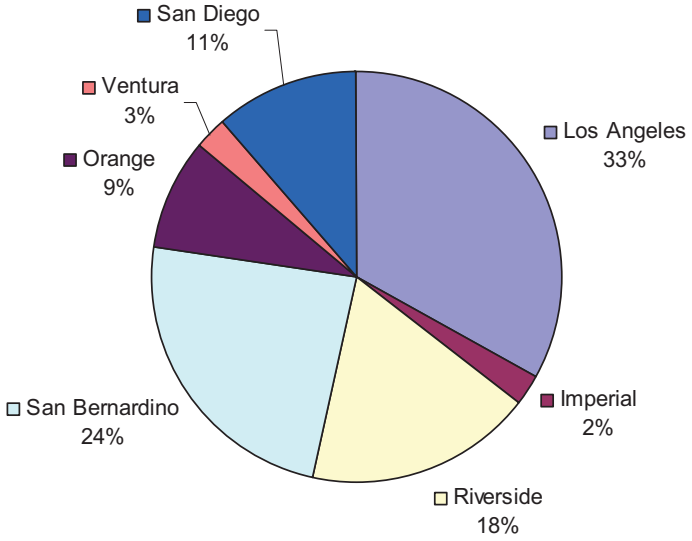
Sources:
StreetMap 2006
MCGMAP Tech Memo 3 2006

Figure 3

Trucks

Figure 4 shows the distribution of truck traffic in the region by county, measured in terms of truck miles of travel on the state highway system. San Bernardino County accounts for 24 percent of the total regional truck miles of travel, ranking second after Los Angeles County which has 33 percent.

Figure 4
2003 Percentage of Truck VMT in MCGMAP Study Area by County



Source: "Truck Miles of Travel: California State Highway System 1988-2003," California Department of Transportation (Caltrans) 2005

San Bernardino County also comes very close to Los Angeles in VMT for Heavy Heavy Trucks, carrying about 3.270 million trucks daily in the Year 2003. Los Angeles County has 3.433 million; add in Riverside County with 2.202 million and the two Inland Empire Counties surpass Los Angeles County.

Table 2 shows the 2003 truck volumes on the county's freeway segments. Some of the heavily used truck corridors in the county include the following (also shown in Figure 5):

Table 2
Year 2003 Truck ADT

Route	Segments	County	Year 2003 Trucks N/E	Year 2003 Trucks S/W	Total ADT 2003
I-10	SR-57 to I-15	San Bernardino	9,863	8,140	18,003
I-10	I-15 to I-215	San Bernardino	10,007	11,638	21,645
I-15	I-215 to SR-138	San Bernardino	8,035	11,015	19,050
I-15	I-210 to I-215	San Bernardino	7,871	9,433	17,304
I-15	I-10 to I-210	San Bernardino	8,404	12,196	20,600
I-15	SR-60 to I-10	San Bernardino	8,512	9,446	17,958
I-215	SR-30 to I-15	San Bernardino	2,880	1,618	4,498
I-215	SR-60 to I-10	Riverside/San Bernardino	5,167	5,849	11,016

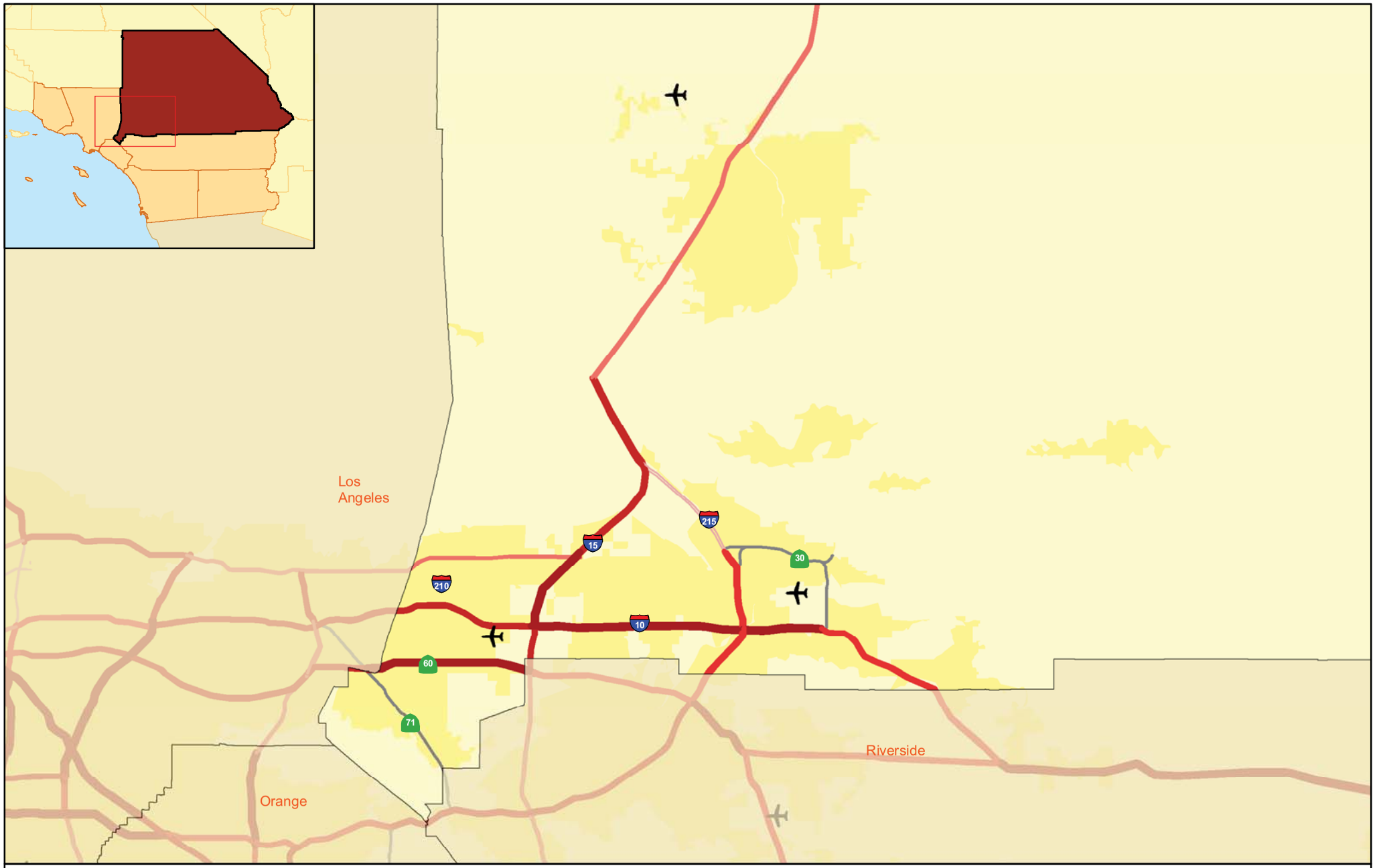
Source: Caltrans, Traffic and Vehicle Data Systems Unit, 2004 Truck;
Wilbur Smith Associates, 2007

Warehousing

The Inland Empire (essentially defined as San Bernardino and Riverside Counties) has an especially strong warehouse and industrial market. The amount of available land in this area is attractive to warehousing and distribution centers for large (one million plus SF) facilities. Such land areas are becoming increasingly rare in counties to the west of the Inland Empire.

Warehousing and wholesaling land use in 2000 is shown in Figure 6.

New developments of warehousing and distribution centers are spreading from the west end of the county to the east. The primary types and sizes of warehouses in this area are large private and contract warehouses and distribution centers. These types of warehouses and distribution centers tend to be in the range from 500,000 SF to 1.7 million SF. As land has become scarce closer to the Los Angeles basin, large new facilities are being constructed in cities farther east such as Moreno Valley, Fontana, Perris, Chino, Ontario, Rancho Cucamonga, and along I-15 toward Las Vegas.



less than 5000
5000 - 10000
10000 - 15000
15000 - 20000
greater than 20000
Other Freeways

Ports
Airports
Urban Areas

Multi-County Goods Movement Action Plan
2003 Truck ADT

0 10 20 40 Miles

N

Sources:
StreetMap 2006
SCAG 2004
WSA 2006

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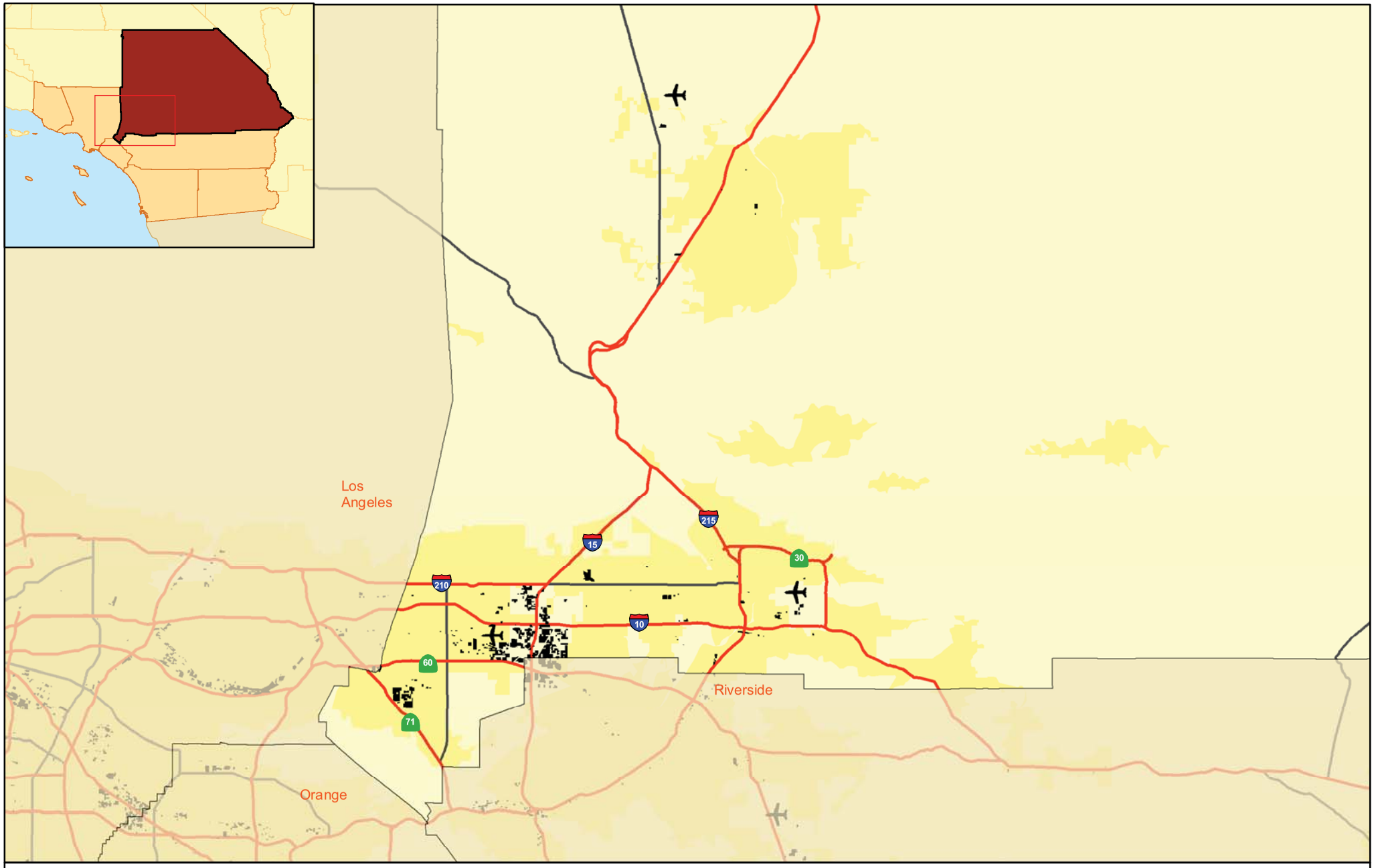
Figure 5



Airports
Ports
Freeways
Highway
Urban Areas
Wholesaling/Warehousing

Multi-County Goods Movement Action Plan
Warehouse Land Use

0 10 20 40 Miles

N

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006
SCAG 2000 Land Use

Figure 6

Table 3 below illustrates a summary of warehouse and industrial space in this area.

Table 3
Summary of Warehouse and Industrial Space within the Inland Empire

Market	Net Rentable Area (SF)	Vacancy Rate %	SF Net Absorption	SF Under Construction	Avg. Asking Lease Rate/SF	Availability Rate %
Inland Empire East[i]	93,228,068	2.1%	2,332,258	12,758,664	$0.42	5.0%
Inland Empire West[ii]	209,641,170	1.8%	3,193,453	9,074,069	$0.37	5.7%
TOTAL – Inland Empire	302,869,238	1.9%	5,525,711	21,832,733	$0.39	5.5%

Source: NAIOP/CBRE 3Q2005
Notes:
[i] Inland Empire East include Rialto, San Bernardino, Redlands, Colton, Riverside, Corona, Moreno Valley, and Perris.
[ii] Inland Empire West includes Rancho Cucamonga, Ontario, Chino, Mira Loma, and Fontana

County Specific Issues

San Bernardino County identified the following issues as critical:

- Colton Crossing
- Rail Mainline Capacity
- Railroad grade separation
- Intermodal capacity
- Mainline freeway capacity enhancements
- Freeway interchanges – warehouse districts
- Devore interchange – freeway mainline bottleneck elimination
- East-west capacity in the High Desert
- Air Quality

Colton Crossing

The Colton Crossing is a major bottleneck in the rail system. This is not simply a San Bernardino County issue, but a regional one, given that movement through the crossing impacts the entire region. Colton Crossing is the location where the two main rail routes serving Southern California cross at-grade in the city of Colton. Most trains entering or leaving Southern California use this at-grade rail crossing, which is a significant cause of congestion on the mainlines of the UP and the

BNSF.[1] In December of 2006, the Alameda Corridor Transportation Authority (ACTA) presented a feasibility study to analyze alternatives and costs for design and construction of an east-west structure, which would grade separate the BNSF and UP mainline tracks at Colton Crossing. In addition, ACTA will be preparing an additional report on a proposed north-south flyover to the south of Colton Crossing to reduce train crossing conflicts. This report will be evaluated by ACTA, UP, and BNSF.

Rail Mainline Capacity

Mainline rail capacity is critical to the movement of goods through and out of the study area. As discussed earlier, San Bernardino County provides the major access to markets throughout the east through the Cajon Pass and the UP Line to El Paso. As a result of this, rail capacity in San Bernardino County plays a key role in moving goods.

The volume of trains through the Colton crossing is expected to increase to 255 by 2025, as shown in Table 4. This averages to more than 10 trains per hour. The forecasted total is an 88 percent increase from the volume of 135 trains per peak day in 2005. Maintaining an at-grade crossing with such volume may not be practical. Figures 7 and 8 show the rail forecast for the year 2025 for freight, and freight and passenger rail combined.

[1] ACTA Colton Crossing Feasibility Study

Table 4
2025 Forecast of Trains per Day by Segment

	FACILITY TYPE/PROVIDER					
TRACK SEGMENTS	**BNSF**	**UP**	**Amtrak**	**Corridor**	**Metrolink**	**Total**
BNSF						
Barstow-San Bernardino	131	29	2			**162**
San Bernardino-Colton	111	29	2		40	**182**
Colton-West Riverside	111	37	2		40	**190**
West Riverside-Atwood	111		2		66	**179**
Atwood-Fullerton	102		2		26	**130**
Fullerton-Hobart	102		2	32	74	**210**
Hobart-Redondo	74		2	32	74	**182**
Atwood-Orange	9				40	**49**
Fullerton-Orange				32	48	**80**
Orange-Irvine/San Juan Capistrano/Oceanside/San Diego	9			32	88	**129**
UP						
East Los Angeles-Pomona (LA Sub)		82			44	**126**
Pomona-Mira Loma (LA Sub)		30			44	**74**
Mira Loma-West Riverside (LA Sub)		37			44	**74**
Pomona-Los Angeles (Alhambra Line)		36	1			**37**
Pomona-West Colton (Alhambra Line)		112	1			**113**
Los Angeles-Burbank		18	2	14	78	**112**
Burbank-Coast Line		12	2	14	36	**64**
Burbank-Palmdale		6			42	**48**
Palmdale-Colton		27				**27**
Colton-El Paso Line		80	1			**81**
Alameda Corridor						**144**
Colton Crossing	111	101	3		40	**255**
Cajon Pass	160	27	2			**189**

Source: Wilbur Smith Associates, 2006

Airports
Ports
Urban Areas
Other Railroad

Trains per Day
0 - 18
19 - 37
38 - 112
113 - 160
161 - 212

Multi-County Goods Movement Action Plan
2025 Forecast Rail Freight Volume

0 15 30 60 Miles

N

Sources:
StreetMap 2006
WSA 2006

WilburSmith ASSOCIATES
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Figure 7

Airports
Ports
Urban Areas
Other Railroad

Trains per Day
27 - 49
50 - 81
82 - 130
131 - 162
163 - 255

Multi-County Goods Movement Action Plan
2025 Forecast Rail Volume

0 15 30 60 Miles

N

Sources:
StreetMap 2006
WSA 2006

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ENGINEERS PLANNERS ECONOMISTS

Figure 8

Improvement to mainline rail capacity is included within the project lists stated in the MCGMAP. It includes triple tracking of the BNSF Transcon and double tracking the two UP corridors from Los Angeles to San Bernardino. This project is estimated to cost $2.3 billion, including improvements not entirely within San Bernardino County.

More local to the county, both the UP and the BNSF report capacity constraints in the Cajon Pass. BNSF is constructing a third main track between San Bernardino and the pass summit (at a cost of more than $100 million), which will be completed in 2008. Any improvement to mainline capacity will help to satisfy the regional Action Set to "Relieve Congestion and Increase Mobility".

Grade Separation

Grade separation was also identified as another rail related issue. The Alhambra Line, San Bernardino/Cajon Pass, and Colton Crossing were specific grade separation areas identified.

Alameda Corridor-East Trade Corridor Grade Separations

The Alameda Corridor-East (ACE) carries about three times the cargo of the recently completed Alameda Corridor. The intermodal rail yards receive more international goods by truck from the ports and even more domestically produced goods for movement to the rest of the U.S. ACE carries about 23 percent of the United States' waterborne international trade. It is the only corridor in Southern California that carries both domestic and international goods through the region to and from the rest of the U.S.[2] Table 5 lists the ACE grade separation projects in San Bernardino County, including the associated total funded and unfunded costs.

[2] Los Angeles County Economic Development Corporation (LAEDC). Statement Submitted to Environment & Public Works Committee; September 9, 2002.

Table 5
ACE Grade Separation Projects

Project Description	Total Project Cost	SCHEDULE							
		Prelim. Design/ Environmental		Final Design		Right-of-Way		Construction	
	(Millions)	Time Frame	Est. Cost	Time Frame	Est. Cost	Time Frame	Est. Cost	Time Frame	Est. Cost
PHASE 1 PROJECTS									
Grove Avenue on the Alhambra Line	$ 2.5	Complete	-	Complete	-	Complete	-	Complete	-
Grove Avenue on the Los Angeles Line	$ 12.0	Complete	-	Complete	-	Complete	-	Complete	-
Ramona Avenue on the Alhambra and Los Angeles Lines	$ 15.9	Complete	0.17	Complete	0.80	Complete	3.27	FY07	11.63
Monte Vista Avenue on the Alhambra and Los Angeles Lines	$ 28.9	Complete	0.40	Complete	1.15	FY07	7.64	FY09	19.91
State/University on the Cajon Line	$ 27.5	Complete	0.24	FY06	1.42	FY07	4.10	FY08	21.69
Hunts Lane on the Yuma Line	$ 26.4	FY07	0.45	FY07	1.40	FY08	5.00	FY09	19.55
Milliken Avenue on the Alhambra Line*	$ 55.0	Complete	0.57	FY07	4.43	FY08	0.25	FY09	49.74
* Full funding of Milliken is dependent on OA level									
Phase 1 Total	$ 113.1								
PHASE 2 PROJECTS									
Alhambra and Los Angeles Lines Combined (UP)									
Central Ave.	$ 4.6	FY12	0.06	FY13	0.58	FY13	0.61	FY14	3.39
San Antonio Avenue	$ 31.8	FY11	0.48	FY12	3.98	FY12	4.14	FY13	23.24
Sultana Avenue	$ 25.3	FY13	0.38	FY14	3.16	FY14	3.29	FY15	18.45
Campus Avenue	$ 31.7	FY08	0.48	FY09	3.96	FY10	4.12	FY11	23.13
Alhambra Line (UP)									
Vineyard Avenue	$ 29.8	FY08	0.45	FY09	3.72	FY10	3.87	FY11	21.72
Mt. Vernon Avenue	$ 5.9	FY12	0.09	FY13	0.74	FY13	0.77	FY14	4.32

Table 5
ACE Grade Separation Projects

Project Description	Total Project Cost	SCHEDULE							
		Prelim. Design/ Environmental		Final Design		Right-of-Way		Construction	
	(Millions)	Time Frame	Est. Cost	Time Frame	Est. Cost	Time Frame	Est. Cost	Time Frame	Est. Cost
Los Angeles Line (UP)									
Vine Avenue	$ 25.4	FY13	0.38	FY14	3.18	FY14	3.31	FY16	18.57
Bon View Avenue	$ 25.3	FY11	0.38	FY12	3.16	FY12	3.29	FY13	18.45
Vineyard Avenue	$ 27.0	FY10	0.41	FY11	3.38	FY11	3.52	FY12	19.74
Archibald Avenue	$ 31.2	FY08	0.47	FY09	3.90	FY10	4.06	FY11	22.78
Milliken Avenue	$ 25.8	FY09	0.39	FY10	3.22	FY11	3.35	FY12	18.80
San Bernardino Line (BNSF and UP)									
Valley Boulevard	$ 31.4	FY08	0.47	FY08	3.92	FY09	4.08	FY10	22.89
Laurel Street	$ 27.4	FY09	0.41	FY09	3.42	FY11	3.56	FY12	19.97
Main Street	$ 27.4	FY10	0.41	FY11	3.42	FY11	3.56	FY12	19.97
Olive Street	$ 25.8	FY11	0.39	FY12	3.22	FY12	3.35	FY13	18.80
Mt. Vernon Avenue	$ 43.2	Complete	-	FY08	0.66	Complete	-	FY09	42.50
Other improvements*: E Street, H Street	$ 0.5	FY08	0.01	FY09	0.06	FY09	0.07	FY10	0.37
Cajon Line (BNSF and UP)									
Palm Avenue	$ 26.9	FY08	0.40	FY10	3.36	FY11	3.49	FY12	19.62
Glen Helen Parkway	$ 28.2	FY08	0.42	FY10	3.52	FY11	3.66	FY12	20.56
Ranchero Road	$ 32.5	Complete	-	FY07	4.06	FY08	4.22	FY09	23.71
Vista Road	$ 25.8	FY11	0.39	FY11	3.22	FY12	3.35	FY13	18.80
Hinkley Road	$ 24.5	FY12	0.37	FY13	3.06	FY13	3.18	FY14	17.87
Lenwood Road	$ 26.7	FY08	0.40	FY09	3.34	FY10	3.47	FY12	19.51
Oro Grande	$ 9.6	FY12	0.14	FY14	1.20	FY14	1.25	FY16	7.01
Other improvements*: Indian Trail	$ 0.5	FY07	0.01	FY07	0.06	FY08	0.07	FY09	0.37

Table 5
ACE Grade Separation Projects

Project Description	Total Project Cost	SCHEDULE							
		Prelim. Design/ Environmental		Final Design		Right-of-Way		Construction	
	(Millions)	Time Frame	Est. Cost	Time Frame	Est. Cost	Time Frame	Est. Cost	Time Frame	Est. Cost
Cutoff Line (UP)									
Ranchero Road	$ 24.5	FY11	0.37	FY12	3.06	FY12	3.18	FY13	17.87
Phelan Road	$ 1.0	FY08	0.02	FY08	0.13	FY08	0.13	FY08	0.73
Other improvements*: Johnson Road	$ 0.5	FY08	0.01	FY08	0.06	FY08	0.07	FY08	0.37
Yuma Line (UP)									
Whittier Avenue	$ 0.5	FY08	0.01	FY08	0.06	FY08	0.07	FY08	0.37
Beaumont Avenue	$ 24.5	FY12	0.37	FY14	3.06	FY14	3.18	FY15	17.87
Alessandro Road	$ 25.3	FY10	0.38	FY11	3.16	FY11	3.29	FY13	18.45
Other improvements*: San Timoteo Canyon Road	$ 2.0	FY08	0.03	FY08	0.25	FY08	0.26	FY09	1.46
Phase 2 Total	$ 672.2								
*Not previously indicated for separation, more recent data may indicate otherwise									
Total	**$ 785.3**								

Source: San Bernardino County Improvement Plan. Total costs include 1.6 x escalations over costs in 2001 plan

The ACE project addresses grade separations in the MCGMAP Region. The total cost of the ACE project across multiple counties is over $4 billion. Of this total cost, approximately $800 million or approximately 23 percent is associated with grade separations in San Bernardino County. This grouping of projects will provide more efficient freight rail movements and reduce traffic congestion by eliminating at-grade crossings throughout San Bernardino County and ultimately the entire region. Additionally grade separations will "Accelerate Regional Environmental Mitigation" primarily by reducing emissions from idling automobiles and trucks.

Intermodal Capacity

San Bernardino County currently has a major BNSF intermodal facility in San Bernardino. This facility distributes domestically manufactured Honda automobiles at approximately 132,000 units annually (per Honda North American discussions 2005). The annual output for this BNSF facility is estimated at 750,000 lifts per year (2,600 lifts per acre). For a facility of this size and capacity, local environmental impacts continue to be a concern. Recently, restrictions on train idling times have been sought by the South Coast Air Quality Management District to curb the negative impacts on local air quality at the yard. However, in May of 2007 a federal judge ruled that the regional laws are preempted by federal regulations protecting the free flow of interstate commerce.

Roadway Capacity

Truck volumes are projected to increase in the county with all the associated effects. Table 6 shows truck volume growth derived from model runs on major freeways from 2003 through 2030 conducted by SCAG. Additionally, traffic through the Cajon Pass has become an issue in the region for road transport. A potential project to address this issue would be reversible managed lanes or truck lanes along I-15. The I-15 Comprehensive Corridor Study recommended a near term project to increase capacity at the I-15/I-215 interchange in Devore. This interchange serves as a major bottleneck to both auto and truck flows through the Cajon Pass.

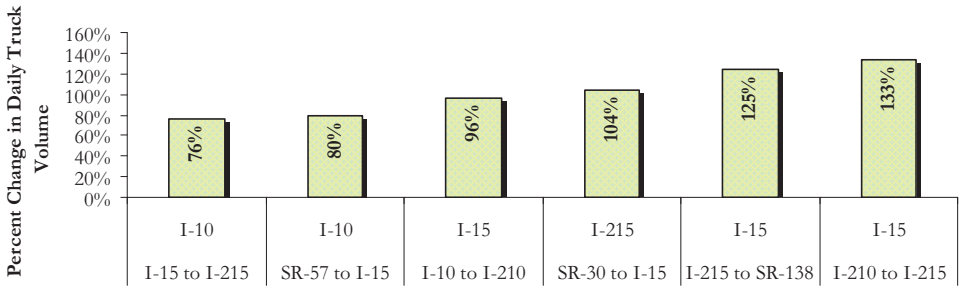
Table 6
Year 2003 and Year 2030 Truck Volumes Derived from Model Runs

Route	Segments	SCAG Model 2003 Truck Volume	SCAG Model 2030 Truck Volume	Percent Change in Daily Truck Volume
I-10	I-15 to I-215	13,112	23,056	76%
I-10	SR-57 to I-15	21,003	37,710	80%
I-15	SR-60 to I-10	11,912	20,228	70%
I-15	I-10 to I-210	11,779	23,068	96%
I-15	I-215 to SR-138	19,690	44,220	125%
I-15	I-210 to I-215	15,487	36,140	133%
I-215	SR-30 to I-15	7,990	16,285	104%

Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006

I-15 will continue to show the highest growth in truck volumes. Figure 9 shows truck growth at more than 75 percent from 2003 to 2030 in San Bernardino.

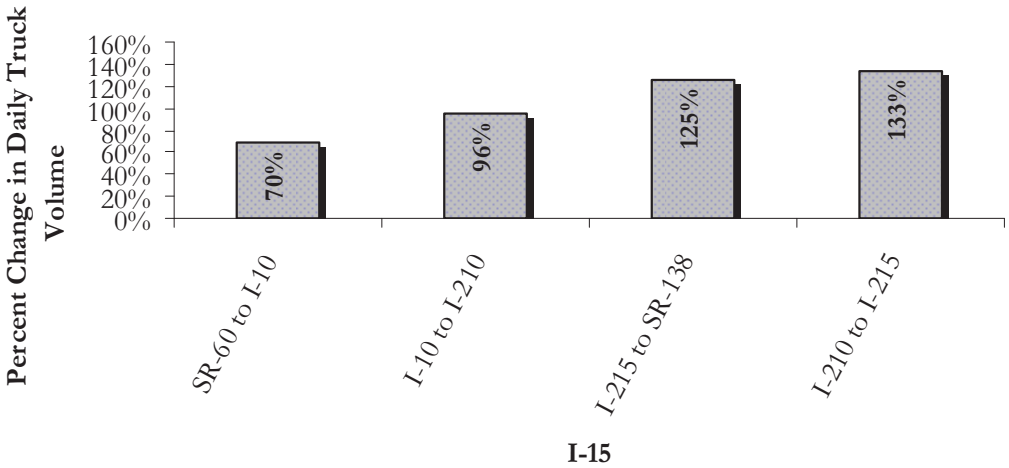
Figure 9
Truck Growth 2003-2030



Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006

I-15 shows more than 50 percent increase in daily truck volumes in all segments of freeway by 2030.

Figure 10
Truck Growth 2003-2030 on I-15



Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006

Table 7 shows the truck volumes on the region's highway system projected for the year 2030.

Table 7
Forecast 2030 Truck Volumes on Region's Highway System

Route	Segments	2030 - Trucks SB/WB	NB/EB
I-10	SR-57 to I-15	20,000	14,700
I-10	I-15 to I-215	14,100	17,500
I-15	I-215 to SR-138	20,100	23,500
I-15	I-210 to I-215	17,200	20,800
I-15	I-10 to I-210	13,900	18,000
I-15	SR-60 to I-10	13,400	12,800
I-215	SR-30 to I-15	9,500	3,300

Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model; Wilbur Smith Associates, 2007.

Goods Movement Projects

The MCGMAP Executive Summary contains a partial list of goods movement projects for San Bernardino County. Table 8 contains a complete listing. The Colton Crossing rail grade separation project is included in the regional list, not the San Bernardino County list, given that it is a regional project. The categories in Table 8 list the general type of project. The application of Intelligent Transportation Systems (ITS) in various locations is needed to improve freeway flow and incident management for all vehicles including trucks. Most of the San Bernardino County projects fall into the category of Freeway Operational/Safety Improvements. Some are mainline projects such as those on I-10, the I-15/I-215 Devore interchange (which includes a capacity increase for a major I-15 mainline bottleneck), SR-58, the proposed High Desert Corridor, and the realignment of US-395 from Adelanto to I-15. The High Desert Corridor would be a new roadway between the Antelope Valley and Victor Valley, with funding coming principally from tolls. A first-phase segment is proposed with primarily public funding between Phantom East and I-15 in Victorville, a project estimated to cost $350 million. A near-term project has also been structured out of the broader I-10 widening project, to include reconstruction of the I-10/Cherry, I-10/Citrus, and I-10 Riverside interchanges and associated auxiliary lanes. A discussion of near-term project priorities is provided near the conclusion of this chapter. Funding issues will be discussed outside of the context of this chapter.

Freeway Interchanges – Warehouse Districts

Freeway interchanges servicing a warehouse district or an inland port facility will likely need improvement to efficiently handle the volume of trucks that the inland port would service. It has not been determined where this inland port will be located, so improvements cannot be assigned to intersections or even counties. San Bernardino County is a potential location, and planners of the system should study interchanges for possible improvement as part of implementation of any inland port.

Air Quality

Much of the air pollution in San Bernardino County is generated from sources to the west. Prevailing winds carry the airborne pollution into the county. Higher concentrations of pollutants occur along rail lines, freeways, and access routes to and from intermodal facilities and warehousing districts. A primary concern of the MCGMAP is the community and environmental effects of poor air quality. Goods movement emissions, primarily a mobile source, are a significant source of pollution in the study area.

The goods movement industry is heavily dependent upon diesel fuel for mobility and operations. As discussed in Tech Memo 5b, diesel fuel results in the emissions of diesel particulate matter (DPM), and have been identified as a toxic air contaminant (TAC) by the state's Office of Environmental Health Hazard Assessment (OEHHA). Diesel fuel is also a significant contributor of nitrogen oxides (NOx), the primary pollutant for ozone formation. Both DPM and NOx are linked to various health issues especially in susceptible populations (the young and the elderly), including people with cancer and asthma, and preterm and low birth weight babies. Due to the current dependency of the goods movement industry on diesel fuel, the spotlight of this Action Plan is emission reduction.

Goods movement in San Bernardino County contributes to the air quality problem. However, projects that assist in congestion mitigation will assist in air quality improvement. Air quality improvement strategies need to be addressed at a more regional level

Table 8
MCGMAP Projects San Bernardino County

Category	County	Description	Cost (Millions)
Application of ITS Technology for Vehicle Management and Routing	SBD	I-10 and I-215 from On I-10 from 0.1 km w/o I-215 (PM 23.6) to 0.9km e/o SR-38 (PM 31.4) to On I-215 from Riverside County Line (PM 0.0) to Jct I-10/I-215 (PM 4.03) - Install Fiber Optic Communications (FOC) backbone system, Changeable message signs (CMS), Ramp metering stations (RMS), modify existing communication hub, CCTV, VDS, TOS Cabinets; widen on-ramps on I-10 and I-215; add aux lanes on I-10 (various locations).	$9.5
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 from 0.1 km e/o I-15 (PM 9.9) to 0.4 km e/o I-215 (PM R24.5) - Install RMS, CCTV ESU; widen entrance ramps from 1 to 2 lanes at: EB & WB at Cherry Ave, Citrus Ave, Cedar Ave, Riverside Ave and Mt Vernon Ave; WB at Rancho Ave; EB at 9th St.	$9.2
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 - widening and interchange improvements, Los Angeles County Line to I-215.	$700

Table 8
MCGMAP Projects San Bernardino County

Category	County	Description	Cost (Millions)
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 from 0.8 km e/o Etiwanda Ave OC (PM 11.6) to 1.5 km w/o Riverside Ave OC (PM 19.1) - In Fontana widen exit ramps from 1 to 2 lanes at Cherry Ave, Citrus Ave, & Cedar Ave IC to accommodate proposed aux lanes at Cherry Ave IC E/B aux lane PM 11.99/12.85, W/B Aux lane PM 13.38/13.68; Citrus Ave IC E/B aux lane only PM 14.58/14.88; Cedar Ave IC E/B aux lane PM 17.36/17.83, W/B aux lane PM 18.94/19.41.	$19.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 EB from Live Oak Canyon Rd to SB County Line – Truck Climbing Lane	$40.0
Freeway Operational/Safety Improvements	SBD	I-10 WB from Yucaipa Bl to Ford St - Add 1 MF lane westbound.	$30.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	SR-60 from Ramona Ave. to I-15 - add auxiliary lanes	$71.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-15 – SR-60 to I-10 Widen Freeway	$100.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-15 Widening and Devore Interchange (at I-215) Reconstruction	$200.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	SR-60 / Ramona Interchange Reconstruction	$26.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	SR-60 / Euclid Interchange Reconstruction	$5.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	SR-60 / Grove Interchange Reconstruction	$43.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	SR-60 / Vineyard Interchange Reconstruction	$43.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	SR-60 / Archibald Interchange Reconstruction	$6.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Monte Vista Interchange Reconstruction	$25.0

Table 8
MCGMAP Projects San Bernardino County

Category	County	Description	Cost (Millions)
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Grove/4th Interchange Reconstruction	$67.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Cherry Interchange Reconstruction	$43.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Beech New Interchange	$40.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Citrus* Interchange Reconstruction	$47.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Cedar Interchange Reconstruction	$33.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Riverside Interchange Reconstruction	$50.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Pepper Interchange Reconstruction	$33.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Mt. Vernon Interchange Reconstruction	$31.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Tippecanoe Interchange Reconstruction	$50.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Mt. View Interchange Reconstruction	$50.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / California Interchange Reconstruction	$43.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 / Alabama Interchange Reconstruction	$26.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-15 / 6th/Arrow Interchange Reconstruction	$36.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-15 / Joshua Interchange Reconstruction	$1.0

Table 8
MCGMAP Projects San Bernardino County

Category	County	Description	Cost (Millions)
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-15 / Bear Valley Interchange Reconstruction	$20.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-15 / La Mesa-Nisqualli Interchange Reconstruction	$72.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-215 / University Interchange Reconstruction	$29.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-215 / Pepper/Linden Interchange Reconstruction	$50.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-215 / Palm Interchange Reconstruction	$10.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	SR-210 / 5th Interchange Reconstruction	$17.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	SR-58 PM 21.8/31.0 Near Hinkley from 1.4 miles /wo Valley View Rd. to 0.Kern Co. Line to 7.5 miles E/O JCT US-395. Construct 4 lane expressway. (2-4 lanes) (Phase 2)	$93.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	SR-58 PM 0.0/12.9 Kern Co. Line to 7.5 miles E/O JCT US-395. Construct 4 lane expressway.	$152.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	US-395 from Adelanto to I-15 - realign on new route to carry trucks and through traffic	$670.0
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	High Desert Corridor - Construct new roadway between Antelope Valley and Victor Valley (First phase from Phantom East to I-15 - $350 million)	$5,600 mostly toll-funds except Phase 3
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-15 at Foothill Blvd (SR-66) - Add 400m deceleration lane on NB I-15 and widen NB off-ramp from 1 to 2 lanes.	$0.7
Freight Corridor Capacity Enhancement and Operational Improvements	SBD	I-10 widening and interchange improvements (LA County Line to I-215)	$700.0
Intermodal Yards / Facilities	SBD	Southern California Logistics Airport Track and intermodal yard improvements	$278.5 (private funding)

Table 8
MCGMAP Projects San Bernardino County

Category	County	Description	Cost (Millions)
Intermodal Yards/ Facilities	SBD	Build new BNSF Intermodal Yard in Victorville	TBD
Application of ITS Technology for Vehicle Management and Routing	SBD / RIV	Electronic Clearance/Pre Pass Program for Inland Empire ITS	$2.0

Source: Wilbur Smith Associates, 2007

The Future

The county also discussed the future configuration of its goods movement system. It was indicated that dedicated freight guideway/regional truck lanes could be a step towards a high speed/high volume freight corridor. This system may or may not use freeways for access between the ports and an inland warehouse district that would receive the freight. Instead, the corridor may follow utility easements. The Action Plan cannot fully address this issue, as the technology to move the goods has not yet been developed. However, the plan recognizes the issue and has projects including the following that examine related issues:

- Shuttle train intermodal service to Inland Empire - Inland Terminal
- Evaluation of Alternative Rail Technologies
- Evaluation of Longer Combination Vehicles (LCVs) on Dedicated Facilities

Planners need to recognize that the system developed in the near term should also be designed to facilitate a system for the distant future. Further future development would occur through additional studies. The ultimate cost of this system has yet to be determined and may expand as new technologies develop and old technologies diminish. The benefits of the system will outweigh the costs if:

- Environmental mitigation is accelerated
- Mobility is improved and goods flow more freely through the region
- Operation is efficient
- The costs are shared equitably between the public and private sector

County Actions

The county projects have been presented in Table 8. Most of the projects on the list relate directly to "Relieve Congestion and Increase Mobility". Indirect effects would "Accelerate Regional Environmental Mitigation".

Discussions indicate that some of the key county goods movement projects are:

- I-15/I-215 Devore Interchange reconstruction
- I-10 auxiliary lanes and interchanges
- Alameda Corridor East railroad grade separation (eight projects have been prioritized)
- High Desert Corridor Phase I from Phantom East to I-15
- SR-58 between Hinkley and Barstow

Conclusions

Current and future projects and actions of San Bernardino County fall within the four action sets of the MCGMAP. The purpose of this section is to show a relationship between county projects and the recommended primary actions of the MCGMAP. The four action sets in the MCGMAP are:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility
- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

A brief description of each action set and how it relates to county activities and projects is provided below.

Action Set 1: Accelerate Regional Environmental Mitigation seeks to mitigate environmental impacts at three levels. The levels are a broad regional approach, regional conformity, and project specific mitigation. The regional approach is for broad strategic policies/efforts focusing on further reducing region-wide impacts. Regional conformity holds emissions to caps set in various plans through aggressive actions by implementing known technologies and best practices. The project specific mitigation requires project sponsors to consider and disclose environmental impacts when planning projects and to address how potential impacts will be resolved. This is specified in the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

The freeway lane and capacity improvements as well as the operational/safety improvements in the San Bernardino project list shown in Table 8 will improve mobility and therefore reduce mobile source emissions. These will assist San Bernardino County to continue to meet conformity goals. The projects may have local impacts that are not addressed within this regional goods movement framework.

Action Set 2: Relieve Congestion and Increase Mobility focuses on improving all aspects of the transportation system to improve region-wide mobility and safety. Specifically, the action set seeks to:

- Increase intermodal lift capacity
- Increase mainline rail capacity
- Grade separate railroad crossings
- Improve highways through comprehensive innovative approaches
- Continue with general purpose highway improvements/ safety and operational improvements

The freeway projects, the mainline rail improvements, and the intermodal facilities/yards will provide market segmented relief and increased mobility. All modes of freight transport to one degree or another benefit from these projects. The construction of railroad grade crossings will help reduce the delay caused by the daily traffic at the thoroughfares.

Action Set 3: Improve Operational Efficiency addresses two categories of actions. These are:

- Improve marine terminal productivity, truck turn times, and intermodal operations
- Improve highway operations through new technologies

These improvements would make the most of existing infrastructure by making the utilization more efficient. Projects like improving freeway capacity and grade separations are intertwined, thus leading to improved operational efficiency.

Action Set 4: Develop Equitable Public/ Private Funding Strategy recognizes that implementation of the actions, projects, and programs with the associated mitigations will require a coordinated effort by the private and public sectors. The action set seeks to:

- Maximize the Study Area's Fair Share of State and Federal Funds
- Identify Opportunities for Project-Specific User Fees
- Establish Institutional Structure for Managing User Fees and Revenues
- Initiate Supportive Legislation

San Bernardino is addressing these issues.

All the projects in the county ultimately are designed to insure that Southern California maintains if not enhances its economic position. Maintenance of the regions economic vitality will be enhanced by the actions being taken in San Bernardino County.

Multi-County Goods Movement Action Plan

San Diego County Action Plan

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
San Diego Association of Governments

Prepared by:

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April 30, 2008

Table of Contents

INTRODUCTION **1**
- **Purpose** **1**
- **Background** **2**
- **Role** **4**
  - Trade with Mexico 4
  - Maquiladora Program 8
  - Port of San Diego 8
  - Air Cargo 9
  - Rail 9
  - Trucks 12
  - Warehousing 15

COUNTY SPECIFIC ISSUES **16**
- **Mexico Trade Issues** **16**
  - Border Backlogs 16
- **Expansion in Mexico** **21**
- **Maquiladora** **21**
- **Mexican Port Expansion** **21**
- **Rail** **22**
- **Port** **23**
- **Pipeline** **23**
- **Air** **24**
- **Funding** **25**
  - Funding Challenges and Economic Impacts for Goods Movement Projects 27

COUNTY ACTIONS **28**
- **Trade Corridor Infrastructure Fund (TCIF)** **31**

CONCLUSIONS **32**

List of Tables

Table 1 – Total Trade Billions of U.S. Dollars 6
Table 2 – San Diego County 2006 Truck ADT 13
Table 3 – San Diego County 2006 Truck ADT Over 10,000 15
Table 4 – Uncertainty and Customs Operations 16
Table 5 – Cross-Border Freight – Economic Impacts Due to Delays at the Border for San Diego County, the State of California and the United States (in Millions of 2005 Dollars) 17
Table 6 – Cross-Border Freight – Economic Impacts Due to Delays at the Border for Baja California and Mexico (in Millions of 2005 Dollars) 19
Table 7 – MCGMAP Preliminary Projects/Strategies and System Improvements 20
Table 8 – Major Revenue Sources/Revenue Constrained Scenario 26
Table 9 – MCGMAP Projects San Diego County 28
Table 10 – Adopted Program of Projects San Diego Border Region 32

List of Figures

Figure 1 – Multi-County Goods Movement Action Plan San Diego County 3
Figure 2 – Multi-County Goods Movement Action Plan Border Area 5
Figure 3 – California/Mexico Distribution of Trucks 7
Figure 4 – Multi-County Goods Movement Action Plan Rail Lines 11
Figure 5 – 2003 Percentage of Truck VMT in the MCGMAP Study Area by County 12
Figure 6 – Major Revenue Sources/Revenue Constrained Scenario ($35.7 Billion) 25
Figure 7 – Project Estimated Costs by Infrastructure Categories 30

Introduction

Purpose

This report outlines a Goods Movement Action Plan for San Diego County, California, part of a broader Multi-County Goods Movement Action Plan (MCGMAP) developed collectively by the Los Angeles County Metropolitan Transportation Authority (Metro), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), San Diego Association of Governments (SANDAG), Ventura County Transportation Commission (VCTC), Southern California Association of Governments (SCAG), and the California Department of Transportation (Caltrans). The MCGMAP contains strategies to support the efficient movement of goods without disproportionately impacting local communities, neither the environment, nor the transportation network. The MCGMAP is also a regional framework for goods movement initiatives.

This report examines the key issues that impact San Diego County from a goods movement standpoint. It examines the plans and proposals that are being pursued to resolve the stated issues, and new specific actions and strategies that should become a focus for the county. It is important to note that this report builds on a large body of work that has been researched and developed over the past few years, all of which collectively address a comprehensive range of goods movement issues.

The Multi-County Goods Movement Action Plan has recommended four primary action sets for goods movement within the region. The action sets are:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility
- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

Current and future projects, relationships, and activities of San Diego County address these four primary action sets. The document concludes with an explanation of how the county's activities support these four action sets.

Other efforts will likely address new and existing issues as they arise. This report is intended to focus on specific actions to address the most significant goods movement issues for the county that have been presented to date. This report is not intended to be a full and complete glossary of every issue.

Background

The following is a list of goods movement studies the county has participated in:

- San Diego Regional Goods Movement Plan, November 2007
- Port of San Diego Freeway Access Study, October 2007
- Interstates 805 South Corridor Study, June 2005
- I-15 Transportation Concept Report, September 2000
- Transportation Concept Report- Interstate 5, May 1997

In addition San Diego County has had a history of Mexican border studies. Reports furnished for the MCGMAP include:

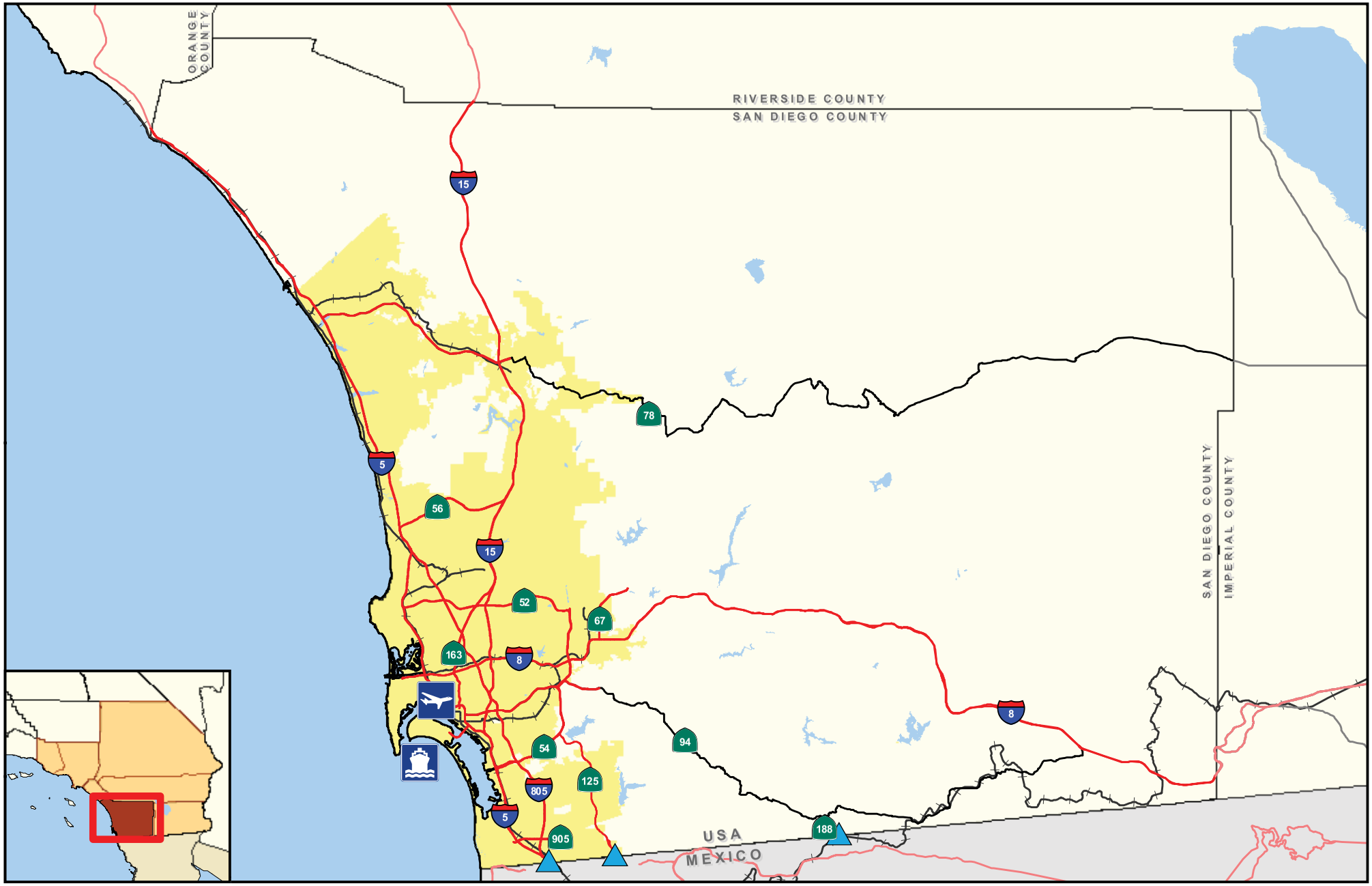
- California – Baja California Border Report, May 2006
- Economic Impact of Wait Times at the San Diego-Baja California Border, January 2006
- Feasibility of Opening an International Border Crossing at Jacumba – Jacume, June 2000

A map showing San Diego County and major infrastructure features is presented in Figure 1. San Diego County is in the southwest corner of the region. The county borders Orange County to the northwest, Riverside County to the northeast, Imperial County to the east, and Mexico to the south.

The three major freight contributors to the goods movement system in San Diego are the Port of San Diego, the San Diego Airport, and the ports of entry (POE) with Mexico. The ports of entry are San Ysidro, Otay Mesa, and Tecate. Otay Mesa East is a planned new POE.

The county's one major rail route comes down the coast from the north. This 62 mile stretch of track is owned by the Burlington Northern and Santa Fe (BNSF) Railway. The southern terminus is near the Port of San Diego. The San Diego and Imperial Valley (SDIV) railroad is a Class II Carrier and has been the freight operator on San Diego and Arizona Eastern (SDAE) railway since 1984. In 2001 the Carrizo Gorge Railway (CZRY) took over operations between Tijuana and Tecate, Mexico, and in 2002 was granted a contract to repair and operate the Desert Line linking with the Union Pacific (UP) Railroad in the Imperial Valley.

The Interstate highways in San Diego County are I-5, I-8, I-15, and I-805. Limited access state routes are the SR-52, SR-54, SR-56, SR-67, SR-78, SR-94, SR-125, SR-163, and SR-905. The flow of goods in the county is much more north-south than east-west. The infrastructure for the county is primarily in the western third of the county with only one major infrastructure feature crossing the eastern boundary with Imperial County. I-8 is the only feature with significant capacity that extends beyond the western third of the county.



Airport
Port
Freeway
Highway
Railroad
Port of Entry
Urban Area
Mexico

Multi-County Goods Movement Action Plan
San Diego County

0 10 20 30 40 Miles

N

Sources:
SANDAG, SanGIS,
Caltrans District 11

Figure 1

Role

In 2006, the San Diego Customs District reported more than $33 billion in international trade goods passed through the San Diego gateway. The U.S. – Mexico POE accounted for $28.6 billion and the two maritime terminals of the Port of San Diego accounted for $9 billion. The growth rate of trade at the San Diego Customs District is expected to parallel that of the Los Angeles District[1].

Trade with Mexico

The principal role of San Diego County is as a port of entry for Mexico. The border's total length is 1,951 miles (3,141 km), according to figures given by the International Boundary and Water Commission[2]. The California border is approximately 142 miles and San Diego County's border is approximately 60 miles.

San Diego County's border is the most frequently crossed international border in the world, with some 350 million people crossing legally every year[3]. In California, San Diego County shares the role of port of entry with Imperial County. Of goods imported and exported from Mexico that pass through San Diego and Imperial County POEs, 57 percent originate in California outside the two border counties, 21 percent originate from somewhere else in the U.S., and 22 percent are from San Diego and Imperial Counties. San Diego is the dominant partner of the trade with 70 percent of the Mexican freight[4].

In 2006, approximately $29.8 billion in trade was handled by the Otay Mesa and Tecate POEs in San Diego County. Caltrans projects that the two million trucks crossing the border in 2003 will increase to 3.1 million trucks in 2010 and 5.6 million trucks by 2030[5].

The border POEs and additional border features are presented in Figure 2.

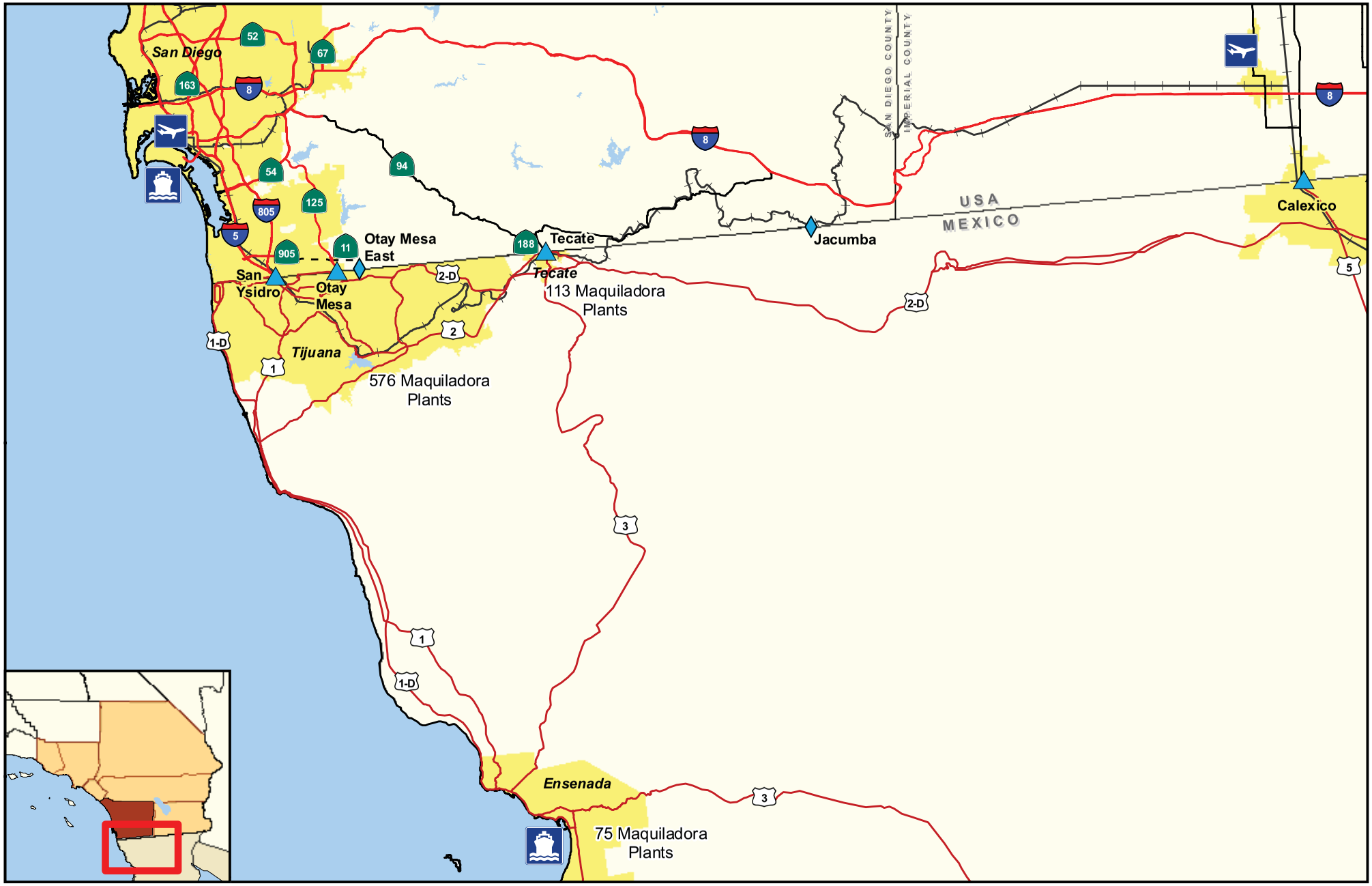
[1] Pathways For The Future: 2030 San Diego Regional Transportation Plan, November 2007, p. 6-37.

[2] The International Boundary and Water Commission, Its Mission, Organization and Procedures for Solution of Boundary and Water Problems.

[3] Borders and Law Enforcement. U.S. Embassy Mexico.

[4] Caltrans – District 11 California/Mexico Briefing – March, 2004.

[5] Pathways For The Future: 2030 San Diego Regional Transportation Plan, November 2007, p.6-38.



Airport
Port
Railroad
Mexico Federal Highway
U.S. Limited Access
U.S. Highway
Existing Port of Entry
Proposed Port of Entry
Urban Area

Multi-County Goods Movement Action Plan
Border Area

0 10 20 30 40 Miles

N

Sources:
SANDAG, SanGIS,
Caltrans District 11

Figure 2

In 1999, Mexico surpassed Japan to become California's top export trade market. Mexico was second in total trade with the U.S., but is now third because China surpassed it as of 2006; however, the numbers are very close.

Table 1
Total Trade
Billions of U.S. dollars

	2004	2005	2006
Canada	445.43	499.29	533.67
Mexico	266.62	290.25	332.43
China	231.42	285.30	343.00
Japan	183.62	193.50	207.74

Source: U.S. Census Bureau, Foreign Trade Statistics, <http://www.census.gov/foreign-trade/top/index.htm>

Agreements with Mexico on trade include the 1987 General Agreement on Tariffs and Trade (GATT), and the North American Free Trade Agreement (NAFTA) ratified in 1993. In 1993, California identified a NAFTA Network (NAFTA-Net) of critical transportation corridors serving trade and traffic through POEs between California and Baja California[6].

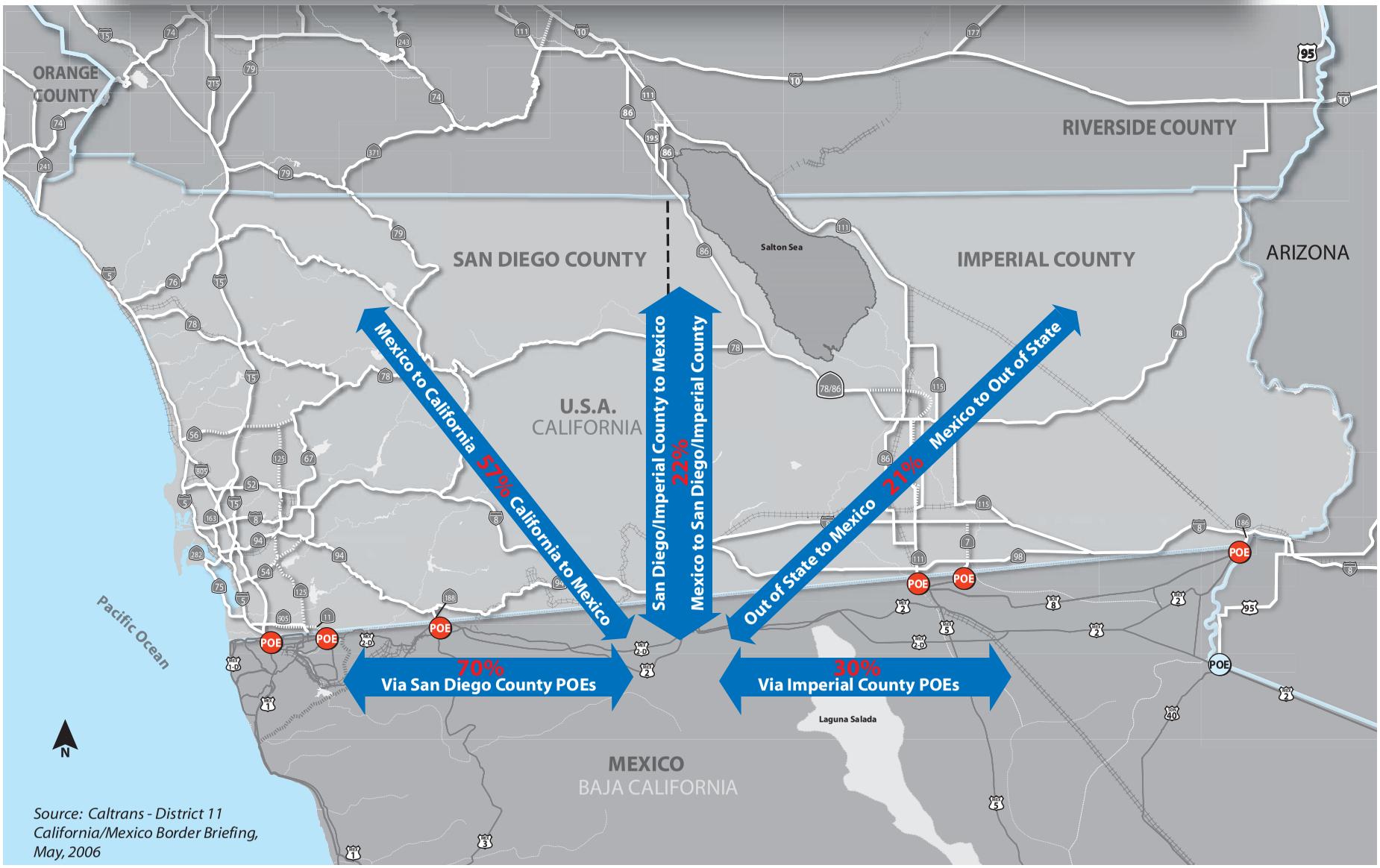
The network:

- Facilitates the movement of goods , services and information
- Insures a safe, efficient and secure cross border trucking
- Accommodates recent and anticipated growth in border related movement[7]

In the NAFTA-Net Fact Sheet of 1998, Caltrans identified the transportation corridors in San Diego which comprise the network[8]. These corridors will be the principal conduit for movement of goods and people as overall demand for transportation increases in and out of the state. The Fact Sheet identified SR-905, SR-125, SR-188, and SR-94 in San Diego County as part of the network. Additional freeways are shown in the California – Baja California Border Report. Figure 2 includes I-5, I-8, SR-11, I-15, SR-163, and I-805. Figure 3 reflects the highway network as well as the truck distribution flows at the border region, as shown in the California – Baja California Border Report.

[6] Caltrans – District 11 California/Mexico Briefing – March, 2004
[7] California – Baja California Border Report, May 2006 p. es-iii.
[8] State of California - business, transportation and housing agency, Department of Transportation, fact sheet NAFTA NET, March 1998.

CALIFORNIA/MEXICO DISTRIBUTION OF TRUCKS



Source: Caltrans - District 11 California/Mexico Border Briefing, May, 2006

Figure 3

Maquiladora Program

The majority of the trade with Mexico is associated with the maquiladora manufacturing plants. A maquiladora or maquila is a factory that imports materials and equipment on a duty-free and tariff-free basis for assembly or manufacturing and then re-exports the assembled product; usually back to the originating country. The term "maquiladora", in the Spanish language, refers to the practice of millers charging a "maquila" or "miller's portion" for processing other people's grain[9].

"Maquiladora" is primarily used to refer to factories in Mexican towns along the United States–Mexico border, but increasingly is used to refer to factories all over Latin America. Maquiladora factories encompass a variety of industries including electronics, transportation, textile, and machinery among others. Maquiladoras are 100 percent foreign-owned (usually by U.S. subsidiary companies) in most countries. Other countries such as Japan, Germany, and Korea have maquiladoras as well, but the majorities of them are located in Mexico and are associated with U.S. companies[10].

Truck trips have increased steadily since 1997. This increase is mainly due to growth in the maquiladora industry along the California/Baja California Border. The number of maquiladora plants has grown from 178 to nearly 900, a 400 percent increase since 1978[11].

Port of San Diego

The port's two marine cargo facilities are Tenth Avenue Marine Terminal (TAMT) and National City Marine Terminal (NCMT). Both cargo terminals have on-dock rail facilities for rapid transfer of cargo to rail. In 2006, the two terminals handled approximately 3.5 million tons of cargo worth more than $9 billion[12].

TAMT is a 96 acre multi-purpose facility offering modern dockside cool/frozen storage, break-bulk, dry/liquid bulk, small scale container operations, and warehousing services.

Principal inbound cargoes are refrigerated commodities, fertilizer, cement, break-bulk commodities, and forest products (including newsprint, cut paper, and cut sheet stock). Primary export cargoes include refrigerated cargo, break-bulk, and bulk commodities.

A state-of-the-art bulk loader is located at this terminal. The loader is used to export soda ash, sodium sulfate, borax, pyroborates, bicarbonate of soda and other bulk commodities.

In the past four years, total bulk tonnage has steadily increased from 157,000 metric tons to 744,000 metric tons annually. The National City Marine Terminal is a 125 acre complex and a

[9] Wilson, Patricia A. Exports and Local Development: Mexico's New Maquiladoras. p. 139.
[10] Hampton, Elaine. Globalization Legacy: A View of U.S. Factory Involvement in Mexican Education. p. 2.
[11] California – Baja California Border Report, May 2006 p. es-i.
[12] Pathways For The Future: 2030 San Diego Regional Transportation Plan, November 2007, p. 6-38.

primary port of entry for Honda, Acura, Volkswagen, Isuzu, Mitsubishi Fuso, and Hino Motors vehicles.

The terminal is capable of handling well over 500,000 vehicles per year. In 2007, approximately 400,000 motor vehicles were handled at NCMT for U.S. distribution.

Another primary commodity handled at this terminal is lumber, transported by barge and break bulk ships from the Pacific Northwest. The port has also handled export cattle and containers at the terminal.

Ship capacity at the Port of San Diego's NCMT needs to be expanded due to growing auto imports. Additional berth space will allow for two 700-foot car carrying vessels to berth simultaneously.

An aggressive international marketing effort is increasing cargo activity. The goal of the Maritime team is to attract niche cargoes, project cargo, maquiladora containers, vehicles, dry bulk commodities, liquid bulk, and year-round cold storage cargo. Target areas/countries include Latin America, Mexico, Pacific Rim/Southeast Asia, Australia, New Zealand, and Canada[13].

Air Cargo

California's Global Gateway Development Program (GGDP) identifies San Diego International Airport (SDIA) as one of the priority air cargo gateways in California. Most air cargo in San Diego County is handled by SDIA. Air cargo activity has grown rapidly at SDIA, increasing at an average rate of 8.5 percent through 2000; slowing to a more moderate 4.3 percent annual rate. In 2005, SDIA handled more than 167,000 tons[14]. Air cargo projections are between 487,000 to 622,000 tons by 2030[15].

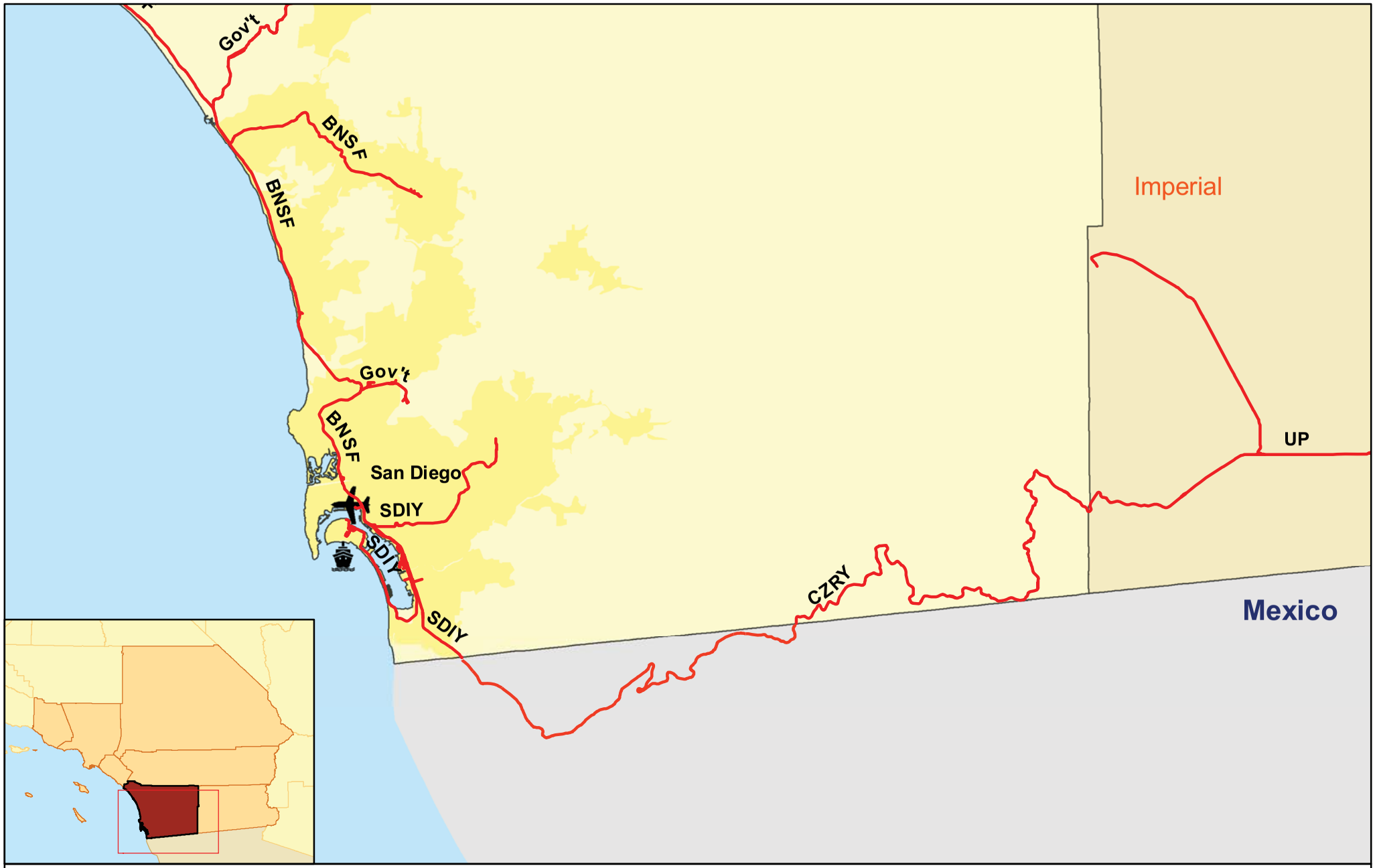
Rail

BNSF is the major carrier in the county and its mainline extends from the border with Orange County down the coast to National City. The port of San Diego is the major freight supplier. In 2004 BNSF moved 2.8 million tons of freight and increase of 23.3 percent over 2003. BNSF also has a branch line between Escondido and Oceanside.

San Diego and Imperial Valley Railroad (SDIV) is a shortline operator on the San Diego and Arizona Eastern Railway track in the U.S. The Carrizo Gorge Railway (CZRY) is the SD&AE's operator in Mexico and the Imperial Valley. The SD&IV has been owned and operated by RailAmerica since 2000; it had been previously owned by RailTex (which RailAmerica acquired) and operated with the SDIV.

[13] Port of San Diego 2006, <http://www.portofsandiego.org/sandiego_maritime/ms_factsheetinfo.asp>
[14] Pathways For The Future: 2030 San Diego Regional Transportation Plan, November 2007, p. 6-37.
[15] SANDAG RTP 2006 Financial Constrained Update.

The SDIV operated at one time on two lines but today operates on only one. At one time it operated from San Diego to Plaster City via Mexico, but today that line is operated by the Carrizo Gorge Railway. The SDIV still operates the San Diego to El Cajon Line. The railroad interchanges with the BNSF Railway operations in San Diego. Rail lines in San Diego County and the border area are shown in Figure 4.



Airports
Ports
Railroad
Urban Areas
Mexico

Multi-County Goods Movement Action Plan
Rail Lines

0 10 20 40 Miles

N

WilburSmith ASSOCIATES ENGINEERS PLANNERS ECONOMISTS

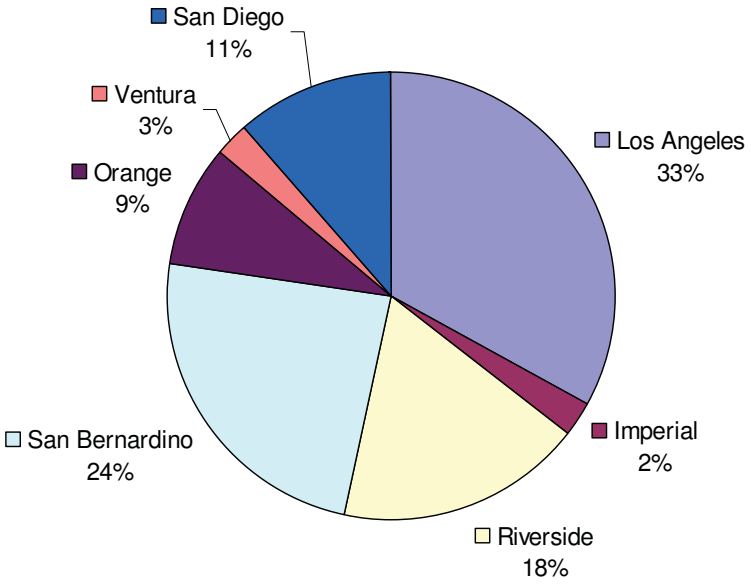
Sources:
StreetMap 2006
www.carrizogorgerailway.com

Figure 4

Trucks

Trucking volumes in San Diego County ranks 4th in the study area measured in terms of truck miles of travel (VMT). Truck VMT in 2003 was approximately 875 million, indicating truck volumes are significant. Figure 5 shows percentage of truck VMT in the study area by county.

Figure 5
2003 Percentage of Truck VMT in the MCGMAP Study Area by County



Source: Truck Miles of Travel: California State Highway System 1988-2003, Caltrans 2005.

The following is a table of truck ADT along interstate and state routes at various locations. The locations are defined by the intersecting highway.

Table 2
San Diego County
2006 Truck ADT

Route	Junction	Truck ADT
I-5	SOUTH JCT. RTE. 805	1,976
I-5	JCT. RTE. 75 WEST	5,883
I-5	8TH STREET	9,500
I-5	JCT. RTE. 15 NORTH	10,300
I-5	JCT. RTE. 8/ROSECRANS	8,651
I-5	SAN DIEGO, JCT. RTE. 274	7,913
I-5	JCT. RTE. 78 EAST	9,797
I-5	BASILONE ROAD	10,500
I-8	JCT. RTES. 5/209	5,516
I-8	SAN DIEGO, JCT. RTE. 163	6,412
I-8	SAN DIEGO, JCT. RTE. 805	6,944
I-8	JCT. RTE. 15	7,920
I-8	GREENFIELD DRIVE	6,072
I-8	JCT. RTE. 79 NORTH, JAPATUL VALLEY ROAD	3,240
I-8	JCT. RTE. 94 SOUTH	1,970
I-15	JCT. RTE. 94	6,528
I-15	JCT. RTE. 8	10,590
I-15	JCT. RTE. 163	10,966
I-15	SAN DIEGO, MIRAMAR/ POMERADO ROADS	10,942
I-15	SAN DIEGO, POWAY ROAD	18,105
I-15	ESCONDIDO, SOUTH JUNCTION OF CENTRE CITY	13,135
I-15	VALLEY PARKWAY	13,206
I-15	SAN DIEGO/RIVERSIDE COUNTY LINE	8,573
SR-52	JCT. RTE. 5	3,168
SR-52	SAN DIEGO, GENESEE AVENUE	3,036
SR-52	JCT. RTE. 805	3,007
SR-52	SANTO ROAD	1,976
SR-54	JCT. RTE. 805	3,042
SR-54	REO DRIVE	2,223
SR-54	JCT. RTE. 94	2,340
SR-67	BRADLEY AVENUE	5,427
SR-67	WINTER GARDEN BOULEVARD	1,428
SR-67	POWAY ROAD	2,024
SR-67	RAMONA, JCT. RTE. 78	1,740
SR-75	SAN DIEGO, JCT. RTE. 5	2,160
SR-75	CORONADO, POMONA AVENUE	485
SR-75	JCT. RTE. 282	874

Table 2
San Diego County
2006 Truck ADT

Route	Junction	Truck ADT
SR-75	JCT. RTE. 5	2,128
SR-76	JCT. RTE. 5	2,288
SR-76	JCT. RTE. 15	3,375
SR-76	VALLEY CENTER ROAD	1,677
SR-76	JCT. RTE. 79	194
SR-78	OCEANSIDE, EL CAMINO REAL	5,294
SR-78	VISTA, MELROSE DRIVE	5,236
SR-78	ESCONDIDO, JCT. RTE. 15	4,718
SR-78	ESCONDIDO, CENTRE CITY PARKWAY	4,187
SR-78	ESCONDIDO ASH STREET	1,740
SR-78	BANDY CANYON ROAD	931
SR-78	JCT. RTE. 67 SOUTHWEST	1,359
SR-78	WEST JCT. RTE. 79	342
SR-78	EAST JCT. RTE. 79	996
SR-79	JCT. RTE. 8	413
SR-79	JCT. RTE. 78	102
SR-79	JCT. RTE. 76 WEST	366
SR-94	BEGIN RTE AT JCT RTE 5 and EB ON FR0M "G"	4,032
SR-94	SAN DIEGO, JCT. RTE. 805	7,293
SR-94	JCT. RTE. 125	5,328
SR-94	AVOCADO BOULEVARD	2,850
SR-94	JCT. RTE. 188 SOUTH	548
SR-94	JCT. RTE. 8	141
SR-125	EAST JCT. RTE. 94	6,468
SR-125	JCT. RTE. 8	1,826
SR-163	JCT. RTE. 5	3,300
SR-163	SAN DIEGO, JCT. RTE. 8	5,661
SR-163	SAN DIEGO, JCT. RTE. 805	6,031
SR-188	JCT. RTE. 94	659
I-805	SAN DIEGO, JCT. RTE. 5	2,255
I-805	TELEGRAPH CANYON ROAD	10,614
I-805	JCT. RTE. 54	14,700
I-805	SAN DIEGO, JCT. RTE. 15	13,620
I-805	JCT. RTE. 8	12,415
I-805	SAN DIEGO, JCT. RTE. 163	12,805
I-805	JCT. RTE. 52	12,958
SR-905	SAN DIEGO, JCT. RTE. 5	3,680
SR-905	JCT. RTE. 805	4,293

Table 2
San Diego County
2006 Truck ADT

Route	Junction	Truck ADT
SR-905	SIEMPRE VIVA ROAD	3,669

Source: SANDAG 2006

Table 3 presents those locations that have greater than 10,000 Truck ADT.

Table 3
San Diego County
2006 Truck ADT over 10,000

Route	Junction	Truck ADT
I-15	SAN DIEGO, POWAY ROAD	18,105
I-805	JCT. RTE. 54	14,700
I-805	SAN DIEGO, JCT. RTE. 15	13,620
I-15	VALLEY PARKWAY	13,206
I-15	ESCONDIDO, SOUTH JUNCTION OF CENTRE CITY	13,135
I-805	JCT. RTE. 52	12,958
I-805	SAN DIEGO, JCT. RTE. 163	12,805
I-805	JCT. RTE. 8	12,415
I-15	JCT. RTE. 163	10,966
I-15	SAN DIEGO, MIRAMAR/ POMERADO ROADS	10,942
I-805	TELEGRAPH CANYON ROAD	10,614
I-15	JCT. RTE. 8	10,590
I-5	BASILONE ROAD	10,500
I-5	JCT. RTE. 15 NORTH	10,300

Source: SANDAG 2006

Truck ADT is highest along the I-805 and I-15. There are only two intersections with over 10,000 Truck ADT on the I-5. The high volume locations would strongly suggest that they are not port or airport generated, they are border generated.

Warehousing

Warehousing and industrial land uses in San Diego County are concentrated at the border region. The facilities are typically in the 50,000 SF range.[16].

[16] MCGMAP Task 3 Warehouses 2.doc.

County Specific Issues

San Diego formed a freight working group in 2005 to address goods movement issues. The Regional Freight Working Group (FWG) is comprised of local freight agency planning staff. The FWG provides input and assistance to SANDAG in the development of a Regional Freight/Intermodal Strategy. The Regional Freight Working Group will report to the SANDAG Transportation Committee. FWG membership consists of one representative from the San Diego County Regional Airport Authority, U.S. Department of Homeland Security – Custom and Border Protection Division, Metropolitan Transit System, North County Transit District, San Diego & Arizona Eastern Railway, San Diego Unified Port District, Caltrans; Kinder Morgan (a private pipeline company), and SANDAG[17].

Mexico Trade Issues

Border backlogs

A reduction of border backlogs and bottlenecks is the top goods movement need in San Diego County. Limited gate capacity restricts the flow of freight through the border resulting in serious delays.

In 2005, inadequate infrastructure capacity created traffic congestion and delay that cost the U.S. and Mexican economies an estimated $6 billion in gross output. Investment potential with the trucking industry is also curbed due to increasing delays at the border. Without improvements border delays will keep growing and the losses will more than double in the next ten years[18].

The cost per crossing is presented below.

Table 4
Uncertainty and Customs Operations

Type of Cost	Minimum Cost	Maximum Cost
Primary Inspection	$364.00	$464.40
Secondary Inspection	$795.30	$1,199.00
Excess Plan Time	$150.00	$680.70
Reduced Cycle / Other	$86.90	$260.60
Driver Documentation	$308.80	$859.20
Cabotage	$132.00	$440.00
Total Border Wait Time and Uncertainty Costs	$1,836.40	$3,903.90

Source: Economic Impact of Wait Times at the San Diego-Baja California Border, Jan 19, 2006

[17] Pathways For The Future: 2030 San Diego Regional Transportation Plan, November 2007, p. 6-38.
[18] Economic Impact of Wait Times at the San Diego-Baja California Border, Jan 19, 2006

Goods are often exchanged between a maquiladora and the U.S. more than once. Partially assembled parts may cross the border three to four times[19]. The effect of border delays on this type of production seriously impact potential investment in cross border facilities.

Total impact to freight is summarized in Table 5.

Table 5
Cross-Border Freight-Economic Impacts Due to Delays at the Border for San Diego County, the State of California and the United States (in Millions of 2005 Dollars)

	San Diego County	
Impact Category	**From Direct Output Losses in…**	**Total Impact**
Output (millions of U.S. dollars)	Agricultural and Food Products	-$82
	Mining and Mineral Products	-$129
	Machinery and Equipment	-$193
	Manufactured Goods	-$51
	Total	-$455
Labor Income (millions of U.S. dollars)	Agricultural and Food Products	-$22
	Mining and Mineral Products	-$35
	Machinery and Equipment	-$59
	Manufactured Goods	-$16
	Total	-$131
Employment (jobs)	Agricultural and Food Products	-532
	Mining and Mineral Products	-644
	Machinery and Equipment	-941
	Manufactured Goods	-343
	Total	-2,461
	State of California	
Impact Category	**From Direct Output Losses in…**	**Total Impact**
Output (millions of U.S. dollars)	Agricultural and Food Products	-$135
	Mining and Mineral Products	-$215
	Machinery and Equipment	-$289
	Manufactured Goods	-$76
	Total	-$716
Labor Income (millions of U.S. dollars)	Agricultural and Food Products	-$35
	Mining and Mineral Products	-$53
	Machinery and Equipment	-$94
	Manufactured Goods	-$23

[19] Ibid

Table 5
Cross-Border Freight-Economic Impacts Due to Delays at the Border for San Diego County, the State of California and the United States (in Millions of 2005 Dollars)

	Total	-$204
Employment (jobs)	Agricultural and Food Products	-887
	Mining and Mineral Products	-911
	Machinery and Equipment	-1,356
	Manufactured Goods	-499
	Total	-3,654
	United States	
Impact Category	**From Direct Output Losses in…**	**Total Impact**
Output (millions of U.S. dollars)	Agricultural and Food Products	-$262
	Mining and Mineral Products	-$357
	Machinery and Equipment	-$493
	Manufactured Goods	-$144
	Total	-$1,256
Labor Income (millions of U.S. dollars)	Agricultural and Food Products	-$64
	Mining and Mineral Products	-$97
	Machinery and Equipment	-$146
	Manufactured Goods	-$43
	Total	-$351
Employment (jobs)	Agricultural and Food Products	-1,873
	Mining and Mineral Products	-1,954
	Machinery and Equipment	-2,789
	Manufactured Goods	-1,031
	Total	-7,646

Source: Economic Impact of Wait Times at the San Diego-Baja California Border, Jan 19, 2006
Note: Mean Expected Outcomes

As described in Tables 5 and 6, the impact of these delays is not limited to San Diego or even California. The trade with Mexico that passes through the San Diego region has national and international impacts.

Table 6
Cross-Border Freight-Economic Impacts Due to Delays at the Border for Baja California and Mexico
(in Millions of 2005 Dollars)

	Baja California	
Impact Category	**From Direct Output Losses in…**	**Total Impact**
Output (millions of U.S. dollars)	Agricultural and Food Products	-$296
	Mining and Mineral Products	-$113
	Machinery and Equipment	-$655
	Manufactured Goods	-$252
	Total	-$1,317
Labor Income (millions of U.S. dollars)	Agricultural and Food Products	-$28
	Mining and Mineral Products	-$17
	Machinery and Equipment	-$70
	Manufactured Goods	-$35
	Total	-$150
Employment (jobs)	Agricultural and Food Products	-2,439
	Mining and Mineral Products	-568
	Machinery and Equipment	-1,227
	Manufactured Goods	-2,695
	Total	-6,929
	Mexico	
Impact Category	**From Direct Output Losses in…**	**Total Impact**
Output (millions of U.S. dollars)	Agricultural and Food Products	-$465
	Mining and Mineral Products	-$178
	Machinery and Equipment	-$1,030
	Manufactured Goods	-$396
	Total	-$2,069
Labor Income (millions of U.S. dollars)	Agricultural and Food Products	-$44
	Mining and Mineral Products	-$27
	Machinery and Equipment	-$110
	Manufactured Goods	-$54
	Total	-$236
Employment (jobs)	Agricultural and Food Products	-3,833
	Mining and Mineral Products	-892
	Machinery and Equipment	-1,928
	Manufactured Goods	-4,235
	Total	-10,889

Source: Economic Impact of Wait Times at the San Diego-Baja California Border, Jan 19, 2006
Note: Mean Expected Outcomes

Additional capacity is needed at the border crossings and highways to meet current and future truck traffic.

As described in the Executive Summary, the following represents the region's key short and mid-term goods movement projects/strategies:

Table 7
MCGMAP Preliminary Projects/Strategies and System Improvements

Mode / System	Description	2007 Cost (Millions)	Committed Funds	Time-Frame (Short, Mid, Long)
Regional Goods Movement Projects/Strategies				
Border Crossing Improvements	Access Improvements to the California/Mexico Ports of Entry at Otay Mesa, Otay Mesa East, and Calexico East Projects	$1,669	$524	Short
County Goods Movement System Improvements				
Rail	Construct Coastal Rail Corridor	$1,350		S, M
Rail	Construct South Line Rail/Trolley	$328		S, M
Maritime	San Diego Port District Maritime Terminal Ground Access	$822		S, M
Freeway / Highway	I-5 Widen/Managed Lanes (From La Jolla Village Dr. to Vandergrift)	$962		S
Freeway / Highway	I-15 Managed Lanes & Operational Improvements (From SR-163 to SR-78)	$608		S
Freeway / Highway	I-805 Widen/Managed Lanes (From SR-905 to I-5)	$1,081		S
Freeway / Highway	San Diego International Airport Truck Access to I-5 (Truck Route/Interchange Improvements)	$32		M
Freeway / Highway	Pipeline Truck Access to I-15 (Truck Route/Interchange Improvements)	$32		M

Source: SANDAG 2007

Expansion in Mexico

Another issue with cross border trade deals with expansion of the volume of goods from the Mexican side of the border. There is a potential increase in maquiladoras and there is also the possibility of a port on the Pacific coast of Baja California.

The Otay Mesa – Mesa De Otay Port-of-Entry (POE) is the busiest commercial border crossing between California and Mexico. In 2006, this POE handled more than 1.4 million trucks and $28.6 billion worth of goods in both directions, which represents the third highest dollar value of trade among all land and border crossings between the U.S. Mexico. Another $1.2 billion in merchandise and more than 140,000 trucks crossed at the Tecate – Tecate POE.

Trade is the fastest expanding component of the San Diego regional economy. Mexico is the Untied States' third largest trading partner (after Canada and China) and California's number one export market. Inadequate and aging infrastructure and more stringent security requirements create congestion at these two commercial border crossings.

Any expansion in goods volume in Baja Mexico will influence San Diego as a significant portion of the goods are likely to be headed for the U.S. through the San Diego County border.

Maquiladora

Expansion of the maquiladora program will impact San Diego County. The markets in the U.S. and Mexico do provide a location to process the goods. It is reasonable to expect this exchange to increase.

The issue for goods movement is how much and how fast. The maquiladora program, however, is not without controversy. It is not within the scope of this discussion to address those issues, and much of what can be done is indirectly influenced by the U.S. The controversy of the program, however, adds other factors that make prediction difficult.

Mexican Port Expansion

A new seaport facility at Punta Colonet has been conceived and desired by overseas suppliers for a number of years. Goods suppliers overseas are frustrated by the existing back ups at POLA and POLB and are interested in alternatives. The volume predicted for Punta Colonet is comparable to that currently at the ports of Los Angeles and Long Beach, or 13 million TEUs per year[20].

The issue for San Diego County is that it will very likely be the entry point for goods to the U.S. The infrastructure in San Diego and the plans do not currently support such volumes. This is a longer

[20] Mexico plans an alternative to the jammed docks in L.A., Long Beach By Diane Lindquist UNION-TRIBUNE STAFF WRITER August 14, 2005

term issue as a port would need to be built and infrastructure put in place in Mexico to move the goods to the U.S. destined for San Diego and Southern California.

The facility would be among Mexico's biggest public works projects. The cost has been estimated at $1.2 billion to $2 billion, but proponents say as much as $22.2 billion could flow into development of the region[21]. Given that these issues are related to foreign development there are no capital projects in the MCGMAP that directly address these issues. Additional improvement of POE's, and border access road and rail would be required if growth increases more than currently estimated. Border issues will likely be an area of continual concern for the foreseeable future. The SANDAG RTP does recognize this issue. Action 32 in the report is to "Evaluate the development of other interregional partnerships with other neighboring counties and Mexico to address land use and transportation needs"[22].

Rail

There are three major generators of freight rail traffic in San Diego County; they are the Port of San Diego, northern Baja California Mexico, and regional San Diego freight. Accommodating the additional demands, which will be made upon the freight rail system, is essential in preventing diversion of even greater percentage of rail traffic to truck. This truck diversion would put an even greater strain on area freeways and truck routes. Maintaining rail as a cost effective alternative for the movement of heavy bulk goods is an important element in reducing freight congestion on regional highways.

The regional consumption rail traffic is expected to grow at a compound annual growth rate of 2 percent. The 2006 regional carloads were 12,000, and could increase to 22,500 by 2030. Incrementally, this traffic could increase by over 2000 carloads per year if a transload facility is built in San Ysidro.

Cross border traffic in 2006 included 6,000 carloads crossed at San Ysidro, and 3000 carloads of vehicles which were loaded at the BNSF Railway San Diego Auto Facility. With a 3 percent growth rate anticipated for this traffic, carloads could grow to 17,500 by 2030. Port traffic from automotive imports was approximately 10,000 carloads in 2006. Incremental growth of this traffic from expanded Port facilities could increase the carloadings to 20,000 carloads (150,000 vehicles) by 2030.

The results of the increases from these regional freight generators would result in an increase in rail carloads from 31,000 in 2006 to 60,000 in 2030, almost doubling in volume.

SANDAG is planning a rail network to ensure that all bottlenecks are dealt with and that capacity throughout the system is sufficient to handle the anticipated increases in traffic.

[21] Ibid

[22] SANDAG RTP 2006 Financial Constrained Update

To fulfill the requirement for additional rail capacity to handle the predicted growth, two areas must add rail capacity. The first area is improvements to handle the cross border rail traffic with Mexico, and the second area is improvements to the San Diego County portion of the LOSSAN Corridor.

Growth in cross border rail traffic will soon exceed the capacity of San Ysidro. The South Line rail projects include expanding the capacity of the San Ysidro yard from 100 to 196 cars, and increasing the mainline capacity of the South Line with signaling and safety improvements to increase the overall number of freight trains from 2 to 4. Together, these improvements would increase capacity from 10,000 annual carloads to approximately 19,600 annual carloads.

The additional demands from an expanded cross border rail infrastructure along with anticipated growth in the Port traffic need to be accommodated by the LOSSAN Corridor in San Diego, which handles all of the regions rail traffic. Double track and bridge improvements are planned to double the number of daily freight trains from 4 to 8. This additional capacity would be sufficient to handle the combined anticipated increases from regional, cross border, and Port freight rail demands.

There are projects in the MCGMAP requiring $9.6 billion in rail improvements. Much of this is for short line and improvements near the border. The plan recognizes that this is a necessary investment requiring a significant funding level.

Port

The Port of San Diego Maritime Division has identified a number of capacity issues that influence its goods movement function. The port needs dredging and more terminal space, and landside access is also a challenge. The port location in the heart of downtown San Diego only serves to exacerbate congestion problems in moving goods using the road system. The current handler of rail freight is BNSF and it faces issues regarding shared mainline tracks which must simultaneously move goods and passengers out of San Diego.

The goal of improvements to the Port of San Diego includes providing some relief to the ports of Los Angeles and Long Beach. Much like the ports in Los Angeles County, the Port of San Diego anticipates a tripling of volume within the time frame of the MCGMAP.

There are $1.9 billion dollars in maritime projects in the project list.

Pipeline

In the San Diego region, Kinder Morgan Energy Partners (a private company) is the sole provider of bulk freight transport by pipeline. The pipeline network runs between Orange, California and the Kinder Morgan Terminal located in Mission Valley. Kinder Morgan transports more than five million gallons of petroleum per day, the equivalent of more than 600 tank trucks carrying 8,700 gallons per truck. The region's volume of petroleum products shipped by pipeline is projected to continually increase, and new pipeline capacity would be required beginning in 2015. The region

needs to construct improved truck access to the pipeline terminal to reduce freeway hazards and improve the efficient delivery of petroleum products[23].

Air

The 2004 SDIA Airport Activity Forecasts projects air cargo tons to reach between 487,000 and 622,000 tons by 2030. The Global Gateways Development Program identified SDIA as one of the priority global gateways to California. The regions economy is at risk of losing 29.6 billion to 93.8 billion of Gross Regional Product by 2030 if airport facilities fall short of regional demand for passenger and cargo[24]. The current site of San Diego International Airport provides limited options for expansion.

From a goods movement perspective, the basic solution to air cargo issues is a new airport. Obviously, a new airport has a wealth of associated issues that are beyond the scope of this study, and that has and will continue to impact how air cargo issues get resolved.

The Airport Site Selection Program is currently evaluating long-term solutions to meet projected 2030 commercial air passenger and cargo demand in the San Diego region[25].

The MCGMAP projects list has $566 million in air cargo projects including the SDIA access to I-5 project at $31.6 million. SANDAG has planned, to the extent possible, for a new airport location. RTP Actions 37 and 38 are as follows:

> 37) Complete the technical studies for the Airport Site Selection Program, and in 2006 place an advisory proposition on the countywide ballot regarding a proposed regional airport solution(s).
>
> 38) Adopt and implement the Airport Master Plan for San Diego International Airport in order to meet capacity needs for the next 20 years.

In response to Action 37, the November 7, 2006 ballot contained Proposition A 'The Commercial Airport" at MCAS Miramar San Diego County Regional Airport Authority advisory vote only. The ballot measure was:

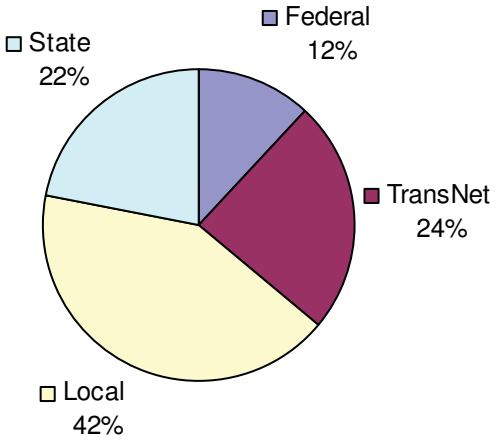
Should Airport Authority and government officials work toward obtaining 3,000 acres at MCAS Miramar by 2020 for a commercial airport, providing certain conditions are met? It was defeated.

[23] Pathways For The Future: 2030 San Diego Regional Transportation Plan, November 2007, p. 38-39
[24] SANDAG RTP 2006 Financial Constrained Update
[25] Ibid

Funding

Funding for projects is an issue for all counties. Major revenue source percentages for San Diego County are provided in Figure 6 below.

Figure 6
Major Revenue Sources/Revenue Constrained Scenario
($35.7 Billion)



Source: SANDAG RTP 2006 Financial Constrained Update

More specific revenue sources for the constrained RTP are provided in Table 8.

Table 8
Major Revenue Sources/Revenue Constrained Scenario

Revenue Sources		Estimated Revenue ($ In Millions)			
		FY 2005-2010	FY 2011-2020	FY 2021-2030	FY 2005-2030
Local					
TransNet Cash		$1,352	$1,011	$1,191	$3,554
TransNet Bond Proceeds		$351	$3,518	$1,192	$5,061
Transportation Development Act (TDA)		$691	$1,402	$1,718	$3,811
City/Council Local Gas Taxes		$613	$892	$720	$2,225
General Fund/Misc. Local Road Funds		$1,794	$2,854	$2,693	$7,341
Toll Road Funding (SR-241)		$350	$150	$0	$500
Miscellaneous/Carryover from Prior Years		$850	$93	$88	$1,031
	Subtotal	$6,001	$9,920	$7,602	$23,523
State					
State Transportation Improvement Program (STIP)					
Traffic Congestion Relief Program (TCRP)		$425	$608	$820	$1,853
Proposition 42		$103	$455	$520	$1,078
State Transit Assistance (STA) Program		$104	$182	$191	$477
State Highway Account Funds for Operations & Maintenance (O&M) Rehab		$750	$1,396	$1,465	$3,611
Miscellaneous/Carryover from Prior Years		$435	$178	$200	$813
	Subtotal	$1,817	$2,819	$3,196	$7,832
Federal					
Federal Transit Administration (FTA) Discretionary		$243	$42	$52	$337
Federal Transit Administration Formula		$375	$707	$808	$1,890
Regional Surface Transportation Program (RSTP)/ Congestion Mitigation and Air Quality (CMAQ) Program		$354	$530	$454	$1,338
Miscellaneous/Carryover from Prior Years		$402	$172	$197	$771
	Subtotal	$1,374	$1,451	$1,511	$4,336
Total		**$9,192**	**$14,190**	**$12,309**	**$35,691**

Source: SANDAG RTP 2006 Financial Constrained Update

Funding Challenges and Economic Impacts for Goods Movement Projects

Since the passage of the North American Free Trade Agreement (NAFTA), the volume of trucks to and from Mexico has more than doubled. Currently, there are 1.6 million trucks through the San Diego Ports of Entry at Otay Mesa and Tecate. This volume is projected to double by 2025. To address the congestion and bottlenecks through local communities, the San Diego County and Imperial County regions have completed critical highway and border crossing infrastructure improvements. However, they are still facing short-falls in funding for additional improvements that would add capacity to highways and land crossings that serve border trade as well as other interregional trade through California. To address funding options, San Diego and Baja California, Mexico stakeholders are investigating the potential for use of public funds together with private financing and toll fees for a new border crossing, highways, and federal inspection staffing at East Otay Mesa, California / Mesa de Otay, and Baja California, Mexico[26].

Toll crossings were investigated in "Economic Impacts of Wait times at the San Diego – Baja California Border" (Jan 19, 2006). The survey in the report indicated that most users would opt for a toll crossing if it would reduce delays. The users surveyed were not restricted to freight movers. Companies moving freight however do take advantage of toll roads in Mexico when they reduce the time in shipment. They also invest in programs like Free and Secure Trade (FAST) and Empresa Certificada to facilitate border crossing. Indications suggest that tolls are a potential source for revenue. All indications imply that firms would pay a toll if they saw that the expenditure will reduce delays and ultimately the bottom line.

[26] Caltrans District 11

County Actions

The county projects for the MCGMAP are presented in Table 9 below. These projects are extracted from SANDAG's 2007 RTP.

Table 9
MCGMAP Projects San Diego County

System/Project Description	Estimated Cost (millions)
Road/Truckway	
I-15 Improvements, SR-52 to Lake Hodges	$83.0
I-805, Widen/ML SR-54 to SR-52	$631.0
I-805, Widen/ML, SR-52 to Caroll Cyn Rd to I-5	$421.0
I-805, Widen/Managed Lanes SR-905 to I-5	$1,801
I-15 Widen/ML, SR-163 to SR-56	$426.0
I-805, Widen/ML SR-905 to SR-94	$884.0
I-5, Widen/Managed Lanes (La Jolla Village Dr. To Vandergift)	$962.0
I-15 Widen/Managed Lanes & Operational Improvements (From SR-163 to SR-78)	$608
I-15 Widen/ML, Ctr City Pkwy to SR-78	$215.0
I-15 Widen/ML SR-56 to Ctr City Pkwy	$427.0
I-15, Widen/HOV SR-94 to SR-163	$265.0
I-5, Widen I-805 to SR-56	$186.0
I-5, J to Sea World Drive, SR-54 to I-8	$1,159.0
I-15 Widen/HOV	$300.0
I-15 Improvement, SR-52 to SR-78	$19.0
SR-125, SR-905 to San Miguel Rd	$640.0
SR-125, San Miguel Rd to SR-54	$200.0
SR-125, Tele Canyon to San Miguel Rd	$130.0
I-15/I-805, HOV/ML Connectors	$66.0
SR-54/125/52 Outer Loop Extension to SR-78	$540.0
SR-52, I-805 to SR-125	$330.0
SR-52, Widen SR-125 to SR-67	$446.0
I-15/SR-94, S/W-E/N Connectors	$140.0
SR-94, Widen/HOV I-5 to I-805	$200.0
SR-94/SR-125 W/N-S/E Connectors	$150.0
SR-54/SR-125, Widen/HOV I-805 to SR-94	$111.0
SR-94, Widen/HOV	$190.0
Pipeline Truck Access (Petroleum Terminal) to I-15 (Truck route/Interchange improvements)	$32
Air Cargo	
San Diego International Airport Access to I-5 (Truck route/interchange improvements)	$32

Table 9
MCGMAP Projects San Diego County

System/Project Description	Estimated Cost (millions)
Future Expansion, Fwy/Grd Access	$173.2
SDIA, Aircraft/Ground Access, AC Facilities, Transload	$110.7
Future Expan., Air/Grd Access, AC Facilities, Transload	$250.0
Pipeline	
I-15 Access to KM MV Terminal	$31.6
KM, New Miramar Junction/Terminal/Tanks	$39.5
KM Expand to 16 Pipe/Extend to Mexico	$45.0
Maritime	
San Diego Port District Marine Terminal Ground Access	$822
NCMT Capacity and Operational Improvements - Access, Rail, Wharf, Decking and Realignment	$183.1
TAMT Capacity and Operational Improvements - Ground Access and Realignment	$357.1
Port Expansion (250 acres on-dock/inland port)	$282.8
Port Expansion (350 acres on-dock/inland port)	$350.0
Port Expansion (200 acres on-dock/inland port)	$189.8
Port Expansion (500 acres on-dock/inland port)	$500.0
Rail	
Construct Coastal Rail Corridor	$1,350
Construct South Line Rail/Trolley	$328
Mex Rail Rehabilitation, Maquilla Spur, Transload	$31.6
Logistics Center - Maquilla Area	$57.9
Coastal - Logistics Center - Miramar Landfill/Mid-County	$60.0
Logistics Center, South County	$60.0
Coastal - Logistics Center - I-5NW	$50.0
Logistics Center - Southeast County, Otay Mesa (2x)	$131.1
Logistics Center - I-15 Northeast County	$50.0
South Line, San Ysidro Yard Improvement 3	$84.8
Sprinter - Improvements	$484.0
Desert Line - Basic Service	$15.8
Mex Rail, Mainline Capacity Improvements	$176.0
South Line, Otay Mesa Rail Spur/Inland Port	$86.8
Desert Line - Modernization	$166.1
High Speed/Inland Rail - North County	$1,850.0
High Speed/Inland Rail - South County	$1,600.0
High Speed/Inland Rail - Connect to Port	$180.0
Sprinter Double Tracking - Planned	$199.0
Desert Line Double Tracking	$2,130.0
Coastal, Del Mar/Miramar Hill Tunnel	$475.0

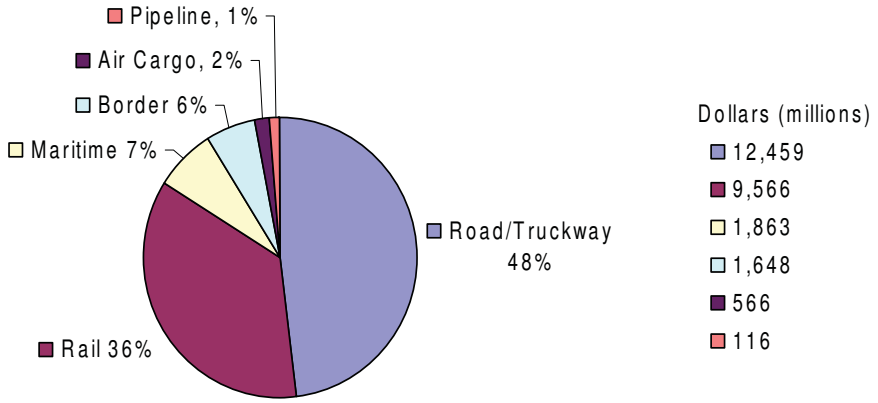
Table 9
MCGMAP Projects San Diego County

System/Project Description	Estimated Cost (millions)
Border	
OME Border Crossing SR-905-8F SR-11-4T, So. Truck Rte	$1,498.0
OME Border Crossing - Rail	$150.0
Total	**$26,217.1**

Source: SANDAG 2007 Regional Transportation Plan, p. B-5.

Road and truckway improvements are approximately $12.5 billion, which is almost half the estimated expenditure. Rail improvements are $9.6 billion, 36 percent of the total. The two categories account for approximately 85 percent of the total estimated expenditures. The percentage of total expenditures by the major infrastructure categories are shown in Figure 7.

Figure 7
Project Estimated Costs by Infrastructure Categories



Source WSA 2007.

Although Maritime, Border, Air Cargo, and Pipeline projects do not account for a large percentage of total expenditures, projects within these categories are some of the highest priority.

The Border category has one of the projects with the highest priority. It is:

- OME Border Crossing SR-905-8F SR-11-4T, So. Truck Rte

Maritime has three projects in the top ten. These are:

- NCMT Capacity and Operational Improvements – Access, Rail, Wharf, Decking and Realignment.
- TAMT Capacity and Operational Improvements – Ground Access and Realignment
- Port Expansion (250 Acres on-dock/inland port)

Air Cargo has one project in the top ten.

- SDIA Access to I-5

Finally the pipeline category also has one project in the top ten.

- I-15 Access to KM MV Terminal

The Road/Truckway and Rail modes do have high priority projects as well. Improvement in each modal sector is recognized as critical to systematic goods movement in San Diego County.

Trade Corridor Infrastructure Fund (TCIF)

Approved by voters as Proposition 1B in November 2006, the TCIF represents $2 billion for highway, freight rail, seaport, airport, and border access infrastructure improvements along corridors that have a high volume of freight movement. A list of projects were adopted by the California Transportation Commission (CTC) in April 2008. Allocations are pending state budget approval. The list below represents the adopted program of projects for the San Diego Border Region.

The San Diego/Border Region's TCIF project proposals reflect a Gateway approach which is systemic; the approach recognizes that goods movement is facilitated by multi-modal investments contributing to freight network integration. The region's TCIF strategy also targets investments which will alleviate goods movement-related environmental and community impacts. The region's TCIF projects also have been screened and selected for their contribution to regional and statewide prosperity. In San Diego County, there are two gateways that accommodate domestic and international trade: the border Ports of Entry (POEs), principally the existing Otay Mesa and Tecate POEs and the proposed new Otay Mesa East POE, as well as the seaport gateway, the Port of San Diego. Growing trade volumes at the region's two gateways drive the need for highway and rail network improvements.

The San Diego/Border Region's TCIF proposals integrate strategic investments at the border, at the Port of San Diego and on the associated highway and rail distribution networks serving both trade Gateways. This investment strategy produces benefits to the highway and rail networks that link the San Diego region with the rest of California. Without these TCIF investments, the trade not facilitated in the region would be forced to other congested and environmentally stressed gateways. The San Diego/Border Region's TCIF projects provide the necessary infrastructure to handle current and projected freight needs at the border and at the Port of San Diego Gateways.

Table 10
Adopted Program of Projects
San Diego Border Region

Project Title	Total Project Cost (in thousands)	Recommended TCIF Funding (in thousands)
BORDER		
State Route 905	$104,700	$ 91,605
State Route 11 and Otay Mesa East Port of	$708,820	$75,000
MARITIME		
Bay Marina Drive at I-5 At-Grade Improvements	$2,380	$910
10th Avenue at Harbor Drive Grade-Separated	$67,200	$30,910
32nd Street at Harbor Drive Grade-Separated	$118,460	$50,665
Civic Center Drive at Harbor Drive and I-5 At-	$3,260	$1,150
Port of San Diego National City Marine Terminal	$34,300	$15,000
RAIL		
South Line Rail Improvements / San Ysidro	$40,460	$25,900
South Line Rail Improvements / San Ysidro	$107,030	$98,060
LOSSAN North Rail Corridor - Sorrento to	$23,700	$10,800
TOTAL	**$1,210,310**	**$400,000***

Source: SANDAG, 2008
*CTC Recommended Programming Target for San Diego Border Region = $400,000

Conclusions

The projects and actions that San Diego County is currently doing or planning to do fall within the four primary action sets of the MCGMAP. The purpose of this section is to show a relationship between county projects developed independent of a regional plan and the recommended primary actions of the MCGMAP. The four action sets in the MCGMAP are:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility
- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

A brief description of each action set and how it relates to county activities and projects is provided below.

Action Set 1: Accelerate Regional Environmental Mitigation seeks to mitigate environmental impacts at three levels. The levels are a broad regional approach, regional conformity, and project specific mitigation. The regional approach is for broad strategic policies/efforts focusing on further reducing region-wide impacts. Regional conformity holds emissions to caps set in various plans through aggressive actions implementing known technologies and best practices. The project specific mitigation requires project sponsors to consider and disclose environmental impacts when planning projects and to address how potential impacts will be resolved. This part of the project development process is specified in the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

Any plans discussed in this county action plan when they reach the CEQA/NEPA part of the planning stage, will disclose environmental impacts that are a direct impact of the action and provide measures to resolve the impact. This is by no means a minor contribution to improving the environment, especially at the local level. The more regional effect however would be how the planned actions help to satisfy regional conformity. In addition, linking county-specific projects to broader regional initiatives, even long-term plans, will assist in developing future policies/efforts to address region-wide impacts.

All the freeway lane and capacity improvements in the San Diego project list will improve mobility and therefore reduce mobile source emissions. These will assist San Diego County to continue to meet conformity goals. It would be rather redundant to discuss each of these projects as there are some 26 of them that improve freeway and freeway access. It should be noted that the projects may have local impacts that are not addressed within this regional goods movement framework. They will need to meet CEQA/NEPA requirements.

San Diego County is unique in the study area as its conformity goals are not addressed by the same agency as the other 6 counties. SCAG has responsibility for conformity in all the other counties, while SANDAG is responsible in San Diego County.

There are recent examples of San Diego County's efforts to reduce environmental impacts of goods movement. In the initial Clean Port efforts by the Port of San Diego, an inventory of emissions and energy use at the maritime terminals is being prepared as an initial step in developing a plan with public participation to address methods to reduce emissions and energy waste[27]. In 2003 the SANDAG Central I-5 Corridor Study, evaluated truck ground access improvements for the Port of San Diego's two terminals to address resident concerns about truck noise and emissions. In 2007, the Port of San Diego used a state planning grant to select an alignment for truck access that enjoys full community and business support[28].

[27] Pathways For The Future: 2030 San Diego Regional Transportation Plan, November 2007, p. 6-44.
[28] Pathways For The Future: 2030 San Diego Regional Transportation Plan, November 2007, p. 6-45.

Action Set 2: Relieve Congestion and Increase Mobility focuses on improving all aspects of the transportation system in order to improve region-wide mobility and safety. Specifically the action set seeks to:

- Increase intermodal lift capacity
- Increase mainline rail capacity
- Grade separate railroad crossings
- Improve highways through comprehensive innovative approaches
- Continue with general purpose highway improvements/ safety and operational improvements

All the infrastructure categories have projects that will provide market segment relief and increased mobility. Freeway, air cargo, maritime, rail, and border improvements will provide relief to all modes of freight transport.

The county has many issues it must address like a new airport, improved port facilities, and border delays. There is a long way to go to address all the issues associated with goods movement but the projects listed as county actions are moving San Diego in the right direction.

Action Set 3: Improve Operational Efficiency addresses two categories of actions. These are:

- Improve marine terminal productivity, truck turn times, and intermodal operations
- Improve highway operations through new technologies

These improvements would make the most of existing infrastructure by making the utilization more efficient.

The project list includes $1.8 billion in maritime improvements

Action Set 4: Develop Equitable Public/Private Funding Strategy recognizes that implementation of the actions, projects, and programs with the associated mitigations will require a coordinated effort by the private and public sectors. The action set seeks to:

- Maximize the study area's fair share of state and federal funds
- Identify opportunities for project-specific user needs
- Establish institutional structure for managing user fees and revenues
- Initiate supportive legislation

SANDAG is addressing these issues. For example, they have taken a major step in addressing some of the border issues by conducting a study of the economic impact of delays at the border. To adequately address fair share it is important to understand the dynamic, and this study has increased the agencies knowledge about this issue which is critical to goods movement.

In addition the RTP has general legislative and funding actions that seek the counties fair share of public funds and work to improve partnering and coordination.

To maintain economic vitality the region needs to provide a competitive advantage in terms of the speed and reliability of moving goods to U.S. markets while mitigating environmental impacts to the region. All the projects in the county ultimately are designed to insure that Southern California maintains if not enhances its economic position. Maintenance of the regions economic vitality will be enhanced by the actions being done in San Diego County.

Multi-County Goods Movement Action Plan

Ventura County Action Plan

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
San Diego Association of Governments

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April 30, 2008

Table of Contents

INTRODUCTION **1**
- **Purpose** **1**
- **Background** **1**
- **Role** **4**
  - Ports/Airports 4
  - Rail 7
  - Trucks 7
  - Warehousing 9

COUNTY SPECIFIC ISSUES **12**
- **Mainline Rail Capacity** **12**
- **Roadways** **12**
- **Funding** **14**

COUNTY ACTIONS **15**
CONCLUSIONS **16**

List of Tables

Table 1 – Port of Hueneme Cargo Volumes 2002 and 2003 (Metric Revenue Tons) **5**
Table 2 – MCGMAP Projects Ventura County **15**

List of Figures

Figure 1 – Multi-County Goods Movement Action Plan Ventura County **3**
Figure 2 – Multi-County Goods Movement Action Plan Port of Hueneme Vicinity **6**
Figure 3 – 2003 Percentage of Truck VMT in the MCGMAP Study Area by County **8**
Figure 4 – Multi-County Goods Movement Action Plan 2003 Truck ADT and Commercial Vehicle Enforcement Facilities **10**
Figure 5 – Multi-County Goods Movement Action Plan Warehouse Land Use **11**
Figure 6 – Percent of Truck VMT to Total VMT by County **13**
Figure 7 – Percent Growth in Truck Volumes from 2003 to 2030 on Major Corridors **13**

Introduction

Purpose

This report outlines a Goods Movement Action Plan for Ventura County, California, part of a broader Multi-County Goods Movement Action Plan (MCGMAP) developed collectively by the Los Angeles County Metropolitan Transportation Authority (Metro), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), San Diego Association of Governments (SANDAG), Ventura County Transportation Commission (VCTC), Southern California Association of Governments (SCAG) and the California Department of Transportation (Caltrans).

The MCGMAP contains strategies to support the efficient movement of goods without disproportionately impacting local communities, the environment, or the transportation network. The MCGMAP is also a regional framework for goods movement initiatives.

This report examines the key issues that impact Ventura County from a goods movement standpoint. It examines the plans and proposals that are being pursued to resolve stated issues, and new specific actions and strategies that could become a focus for the county. The report builds on a large body of work that has been researched and developed over the past few years.

The Multi-County Goods Movement Action Plan has recommended four primary action sets for goods movement within the region. The action sets are:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility
- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

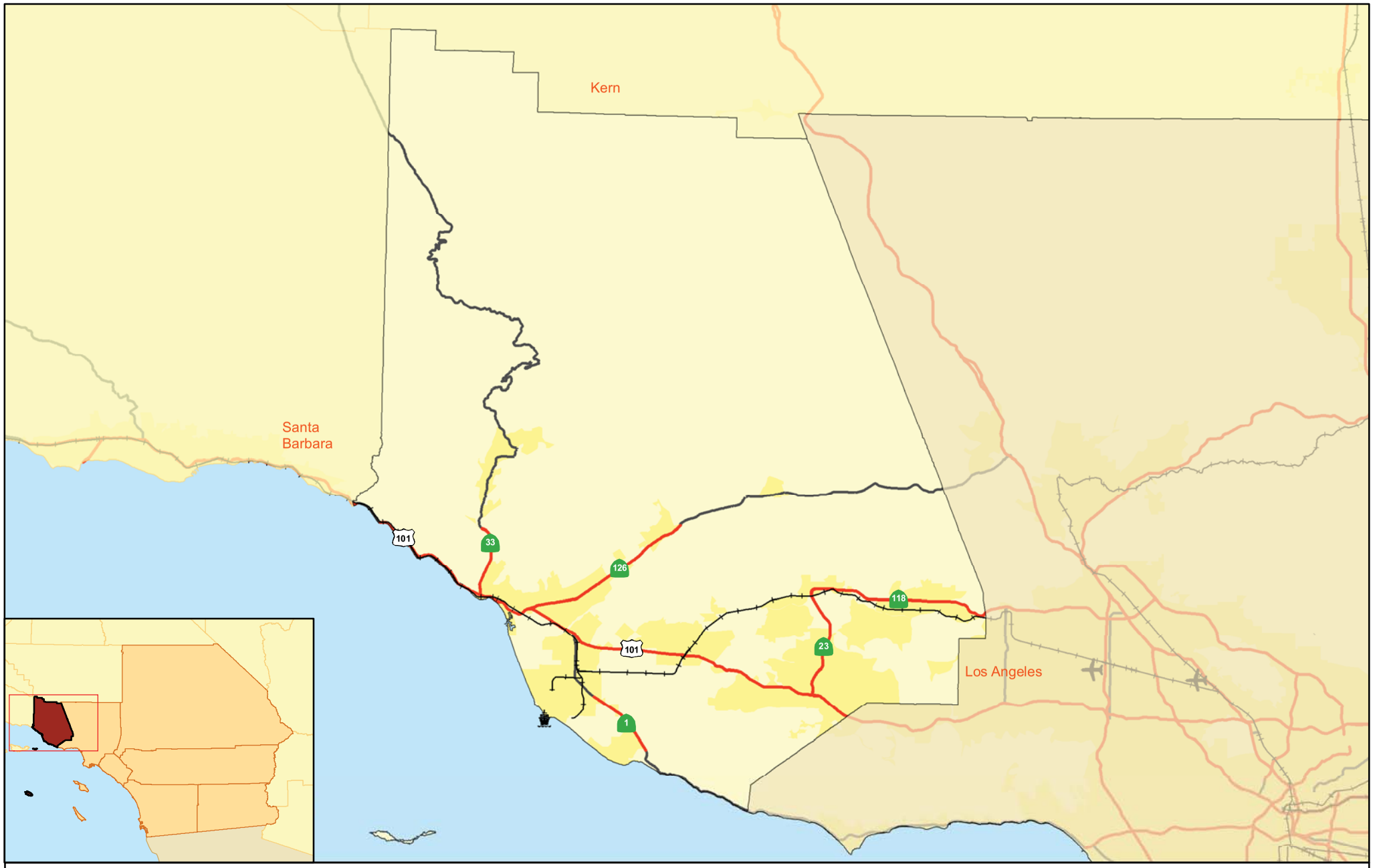
Current and future projects, relationships, and activities of Ventura County address these four primary action sets. The document concludes with an explanation of how the county's activities support these four action sets.

Background

The county has been an integral part of mobility in the region since the urban areas surrounding Los Angeles and Orange Counties have coalesced. Ventura County has participated in the following goods movement related studies:

- Compendium of Truck and Freight Information for the Greater L.A. Metropolitan Area, December 2004
- Port of Hueneme Access Study, December 2000

A map of Ventura County, with essential goods movement related features, is provided in Figure 1. Ventura is on the far west side of the study region. The east border with Los Angeles County is the only border with other MCGMAP Counties. The major source of outside freight is the Port of Hueneme. The Port of Hueneme is located in the city of Port Hueneme which is surrounded by the city of Oxnard.



Airports
Ports
Railroad
Freeways
Highway
Urban Areas

Multi-County Goods Movement Action Plan
Ventura County

0 10 20 40 Miles

N

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Sources:
StreetMap 2006

Figure 1

There is a Union Pacific (UP) rail line that traverses Ventura County with the western end on the coast and the eastern end in Simi Valley. The UP rail line is connected to the port via the Ventura County Railway (VCRR).

US-101 is the only limited access highway that traverses the entire county. The additional limited access highways in the county are SR-126, SR-118, SR-23, SR-1 and SR-33.

Role

Ports/Airports

As the only deepwater port between Los Angeles and San Francisco, the Port of Hueneme is an important center for freight activity for Ventura County and the MCGMAP Region. From a regional perspective, Ventura County's primary role in goods movement is through the Port of Hueneme. The port handled over one million metric revenue tons (MRT) of cargo in 2003. Furthermore, projections indicate that by 2010, MRT will increase by as much as 50 percent totaling between 1.4 and 1.5 MRT[1]. As shown in Table 1, the port's principal commodities include automobiles, bananas, wood pulp, fresh fruit, general cargo, offshore oil support, and fish.

[1] Phone conversation with Anthony Taormina, Port of Hueneme, May 17, 2007

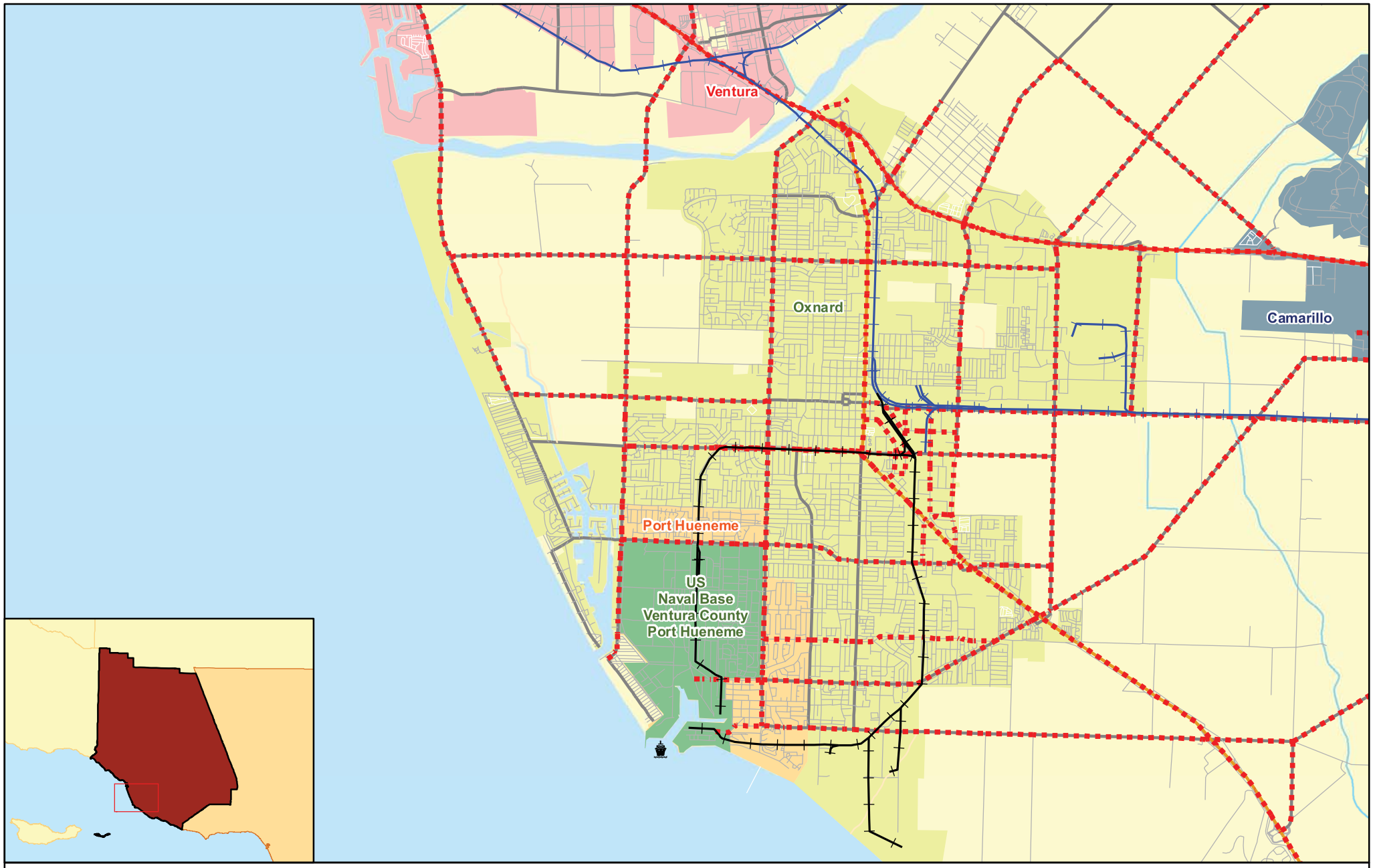
Table 1
Port of Hueneme Cargo Volumes 2002 and 2003
(Metric Revenue Tons)

Cargo Type	2002	2003
Automobiles	235,102	219,170
Bananas	395,157	434,092
Wood Pulp	39,200	35,500
Fresh Fruit	116,929	144,506
General Cargo	98,050	159,354
Offshore Oil	79,763	88,689
Fish	23,660	14,177
Total	987,861	1,095,488

Source: Port of Hueneme, Naval Base Ventura County: Strategic Commercial Development Plan, December 1, 2003

Cargo types handled by the port are predominantly fresh fruit and automobiles, which combined equal 72 percent of all MRT handled in 2003. Handling over 2.19 MRT of automobiles in 2003, the Port of Hueneme is a notable load center for the import and export of automobiles.

Goods movement through the port is aided by both truck and rail capacity within the city of Oxnard. The following paragraphs describe each primary rail line as well as the major local and intercity truck routes. The locations of these facilities in conjunction to the port can be seen in Figure 2.



Multi-County Goods Movement Action Plan
Port of Hueneme Vicinity

Truck Route
Limited Access
Highway
Major Road
Ports
Airports
UP
VCRR

0 1 2 4 Miles

N

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Sources:
StreetMap 2006
City of Oxnard

Figure 2

Rail

Ventura County Railway

Rail capacity immediate to the vicinity of the port consists of an approximate 10.3 mile loop of Ventura County Railway (VCRR) track. The track and rail property is owned, dispatched, and maintained by the port. This line transfers freight from the Port of Hueneme and connects to the UP Coast Mainline in downtown Oxnard, making it of particular importance to the customers of the port. The railway has a total of 20 at-grade crossings within Oxnard[2].

Union Pacific Railroad

The UP Coast Mainline serves as a connection between the city of Oxnard and all major west coast destinations. As the only intercity freight rail provider in the city, this line provides an important link for the delivery of goods out of Oxnard. There are currently 24 passenger trains per day on Ventura County rails. Of these, 16 are Metrolink and eight are Amtrak. In total, eight to 24 freight trains per day utilize this line. The line has 10 at-grade crossings which can significantly delay the flow of traffic in Oxnard[3].

Santa Paula Branch Line

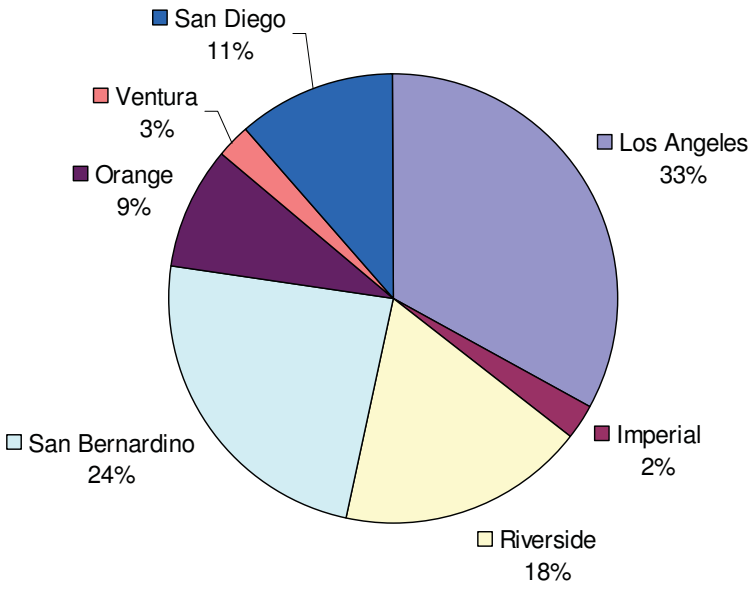
The Santa Paula Branch Line is owned and operated by the Ventura County Transportation Commission (VCTC). The line primarily serves passengers and has limited freight service. The Santa Paula Branch Line is accessible by the UP Coast Mainline, making it ultimately accessible to the Port of Hueneme.

Trucks

Figure 3 shows the distribution of truck traffic in the region by county, measured in terms of truck miles of travel on the state highway system. Ventura County accounts for 3 percent of the total regional truck miles of travel, which is the second lowest among the studied counties, while Imperial County is lower at 2 percent.

[2] Goods Movement, Oxnard General Plan Update 2020, p 22
[3] Ibid

Figure 3
2003 Percentage of Truck VMT in the MCGMAP Study Area by County



Source: Truck Miles of Travel: California State Highway System 1988-2003, Caltrans 2005.

A number of truck routes serve the port. In recent years, the port has seen a shift in goods movement from rail to the trucking industry[4].

Factors contributing to this shift include the deregulation of rail and shipping industries, and the completion of major highway networks. To accommodate the increase in trucking demands, the following primary trucking routes with direct connection to the port have been established as shown in the previous Figure 2.

- Victoria Ave.
- Hueneme Rd.
- Rice Ave.
- Pleasant Valley Rd.
- Bard Rd.

[4] Ibid

Major regional truck routes along US-101 and SR-126 connect with these local truck routes. Additionally, sand and gravel trucks utilize SR-118. The use of SR-118 to bypass weigh stations on US-101 has led to the consideration of a new truck weigh station on SR-118. Figure 4 shows the locations of the existing and proposed Commercial Vehicle Enforcement Facilities (CVEF) in Ventura County. It also shows Truck ADT on the freeways.

The high volume of trucks on the limited access portion of SR-118 and the low volume on SR-23 suggest that the trucks are using a route that does not require passing through the existing CVEF to the west of SR-23. This means that the non-limited access portion of SR-118 is being used to move freight. The location of the proposed CVEF on SR-118, west of the SR-118/SR-23 junction, would process trucks using this route.

Warehousing

Compared to other counties within the MCGMAP region, there are limited warehouse and distribution facilities in Ventura County. Figure 5 portrays land classified as warehousing and wholesaling.

Multi-County Goods Movement Action Plan
2003 Truck ADT and Commercial Vehicle Enforcement Facilities

Sources:
StreetMap 2006
SCAG 2004
WSA 2006
Caltrans 2006

WilburSmith Associates
Engineers Planners Economists

Figure 4

Airports
Ports
Railroad
Freeways
Highway
Urban Areas

Multi-County Goods Movement Action Plan
Warehouse Land Use

0 5 10 20 Miles

N

WilburSmith ASSOCIATES
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Sources:
StreetMap 2006
SCAG 2000 Land Use

Figure 5

Warehousing is limited due to the focus on agricultural land uses in the county and relatively high housing costs for workers. Similar to Orange and San Diego Counties, most warehouse facilities in Ventura County are private and contract to warehouse and distribution centers. Warehouse facilities are typically less than 50,000 square feet. Overall, the market is relatively stable with a slight decline in vacancy levels and a moderate increase in available space.

County Specific Issues

Mainline Rail Capacity

Rail throughout the county is single track, thus limiting the movement of passengers and freight. There are no funded projects that address this issue or the potential to enhance movement by double tracking rails. The specific county projects that relate to rail include the Santa Paula Branch Line and grade separations between the non-limited access portion of SR-118 and the UP rail line.

The Santa Paula Branch Line is on the MCGMAP project list, and a planning study is currently being conducted. If constructed, the line would bring freight and passenger trains through the Santa Clara River Valley, carry goods from the Port of Hueneme, and bring commuters to Valencia's office parks. Amtrak may also be rerouted through Santa Clarita via this branch line.

The line would traverse a historic branch line through the valley. Some track exists but would need to be upgraded. The line would run through Santa Paula and Fillmore and link with the rail lines in Santa Clarita on the northern edge of the urban area of Los Angeles. This project would allow freight trains to avoid the Los Angeles corridor en route to national rail networks.

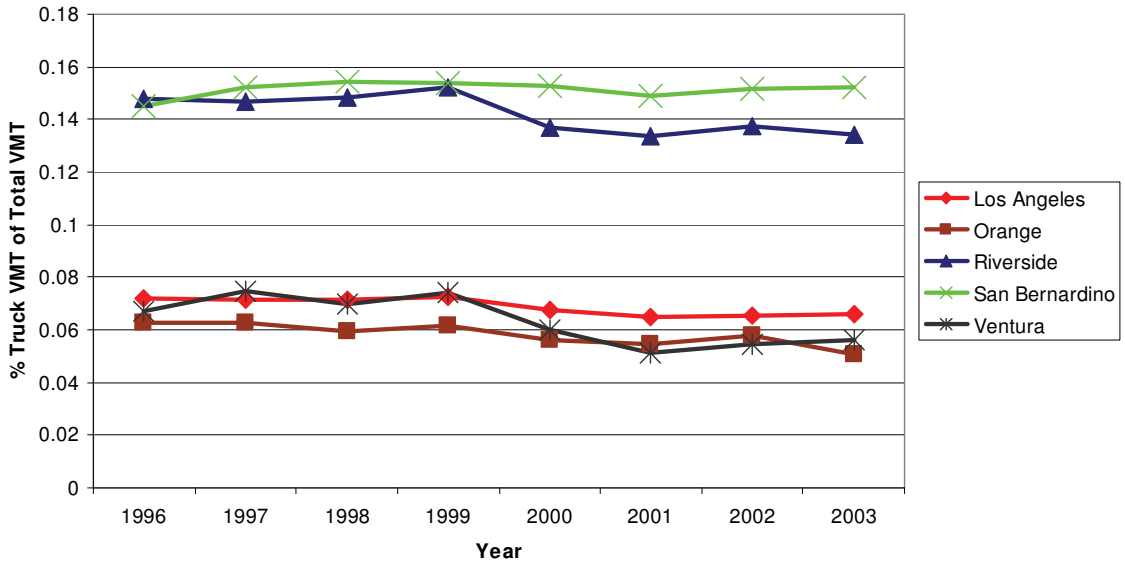
The other specific rail issue in the county is the need to grade separate SR-118 and the UP rail line. This project is not listed on the MCGMAP Project List because it is funded and listed in the 2004 RTIP Grade Separation Projects List. This grade separation will positively impact local congestion in addition to improving safety.

Roadways

A survey conducted earlier in the MCGMAP determined that highway congestion is perceived as a problem in Ventura County. Traffic delays, truck traffic intrusions to neighborhoods, poor pavement conditions, and air pollution from trucks were indicated as important community concerns.

From a regional perspective, Ventura County has very low truck volumes. Figure 6 depicts the trends in percent of Truck VMT to Total VMT. The percentages are comparable to those of Los Angeles and Orange Counties. Even though Los Angeles County has over 10 times the truck VMT, the proportion of trucks sharing roadways is similar.

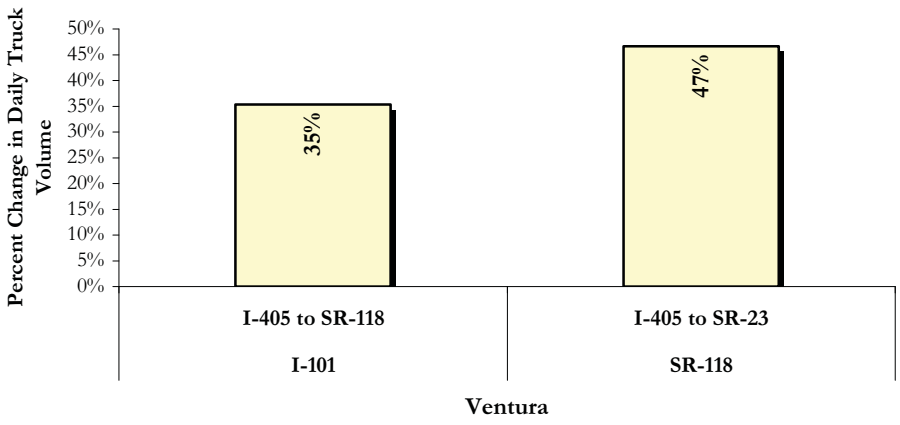
Figure 6
Percent of Truck VMT to Total VMT by County



Source: Truck Miles of Travel: California State Highway System 1988-2003, Caltrans 2005.

Figure 7 shows growth of truck volumes on major freeways from 2003 through 2030. Although Ventura County has a low volume of trucks, the relative growth specific to trucks along these corridors is substantial.

Figure 7
Percent Growth in Truck Volumes from 2003 to 2030 on Major Corridors



Source: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006

Ventura County is pursuing an interchange improvement project on Rice Avenue**.** A "Mitigated Negative Declaration/Finding of No Significant Impact" was declared by FHWA based on a 2001 study for the "Rice Avenue/U.S. 101 Interchange Project" prepared for the city of Oxnard. The study determined the following:

"Existing high traffic volumes and the configuration of the existing interchange and over crossing contribute to deficient operating conditions, congestion, and vehicle delay. The northbound US-101 on- and off-ramps, which present safety concerns, were designed with tight radii, providing little room for vehicles, particularly truck traffic, to maneuver and decelerate. In addition, the horizontal curve of the over crossing restricts the sight distance for motorists. The on- and off-ramps are no longer able to accommodate increases in travel speeds and peak hour traffic volumes, resulting in substantial queuing at these ramps, particularly during peak hours."

In addition to accommodating the projected growth in truck volumes, the Rice Avenue interchange improvement will facilitate goods movement from the port, thus providing increased mobility. This project was listed under proposition 1B which passed in the 2006 mid-term elections. However, complete funding has yet to be secured.

Funding

Funding requirements for highway, port and railway improvements will require key partnerships between various public and private entities in order to be successful.

As freight demand at the Port of Hueneme continues to increase, capacity constraints will need to be addressed. Operational and intermodal facility improvements would help move goods faster and increase capacity; however, the port predicts that berth space will be a constraint. Expansion of the port and its capacity would require partnerships with the adjacent naval base.

Funding for railway improvements also provides opportunities for public-private partnerships to aid in the progress of goods movement throughout the county. One example would be through partnerships for project funding and usage agreements between public rail operators and track owners. Such a partnership would be the exchange of usage rights for funding of critical projects along rail lines. The VCTC has expressed interest in pursuing a similar partnership with the UP. If key public-private partnerships could be created throughout the county, critical rail improvements would be achieved sooner, expediting the forward progress of goods movement throughout the region.

Federal funding for major highway and rail projects will be essential for project development. Currently, $350 million of federal funding is being pursued for the Santa Paula Branch Line, while the $70 million Rice Avenue Interchange Improvement Project is $26 million short on funding.

County Actions

Goods movement issues within Ventura County are being addressed by a number of projects and actions. The Rice Avenue Interchange project is close to achieving additional funding.

Table 2 lists the projects, capital ventures, and actions that would assist in enhancing goods movement.

Table 2
MCGMAP Projects Ventura County

Category	County	Description	Cost ($Mill's)
Modification of Delivery Hours	All	Extend Delivery Hours to 24 hours	
Use of LCVs on Dedicated Facilities	All	Evaluate Use of LCVs on Dedicated Facilities	
Data and Analytical Methods	All	Improve demand forecasts for labor and equipment across all modes	
Data and Analytical Methods	All	Employ better trade and transportation forecasting	
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	All	Enact expanded public-private partnership legislation	
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	All	Enact design-build and design sequencing legislation	
Freight Corridor Capacity Enhancement and Operational Improvements	VEN	Reconstruct US 101/Rice Avenue IC	$75.0
Grade Separations	VEN	Construct Rice Avenue/UP Grade Separation	$45.0
Grade Separations	VEN	Construct Rose Avenue/UP Grade Separation	$45.0
Grade Separations	VEN	SR-118/Coast Line – Construct Grade Separation	TBD
Mainline Rail Capacity Improvements	VEN	Port/rail intermodal access at Port of Hueneme	$18.0
Mainline Rail Capacity Improvements	VEN	Santa Paula Branch Line from Santa Clarita to Port Hueneme	$350.0
Construction of Additional Freeway Lanes/Capacity	VEN	Port Terminal - Hueneme Rd (Port to Los Pasos), Los Pasos (Hueneme to US 101)	
Construction of Additional Freeway Lanes/Capacity	VEN	Port Terminal - Ventura Rd (Hueneme to Channel Island), channel Island Blvd (Ventura to Victoria), Victoria Ave (Channel Island to US 101)	

Source: Wilbur Smith Associates, 2007

Capacity and operational improvements are needed for the port. These issues are the focus of action sets called out in the MCGMAP. Improvements to the Port of Hueneme not only provide regional goods movement relief, but address county specific issues and thus should be considered top tier projects. Trucking-related congestion and air quality concerns can be addressed if actions are taken to provide more direct ship to rail intermodal access and if trucking dwell times are reduced. However, it should be noted that the role of trucking in goods movement within Ventura County has grown over the years.

The community's perception of congestion and truck issues presents the largest discrepancy for Ventura County. These issues have no specific actions called out in the MCGMAP, yet surveys indicate these issues to be of significant concern. This discrepancy is supported by the fact that Ventura County only contributes 3 percent of total truck volumes throughout the study region. However, this does not diminish the perceived impacts of trucking, as Ventura County's total proportion of trucks to other vehicles is comparable to both Orange and Los Angeles Counties.

The proportion of trucks will increase. Projects such as the Rice Avenue Interchange are essential at the county level. Given the regional connectivity of goods movement in Southern California and the increasing coalescence between regions, such county specific issues would ultimately forward the progress of a regional goods movement system.

Conclusions

There is a relationship between county projects and the recommended primary actions of the MCGMAP. The four action sets in the MCGMAP are:

- Action Set 1: Accelerate Regional Environmental Mitigation
- Action Set 2: Relieve Congestion and Increase Mobility
- Action Set 3: Improve Operational Efficiency
- Action Set 4: Develop Equitable Public/ Private Funding Strategy

Action Set 1: Accelerate Regional Environmental Mitigation seeks to mitigate environmental impacts at three levels; a broad regional approach, regional conformity, and project specific mitigation. The regional approach is for broad strategic policies and efforts focusing on further reducing region-wide impacts. Regional conformity holds emissions to caps set through aggressive actions and implementing high-level technology and best practices. The project specific mitigation requires project sponsors to consider and disclose environmental impacts when planning projects and to address how potential impacts will be resolved. This part of the project development process is specified in the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

The port and port vicinity improvements are linked to the broader regional MCGMAP initiative. In addition, planned actions around the port will improve mobility and in turn, reduce non-point source pollution and contribute to regional environmental mitigation. The projects may have local impacts

that are not addressed within this regional goods movement framework but the projects will need to meet CEQA/NEPA requirements.

Action Set 2: Relieve Congestion and Increase Mobility focuses on improving all aspects of the transportation system to improve region-wide mobility and safety. This action set seeks to achieve the following:

- Increase intermodal lift capacity
- Increase mainline rail capacity
- Grade separate railroad crossings
- Improve highways through comprehensive innovative approaches
- Continue with general purpose highway improvements/ safety and operational improvements

The mainline rail addition of the Santa Paula Branch, intermodal facilities at Port Hueneme, and highway improvements will provide congestion relief and increase mobility. All modes of freight transport stand to benefit from these projects.

The grade separation of the non-limited access portion of SR-118 and the UP rail line is also a part of this action. The proposed Commercial Vehicle Enforcement Facility (CVEF) on SR-118 could also increase mobility. The facility is used for enforcement, but if it reduces the use of inefficient roads it could also improve mobility. The benefits of reducing the truck volumes on these roads would have at least the same impacts as grade separating railroad crossings.

Action Set 3: Improve Operational Efficiency addresses the following action categories:

- Improve marine terminal productivity, truck turn times, and intermodal operations
- Improve highway operations through the use of new technology

These improvements would make the most of existing infrastructure. Port and rail intermodal access at Hueneme Port will improve operational efficiency. Expansion of the port with cooperation from the naval base would also improve operational efficiency.

Action Set 4: Develop Equitable Public/Private Funding Strategy recognizes that implementation of the actions, projects, and programs with mitigations will require a coordinated effort by private and public sectors. The action set seeks to achieve the following:

- Maximize the Study Area's Fair Share of State and Federal Funds
- Identify Opportunities for Project-Specific User Needs
- Establish Institutional Structure for Managing User Fees and Revenues
- Initiate Supportive Legislation

Ventura County should continue to express interest in partnering with the private sector to help fund rail improvements. The county also needs to maintain and recognize relationships with other MCGMAP agencies that have a role in the regional movement of goods. In order for the port to expand, it would need to reach agreements with the adjacent naval base. The potential of partnership with the adjacent naval base would also influence goods movement.

All the projects in the county ultimately are designed to insure that Southern California maintains, if not enhances, its economic position. Maintenance of the regions economic vitality will be enhanced by the actions being done in Ventura County.

MULTI-COUNTY GOODS MOVEMENT ACTION PLAN
VOLUME 1, APPENDIX A: FINANCIAL FRAMEWORK

Prepared for:

Los Angeles County Metropolitan Transportation Authority (Metro)
Orange County Transportation Authority (OCTA)
Riverside County Transportation Commission (RCTC)
San Bernardino Associated Governments (SANBAG)
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April 2008
A31418

Table of Contents

1.0 FINANCIAL FRAMEWORK A-1
2.0 FEDERAL FUNDING SOURCES A-10
2.1 FEDERAL DISCRETIONARY PROGRAMS A-11
2.2 FEDERAL FORMULA PROGRAMS A-17
2.3 FEDERAL FORMULA PROGRAMS A-20
2.4 FREIGHT PROGRAMS IN SAFETEA-LU A-26
2.5 DEPARTMENT OF DEFENSE A-27
3.0 STATE FUNDING SOURCES A-28
4.0 LOCAL FUNDING SOURCES A-34
5.0 USER FEES A-37
6.0 INNOVATIVE FINANCE A-42
6.1 INNOVATIVE FINANCING MECHANISMS A-43
6.2 INNOVATION AND MANAGEMENT OF FEDERAL FUNDS A-46
6.3 INNOVATIVE PROJECT DELIVERY AND MANAGEMENT SYSTEMS/PUBLIC PRIVATE PARTNERSHIPS A-49
7.0 CONCLUSION A-55

List of Figures

Figure 1: Funding Sources for Completion of the Alameda Corridor East (ACE) Trade Plan A-2
Figure 2: Funding Sources By County for the ACE Trade Plan A-3
Figure 3: Percent of Funding By County for the ACE Trade Plan A-3
Figure 4: Funding Sources for the ACECA Portion of the ACE Trade Corridor Plan A-4
Figure 5: Funding Sources for the San Bernardino Portion of the ACE Trade Corridor Plan A-4
Figure 6: Funding Sources for the Riverside County Portion of the ACE Trade Corridor Plan A-5
Figure 7: Funding Sources for the Orange County Portion of the ACE Trade Corridor Plan A-5
Figure 8: Unfunded Portion of the ACE Trade Corridor Plan, By County A-6
Figure 9: Funding Sources for the Gerald Desmond Bridge A-6
Figure 10: Funding Sources for the SR-47 Expressway A-7
Figure 11: Funding Sources for the Navy Way / Seaside Avenue Project A-7
Figure 12: Funding Sources for the 1-110 Connectors A-8
Figure 13: Funding Sources for the Ports Rail Systems A-8
Figure 14: Funding Sources for I-10 from I-15 to Ford Street A-9
Figure 15: Funding Sources for Goods Movement Interchange Program A-9

List of Tables

TABLE OF CONTENTS

Table 1: Revenues Pledged for Repayment of TIFIA Financing A-22
Table 2: Summary of RRIF Program Agreements A-25
Table 3: Order of Magnitude Truck Toll Revenue Bond Levels A-39
Table 4: Potential Bonding Capacity From Container Fees A-41
Table 5: Requirements for Flexible Match Contributions A-48
Table 6: Innovative Contracting Roles and Responsibilities A-50

Note: The following financial framework was developed using the comprehensive list of projects and strategies contained in Appendix B, prior to the project partners' refinement of the regional and county-level list of projects included in the Executive Summary.

1.0 FINANCIAL FRAMEWORK

As shown in the comprehensive list of Goods Movement Projects within the MCGMAP Study Area, the results of this study have identified 249 projects for the region to improve goods movements. These projects fall into the following three project cost/funding categories:

1. Projects identified without cost estimates: 102 projects;
2. Projects identified with cost estimates with cost estimates and a preliminary funding plan: 50 projects; and
3. Projects identified with cost estimates but without a preliminary funding plan: 97 projects.

The total cost estimate for the 147 projects with cost estimates is almost $40 billion, while the 50 projects with preliminary funding plans have identified $2.5 billion for these projects. The resulting shortfall for projects with cost estimates is approximately $37.5 billion.

The following figures provide a range of funding sources identified for a sample of projects.

- Figures 1 through 8 provide a detailed breakdown of the Alameda Corridor East Trade Plan, which has a funding shortfall of $3.8 billion dollars. To date the largest funding sources identified are the State (282.3), the four counties ($245 million combined) and a SAFETEA-LU earmark ($172.3 million). However, only $82.6 million of the SAFETEA-LU earmarks are currently considered fully funded.
- Figures 9 through 13 provide summaries of five infrastructure projects in the ports area. These five projects total $2.16 billion of which 22 percent is committed from Federal sources and 19 percent is committed from State sources. However, the State General Obligation funds (25 percent of the total) represents the level of funding the ports would like to receive from Proposition 1B ($2 Billion Trade Corridor Infrastructure Fund). Please note that in the *Good Movement Action Plan,* the Business, Transportation and Housing Agency only recommended this source for two of the projects (Gerald Desmond Bridge and SR-47 Express) at lower funding levels. Finally, the ports have proposed that private industry should share in funding these projects which would be through a fee on loaded containers collected from Beneficial Cargo Owners (importers and exporters). The five individual projects reflect the following
    - Figure 9 summarizes the funding plan for the Gerald Desmond Bridge, which has identified funding sources for the entire $800 million project. The majority of project funding will be provided from Federal sources (40 percent - committed), private industry (28 percent) and State General Obligation (GO) Bonds (25 percent)
    - Figure 10 shows the funding plan for the SR-47 Expressway. Funding for the $557 million project has been identified with the largest shares provided by the Ports (52 percent), State GO Bonds (22 percent) and private industry (22 percent)
    - Figure 11 provides the Navy Way/Seaside Avenue project. Funding for the $40 million project has been identified with the largest shares provided by private industry (44 percent), State GO Bonds (39 percent) and the Ports (17 percent).

- Figure 12 summarizes the I-110 Connectors. Funding for the $134 million project has been identified with the largest shares provided by State GO Bonds (38 percent), private industry (38 percent), and 28 percent from the Ports.
- Figure 13 summarizes the $631 million Ports Rail Systems. Industry has been identified as primary funding source (61 percent) with the remainder to be funded by State GO Bonds (39 percent).

▪ Figures 14 and 15 represent funding plans within San Bernardino County for improvements to I-10 and the county's goods movement interchange improvement program.

- Figure 14 shows the only identified funding source to add auxiliary lanes on I-10 from I-15 to Ford Street is Measure I funds (68 percent of total costs).
- Figure 15 provides the funding sources for San Bernardino's Goods Movement Interchange Program. In total there are 27 interchange projects identified totaling $971 million. Identified funding sources include Measure I funds (52 percent) and Developer Fees (39 percent).

Figure 1: Funding Sources for Completion of the Alameda Corridor East (ACE) Trade Plan

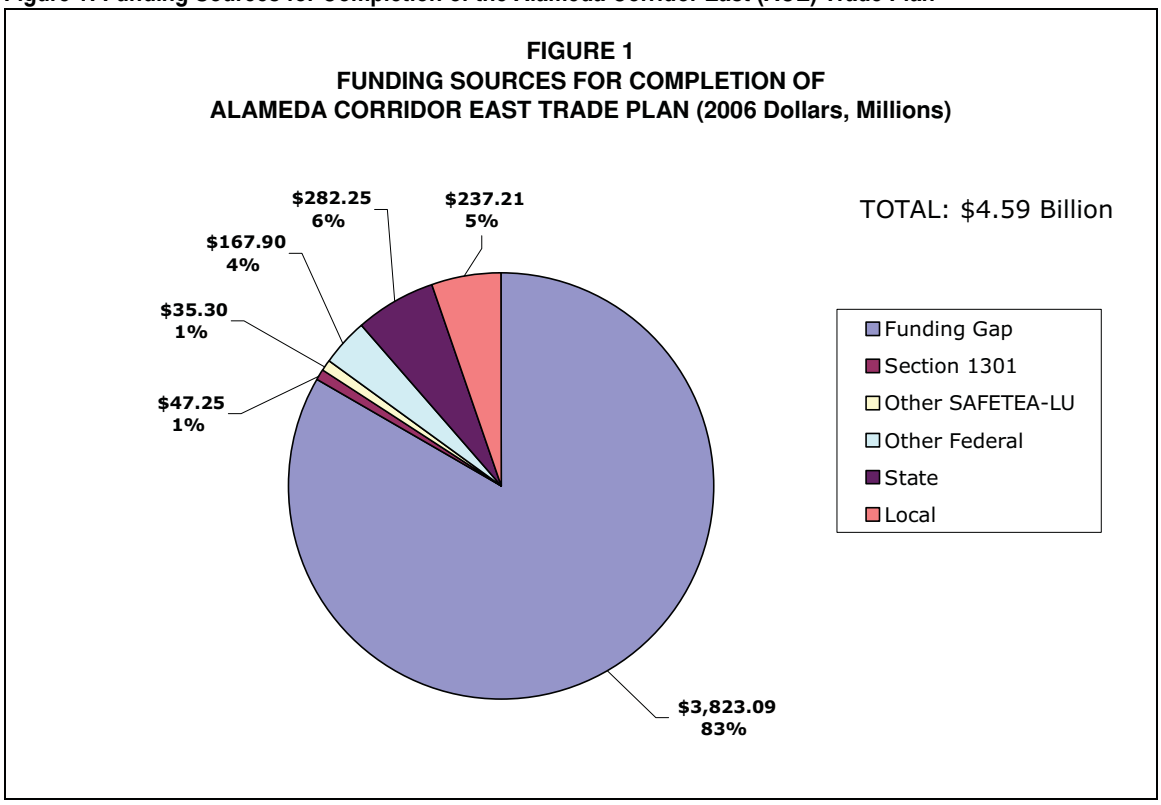
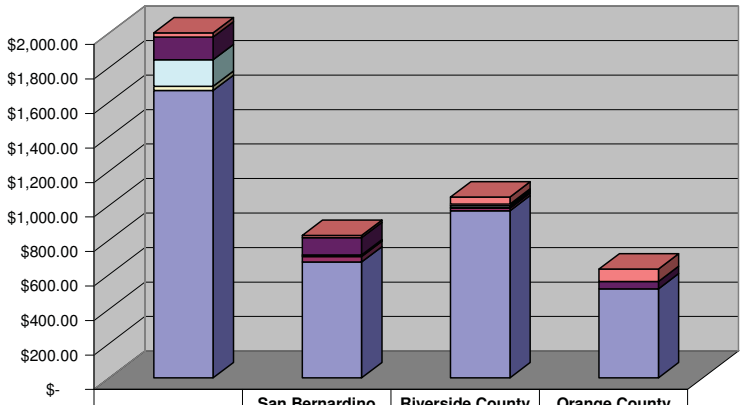


Figure 2: Funding Sources By County for the ACE Trade Plan

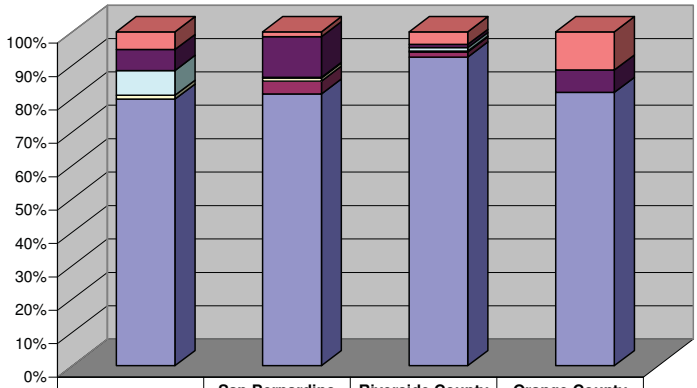
FIGURE 2
FUNDING SOURCES FOR COMPLETION OF ALAMEDA CORRIDOR EAST TRADE CORRIDOR PLAN (2006 Dollars, Thousands)



	ACECA - Los Angeles County	San Bernardino Associated Governments	Riverside County Transportation Commission	Orange County Transportation Authority
Local	$111.90	$12.81	$39.90	$72.60
State	$130.30	$99.95	$10.00	$42.00
Other Federal	$155.50	$1.60	$10.80	$-
Other SAFETEA-LU	$24.00	$8.20	$3.10	$-
Section 1301	$-	$31.25	$16.00	$-
Not Funded	$1,665.90	$671.99	$968.20	$517.00

Figure 3: Percent of Funding By County for the ACE Trade Plan

FIGURE 3
FUNDING SOURCES FOR COMPLETION OF THE ALAMEDA CORRIDOR EAST TRADE CORRIDOR PLAN (%)



	ACECA - Los Angeles County	San Bernardino Associated Governments	Riverside County Transportation Commission	Orange County Transportation Authority
Local	5%	2%	4%	11%
State	6%	12%	1%	7%
Other Federal	7%	0%	1%	0%
Other SAFETEA-LU	1%	1%	0%	0%
Section 1301	0%	4%	2%	0%
Not Funded	80%	81%	92%	82%

Figure 4: Funding Sources for the ACECA Portion of the ACE Trade Corridor Plan

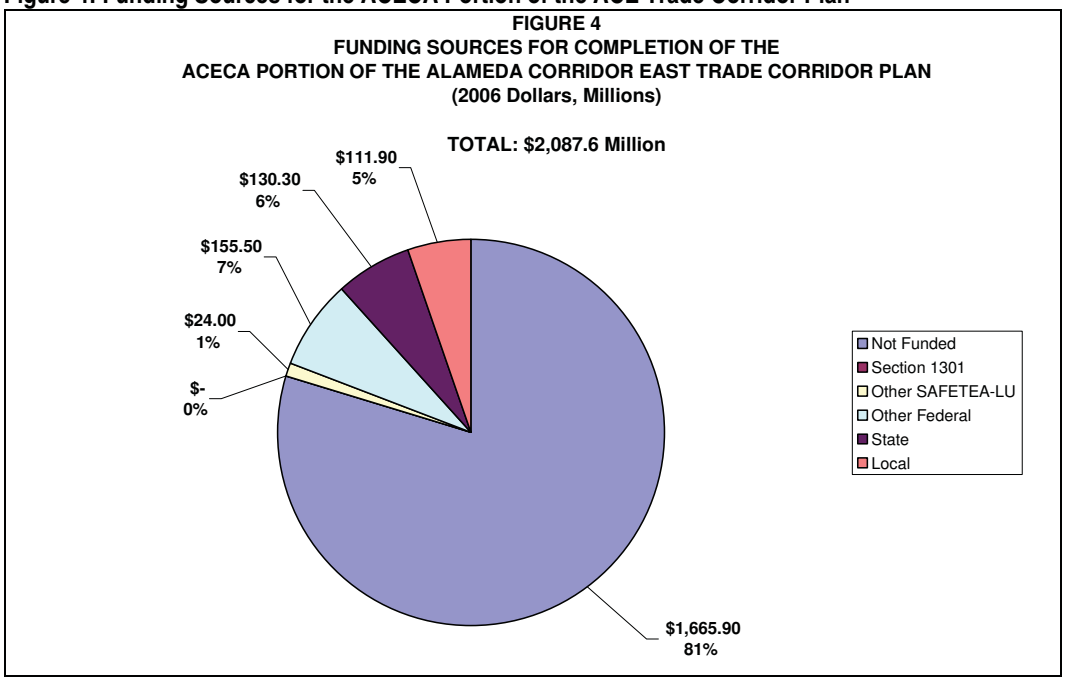


Figure 5: Funding Sources for the San Bernardino Portion of the ACE Trade Corridor Plan

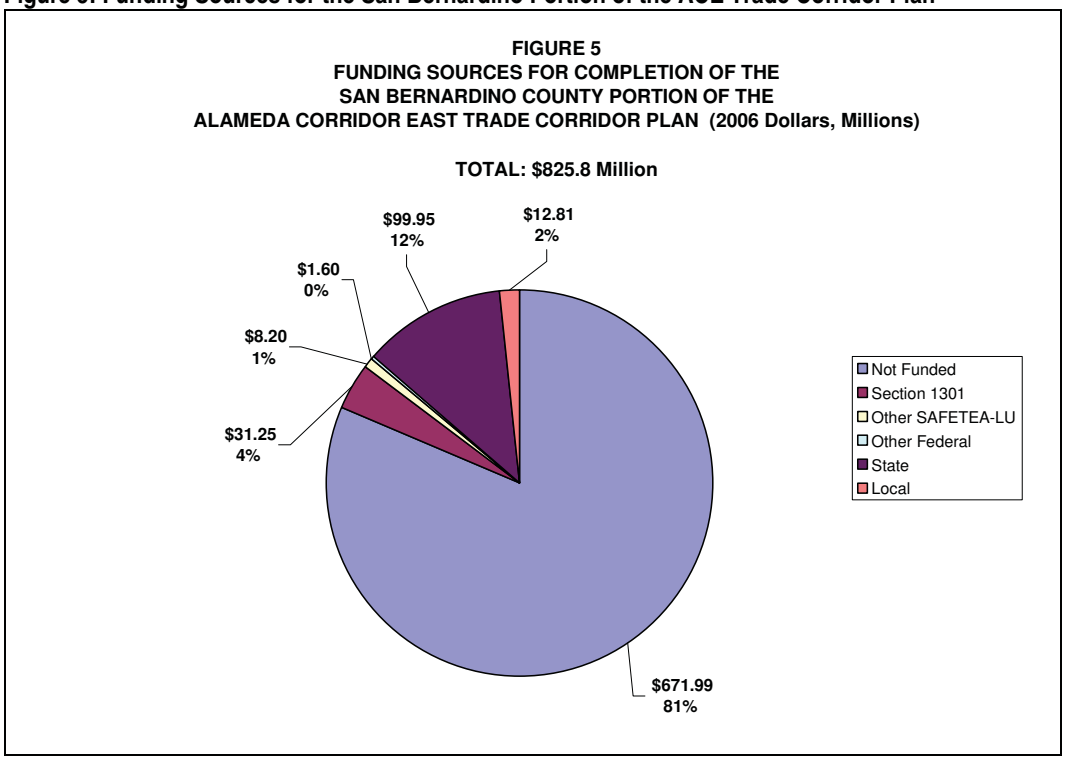


Figure 6: Funding Sources for the Riverside County Portion of the ACE Trade Corridor Plan

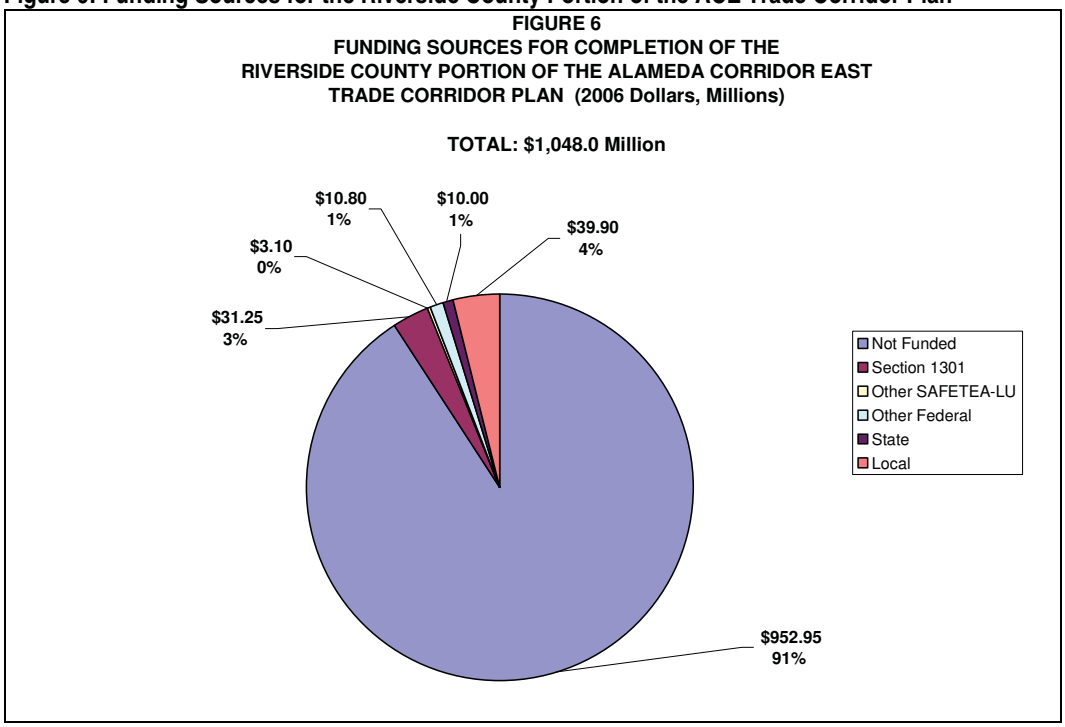


Figure 7: Funding Sources for the Orange County Portion of the ACE Trade Corridor Plan

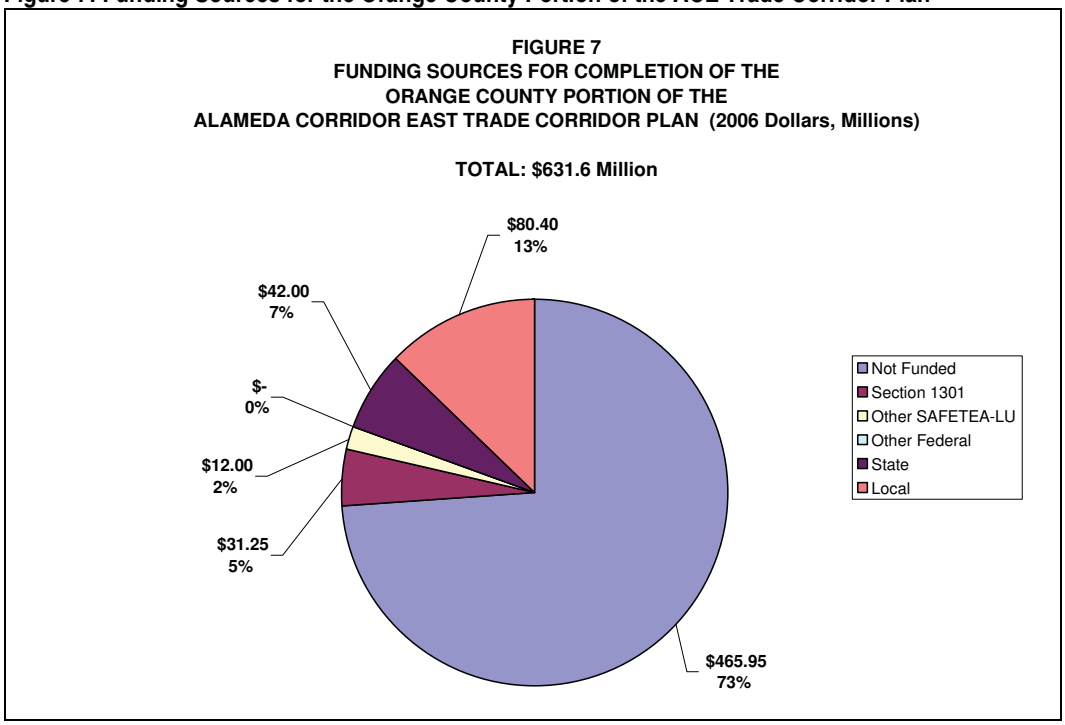


Figure 8: Unfunded Portion of the ACE Trade Corridor Plan, By County

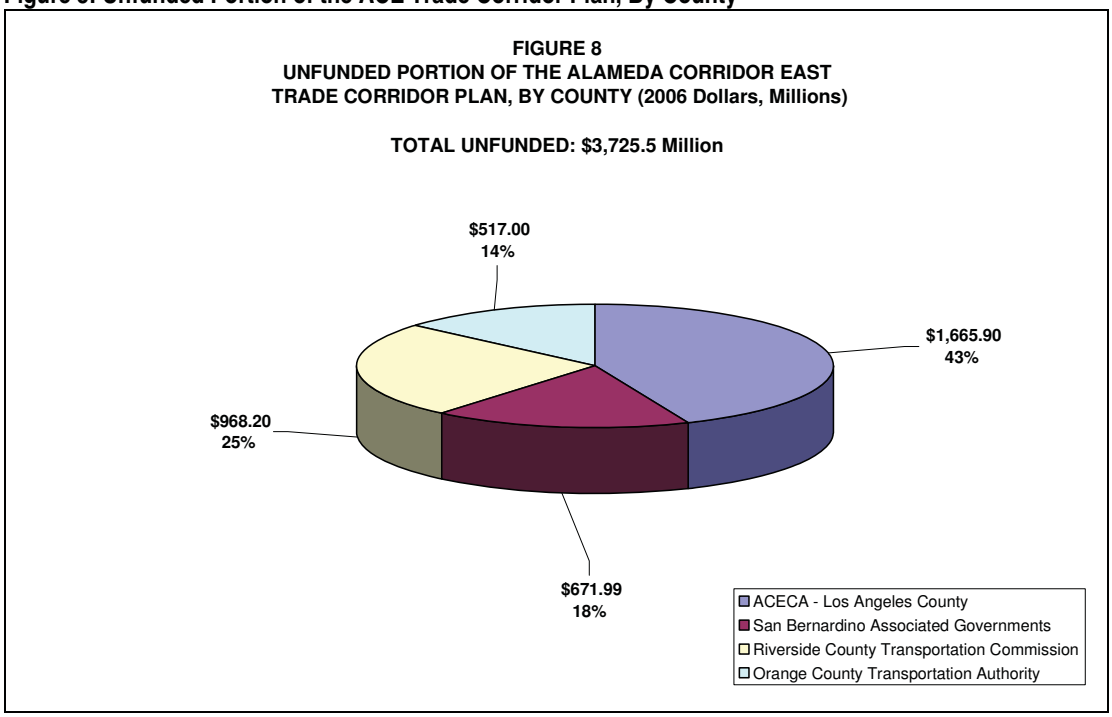


Figure 9: Funding Sources for the Gerald Desmond Bridge

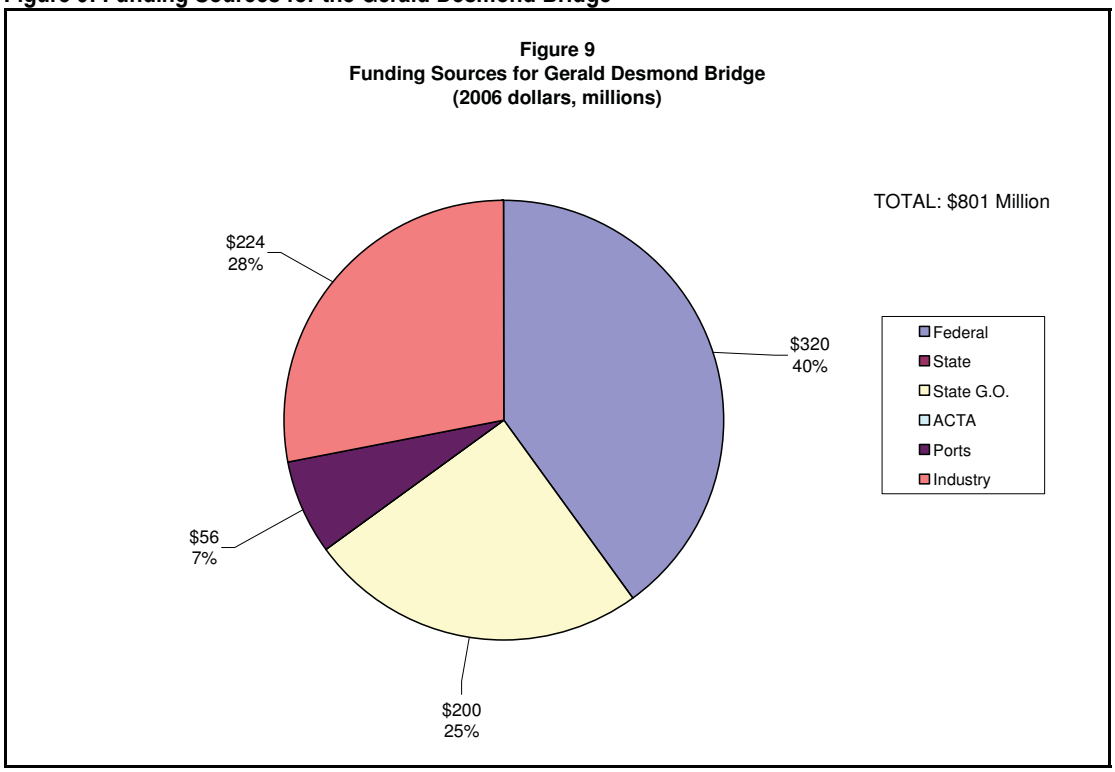


Figure 10: Funding Sources for the SR-47 Expressway

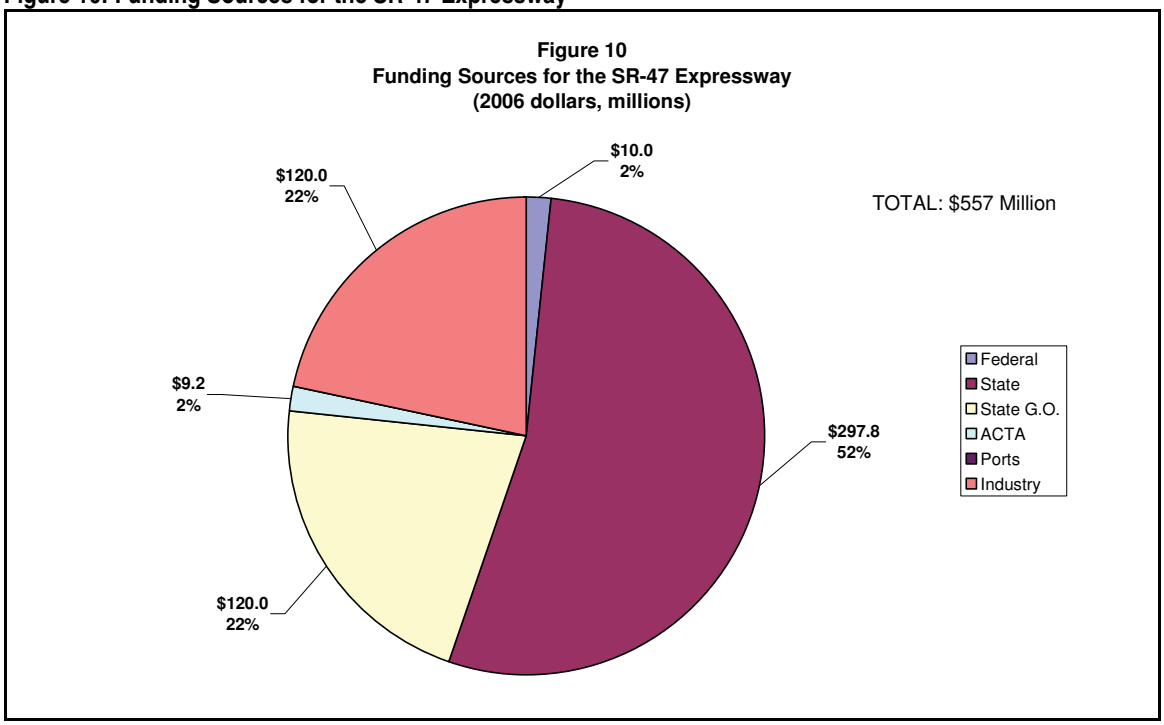


Figure 11: Funding Sources for the Navy Way / Seaside Avenue Project

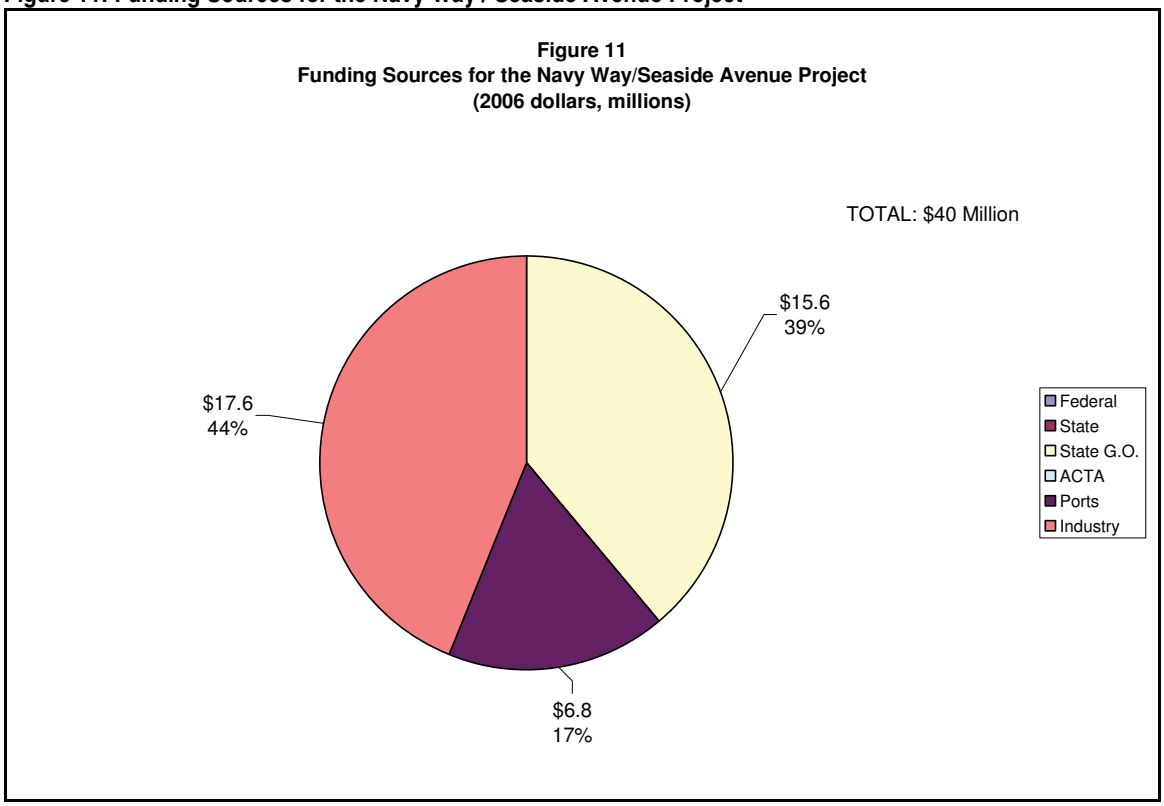


Figure 12: I-110 Connectors Project

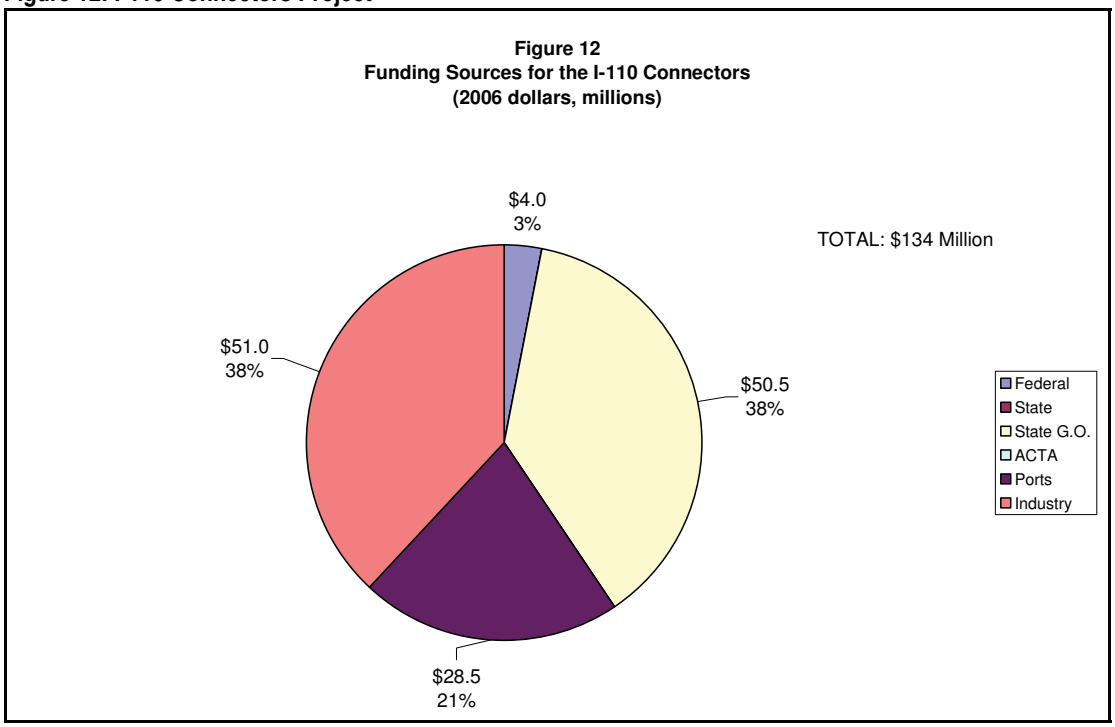


Figure 13: Funding Sources for the Ports Rail Systems

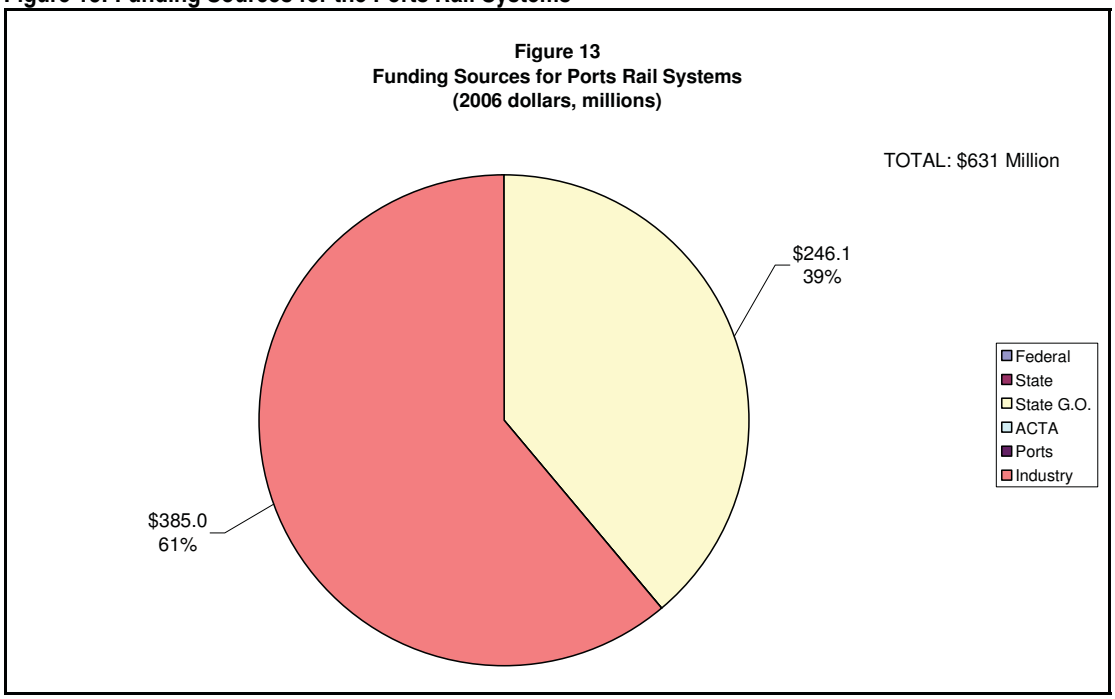


Figure 14: Funding Sources for I-10 from I-15 to Ford Street

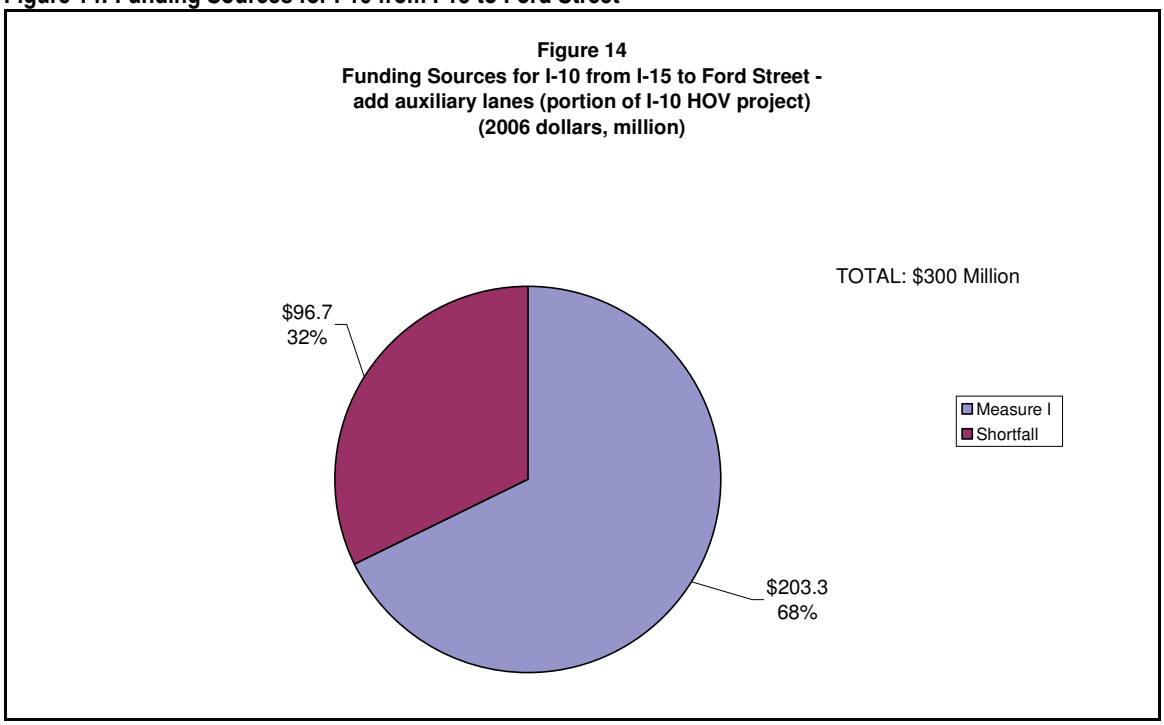
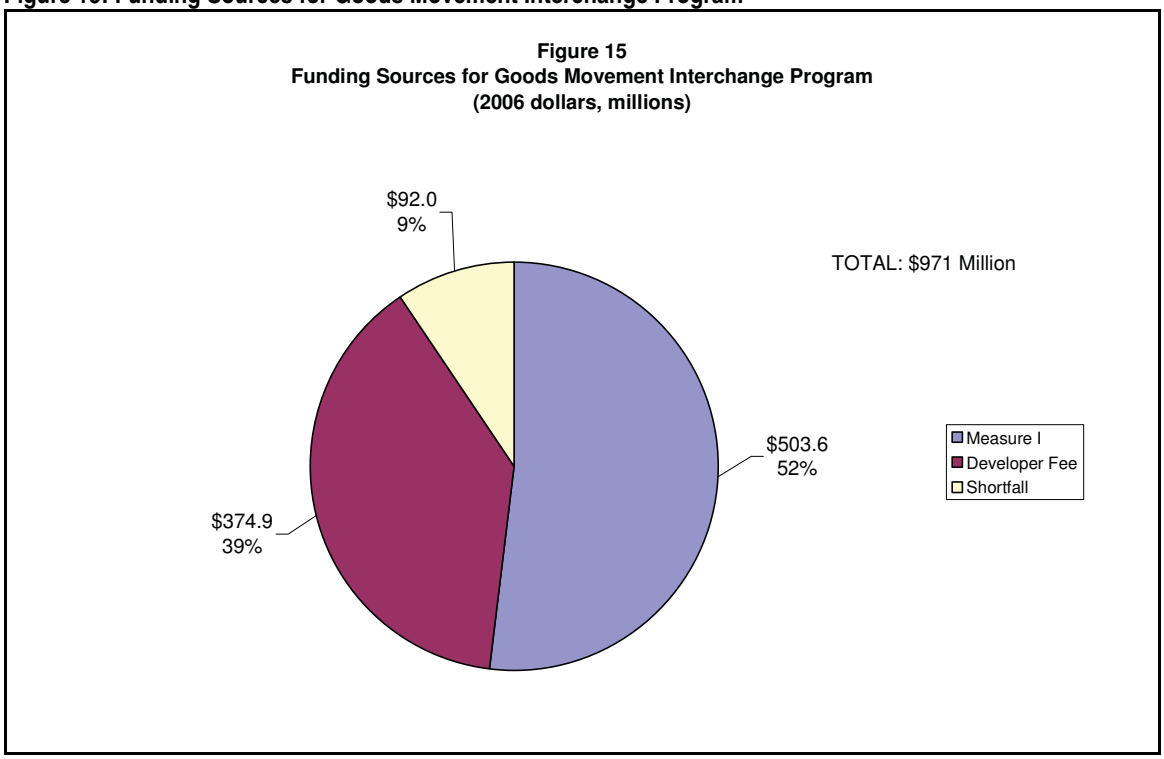


Figure 15: Funding Sources for Goods Movement Interchange Program



A substantial level of funding, from a variety of sources will be needed to incrementally implement the projects identified in this study. The following sections provide a menu of 45 potential funding sources that could be used to assist in implementing these projects. As shown in Appendix B, the funding sources are divided into six categories and represent a mixture of traditional funding sources and innovative sources: 1) Federal program; 2) State programs; 3) Regional programs; 4) Local programs; 5) User fees; and 6) Innovative Finance, Management of Funds, and Project Delivery Systems. These sources are discussed in greater detail following the table. Additionally, the project team has indicated which types of projects would likely be eligible for each source.

Finally, due the scarcity and competition for funding, as individual projects move forward it will be important for project sponsors to evaluate the strengths and weaknesses of a variety of funding sources. This will allow sponsors to target their efforts on those funding sources that will have the highest probability of success.

2.0 FEDERAL FUNDING SOURCES

This section describes the potential federal revenue sources that could be considered by project sponsors. The potential federal revenue sources include discretionary grant programs, formula grant programs, and financing programs from the US Department of Transportation; freight programs identified in SAFETEA-LU; and potential funding from the Department of Defense.

1) Discretionary programs: for these programs, the overall dollar amount for the program is authorized by Congress and funding is provided either in the form of earmarks or the responsible agency determines the projects to be funded based on evaluations. Discretionary programs include:
   - i) High Priority Project Earmark
   - ii) Projects of National and Regional Significance
   - iii) National Corridor Infrastructure Program
   - iv) Interstate Maintenance Program
   - v) Highway Bridge Program
   - vi) Transportation Improvement Projects
   - iv) Transportation, Community, and System Preservation Program
2) "Core" programs: these are formula based programs. Under FHWA Core programs, the state receives a certain percentage of available funds based on allocation measures such as population, lane-miles of Federal-aid highways, total vehicle-miles traveled on those Federal-aid highways, estimated contributions to the highway account of the highway trust fund; or lane miles. These are then sub-allocated to the metropolitan planning organizations and regional transportation planning agencies within the state. Core programs include:
   - i) FHWA Surface Transportation Program;
   - ii) FHWA Congestion Mitigation and Air Quality Program; and
3) Loan and Financing Programs: these programs provide secured loans, loan guarantees, and lines of credit from the Federal government for surface transportation infrastructure projects. Loan and financing programs include:

i) Transportation Infrastructure Finance and Innovation Act (TIFIA) program;

ii) Section 129 Loans; and

iii) Railroad Rehabilitation and Improvement Financing

4) Freight specific programs identified in SAFETEA-LU:

i) Freight Intermodal Distribution Pilot Grant Program; and

ii) Capital Grants for Rail Line Relocation Projects

5) Department of Defense (DOD) Programs including

i) Department of Homeland (DHS) Security Preparedness and Recovery Preparedness

ii) DOB Railroads for National Defense Program

iii) Defense Access Roads

iv) Military Construction Funds

v) Critical Infrastructure Funds

The five program categories are described in greater below.

2.1 Federal Discretionary Programs

Earmarked funds ensure an identifiable funding stream and advantage for any identified project. Congressional earmarks - especially if they are contained in both House and Senate versions of the reports accompanying the Transportation Appropriations measures - carry the special intent of Congress which means that these projects move ahead of others in the funding queue. Thus, Congressional earmarks often indicate a money trail and preference for key projects.

The ability to secure federal demonstration funding for project sponsors will be dependent on strong local, regional and state support and financial participation. It would also be dependent upon the project partners making a strong case that their project is a high priority within the region and the state.

High Priority Project Earmark

Description

High Priority Projects earmarked to receive federal funding are for transportation projects of special importance to members of Congress. Guaranteed funding is made up of two parts: (1) discretionary spending that is protected by firewalls that effectively wall off specified amounts of highway and transit spending from other discretionary spending; and (2) for the highway program, small amounts of mandatory funding, that is, funding exempt from the obligation limitation (Emergency Relief and $639.00 million per year of the minimum guarantee funding).

A potential source to project sponsors in the pending SAFETEA-LU reauthorization, the process is driven by House/Senate authorization committees every six years and by appropriation committees each year. Amounts available in SAFETEA-LU and in subsequent multi-year legislative reauthorizations of federal transportation programs are discretionary funds that can be earmarked with a positive impact to the project.

Depending on the specific federal program from which funds are earmarked, funding committed to earmarked projects may result in a reduction in the level of funding available for other projects in the State and/or the region. If earmarks are sizeable in total this could require deferral of other programmed or planned regional projects.

Federal earmarks are spread widely throughout the US in increments of various sizes. Earmarks are generally a small percent of the total project costs. Within the 1998-2003 6-year period of TEA-21, a total of approximately $9.30 billion was earmarked for 1,850 High Priority Projects nationwide. The average amount earmarked per project was $5.00 million, with funding spread over 6 years. Of the total number of projects nationwide, 154 projects were in California. Over the 6-year SAFETEA-LU reauthorization period, approximately 5,200 High Priority Project were identified with funding levels ranging from $10,000 to $100,000,000. There are 158 California High Priority Projects identified in SAFETEA-LU with funding levels ranging from a low of $12,800 to a high of $12.4 million. The project-specific annual earmarks range in size from a low of $2,800 to a high of $7.50 million.

Project Categories

High Priority Project earmarks could be used for highway, port and rail projects.

Projects of National and Regional Significance

Description

The Projects of National and Regional Significance (PNRS) program provides funding for high cost projects of national or regional importance. To be eligible for this funding source, a project must have a total eligible cost greater than or equal to the lesser of (1) $500 million or (2) 75 percent of the amount of Federal highway funds apportioned to the State in which the project is located for the most recently completed fiscal year (estimated at $337.5 million).

Eligible costs include development phase activities (including planning, feasibility analysis, revenue forecasting, environmental review, preliminary engineering and design work, and other preconstruction activities) and the costs of construction, reconstruction, rehabilitation, and acquisition of right-of-way, environmental mitigation, construction contingencies, acquisition of equipment, and operational improvements.

Applications for funding are solicited by the Secretary of Transportation and funding for projects is awarded competitively through an evaluation process modeled on the Federal Transit Administration (FTA) New Starts program. Projects are evaluated on the ability of the project to:

- generate national economic benefits;
- reduce congestion;
- improve transportation safety;
- enhance the national transportation system;
- garner support for non-Federal financial commitments and the degree to which Federal investment is leveraged;

- provide evidence of stable and dependable financing for construction, maintenance, and operation of the facility;
- use new technologies that enhance project efficiency; and
- help maintain or protect the environment

Similar to the FTA New Starts process, projects that rank well against the evaluation criteria prove the projects have significant benefit in the eyes of FHWA and Congress, which means that these projects will likely move ahead of others in the funding queue.

Six of the twenty-five projects listed in SAFETEA-LU were from California and included the following: Bakersfield Beltway System ($140 million); Roadway improvements in and around the former Norton Air Force Base as part of the Inland Empire Goods Movement Gateway project ($55 million); Alameda Corridor East ($125 million); Transbay Terminal ($27 million); Gerald Desmond/I–710 Gateway Project ($100 million); and the Sacramento Intermodal Station ($3 million).

Project Categories

PNRS earmarks could be used for highway, port and rail projects.

National Corridor Infrastructure Improvement Program

Description

The National Corridor Infrastructure Improvement Program is a discretionary program that provides funding for construction of highway projects in corridors of national significance to promote economic growth and international or interregional trade.

Funding for projects will be awarded through a selection process conducted by the Secretary that:

- requires States to submit an application
- gives priority to projects in corridors that are part of, or will be part of, the Dwight D. Eisenhower National System of Interstate and Defense Highways after completion, and to projects that will be completed within 5 years of allocation of funds for the project.

Highway construction projects in corridors of national significance will be selected with consideration of the extent to which:

- the corridor links two existing segments of the Interstate System
- the project facilitates major multi-state or regional mobility, economic growth, and development in areas underserved by highway infrastructure
- commercial traffic in corridor has increased since enactment of NAFTA and where traffic is projected to increase in the future
- international truck-borne commodities movement through the corridor
- the project will reduce congestion on an existing segment of the Interstate
- the project will reduce commercial and other travel time through a major freight corridor

- Federal funds will be leveraged and the value of the cargo carried by commercial vehicle traffic in the corridor and the economic costs arising from congestion in the corridor

Project Categories

The National Corridor Infrastructure Improvement Program is available for highway related projects.

Interstate Maintenance Program

Description

The 46,000 mile Dwight D. Eisenhower National System of Interstate and Defense Highways retains a separate identity within the national highway system. The Interstate Maintenance (IM) program, established under ISTEA and continued in SAFETEA-LU, provides for the on-going work necessary to preserve and improve Interstate highways. This includes funding for resurfacing, restoring, rehabilitating and reconstructing (4R) most routes on the Interstate System.

Authorizations totaling $25.2 billion are provided through 2009 which includes $500 million of authorized funds available at the discretion of the Secretary for high-cost, ready-to-go IM projects.

There are no regulatory criteria for selection of IM discretionary projects; however, the following criteria are also considered in the evaluation of candidates for this program:

- Leveraging of private or other public funding - Because the annual requests for funding far exceed the available IMD funds, commitment of other funding sources to complement the requested IMD funds is an important factor.
- State priorities - For States that submit more than one project, consideration is given to the individual State's priorities.
- Expeditious completion of project - Preference is also given to requests that will expedite the completion of a viable project over requests for initial funding of a project that will require a long-term commitment of future IMD funding. For large-scale projects consideration is given to the State's total funding plan to expedite the completion of the project.
- Transportation benefits and advantages that will be derived upon completion of the project.

Each year, usually around March, a memorandum is sent from the FHWA Headquarters Office of Program Administration to the FHWA division offices requesting the submission of candidate projects for the following fiscal year's funding. The FHWA division offices provide this solicitation request to the State transportation departments, who are the only agencies that can submit candidates. The State transportation departments coordinate with local governments and Metropolitan Planning Organizations (MPOs) within their respective States in order to develop viable candidate projects. The State transportation departments submit the candidate applications to the FHWA division office in their state. After the FHWA division office has reviewed the submission and ensured that the submission and all applications meet submission requirements, the FHWA division office sends the applications to the Office of Program Administration in Headquarters. Candidate projects are due in FHWA Headquarters usually around the middle of July.

The candidate project applications are reviewed and evaluated by the Office of Program Administration and an allocation plan is prepared for presentation of the candidate projects to the Office of the Federal Highway Administrator, where the final selection of projects for funding is made. The announcement of the selected projects and the allocation of funds are usually accomplished by the middle of November.

Seven California projects were included in the FY 06 IM Funding Program: Highway 156, Monterey County, $500,000; I-10 Cypress Avenue Overcrossing, Fontana, $1,000,000; I-15/Base Line Road Interchange, Rancho Cucamonga $1,000,000; Reyes Adobe Interchange Project, Agoura Hills $850,000; State Route 180 E Improvements, $900,000; and Louise Avenue I-5 Interchange Improvements Project $750,000.

Project Categories

The IM Program is available for highway related projects.

Highway Bridge Program

Description

The Highway Bridge Program provides funding to enable States to improve the condition of their highway bridges through replacement, rehabilitation, and systematic preventive maintenance. SAFETEA-LU no longer requires that the bridges be considered "significantly important". A total of $21.6 billion is authorized for this program through 2009 to enable States to improve the condition of their eligible highway bridges over waterways, other topographical barriers, other highways and railroads. The requirement that each State spend at least 15% of its bridge apportionment for bridges on public roads that are not Federal-aid highways (off-system bridges) is retained, but the 35% cap is removed. The discretionary bridge program was funded only through 2005; beginning in 2006, $100 million has been set aside annually to fund designated projects.

To be considered for this funding program, local agencies submit project applications and detailed eligible scopes of work and eligibility requirements. Caltrans evaluates the candidate projects for eligibility requirements and includes the successful candidate projects in the Highway Bridge Program and incorporated the projects into the Federal Transportation Improvement Plan (FTIP) and Federal Statewide Transportation Improvement Plan (FSTIP). Once their projects are in the FTIP and FSTIP, local agencies must request authorization to proceed according to the Local Assistance Procedures Manual to be eligible for project related cost reimbursement.

The federal reimbursement rate is 88.53% of the eligible participating project costs. Eligible project costs include: replacement, rehabilitation, painting, scour countermeasure, bridge approach barrier and railing replacement, low water crossing replacement, and ferry service replacement and also includes preliminary engineering and right of way costs.

Project Categories

The Highway Bridge Program is available for highway related projects.

Transportation Improvement Earmark

Description

The Transportation Improvements provision provides designated funding for specific projects identified in SAFETEA-LU. A total of 466 projects are identified, each with a specified amount of funding over the 5 years of SAFETEA-LU. For each project identified in SAFETEA-LU, the Secretary of Transportation will allocate a portion of the amount designated for that project: 10% in 2005, 20% for 2006, 25% for 2007, 25% for 2008 and 20% for 2009.

Examples of Southern California projects included in SAFETEA-LU under this funding program: Century Boulevard Pedestrian Safety and Transportation Improvements in City of Inglewood ($3 million); Widen Northbound I-405 between I-10 and US-101 for HOV Lane ($30 million); and Alameda Corridor East Construction Authority ($30 million).

Project Categories

Transportation Improvements earmarks could be used for highway, port and rail projects.

Transportation, Community and System Preservation (TCSP) Program

Description

This competitive program provides earmarked funds for projects that integrate transportation, community, system preservation, and the environment

Activities funded under the TCSP Program must address and integrate each of the purposes of the program listed below:

- Improve the efficiency of the transportation system.
- Reduce the impacts of transportation on the environment.
- Reduce the need for costly future public infrastructure.
- Ensure efficient access to jobs, services and centers of trade.
- Encourage private sector development patterns.

Two grants are provided under this program: planning grants and implementation grants.

- Planning assistance under the TCSP Program is intended to provide financial resources to explore integrating their transportation programs with community preservation and environmental activities. Grants will be awarded for planning activities that will achieve this integration, meet the purposes of the program described above and are innovative.
- Implementation assistance under the TCSP Program is intended to provide financial resources to enable agencies to carry out activities that address transportation efficiency while meeting community preservation and environmental goals.

Priority will be given to applicants that have already instituted preservation or development programs and policies that:

- Qualify for Federal highway and transit funding (to be determined by FHWA);
- Coordinate with State and locally adopted preservation and development plans;
- Integrate transportation and community and system preservation practices;
- Promote investments in transportation infrastructure and transportation activities that minimize adverse environmental impacts and lower total life cycle costs; and/or
- Encourage private sector investments and innovative strategies that address the purposes of the TCSP Program.

In FY 2005 the TCSP program distributed grants totaling $25 million among 39 projects. Within California, two projects received grants in the amount of $212,000 and one project received an $848,000 grant. Beginning in FY 2006, the TCSP program is authorized at $61.25 million per year through FY 2009.

Project Categories

The TCSP is available for highway related projects.

2.2 Federal Formula Programs

Surface Transportation Program

Description

The Surface Transportation Program (STP) provides a flexible source of funds to be used on surface transportation infrastructure projects (except local streets and roads are currently not eligible). Additionally, SAFETEA-LU expands STP eligibilities to include advanced truck stop electrification systems, high accident/high congestion intersections, and environmental restoration and pollution abatement programs.

STP funds are provided through a transportation program administered by the FHWA and Caltrans. SAFETEA-LU legislation requires states to distribute STP funds in the following manner:

- 10 percent - Safety construction
- 10 percent - Transportation Enhancement Activities
- 50 percent - Regional STP, STP Local, and rural areas guaranteed return
- 30 percent - State discretionary

STP funds can be used for construction, reconstruction, rehabilitation, resurfacing, restoration and operational improvements for roads or highways and are programmed in the Interregional Transportation Improvement Plan (ITIP) and/or the Regional Transportation Improvement Plan (RTIP) by Caltrans and the regional transportation planning agencies respectively. STP funds are programmed in the State Transportation Improvement Program (STIP), with 75 percent programmed by the regional transportation

planning agencies and 25 percent programmed by Caltrans. As such, STP funds are considered under the State and Regional funding sources.

STP is discussed further under the State and Regional funding sources.

Project Categories

STP could be used for all transportation project categories

National Highway System Program

Description

The National Highway System (NHS) Program provides funding for improvements to rural and urban roads that are part of the NHS, including the Interstate System and designated connections to major intermodal terminals.

The NHS is a 163,000-mile system of significant rural and urban roads serving major population centers, international border crossings, intermodal transportation facilities, and major travel destinations. The NHS Program provides funding for improvements to the Interstate System, other urban and rural principal arterials, highways that provide motor vehicle access between the NHS and major intermodal transportation facilities, the defense strategic highway network, and strategic highway network connectors.

SAFETEA-LU expands eligibility of NHS funding to include environmental restoration and pollution abatement to minimize the impact of transportation projects, control of noxious weeds and aquatic noxious weeds, and establishment of native species.

NHS funds are programmed in the STIP, with 75 percent programmed by the regional transportation planning agencies and 25 percent programmed by Caltrans. As such, NHS funds are considered under the State and Regional funding sources.

Project Categories

NHS funds are primarily used for highway projects

Highway Safety Improvements Program

Description

SAFETEA-LU authorized the creation of a new core Federal-aid funding program beginning in FY 2006. The goal of this program is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads

As part of SAFETEA-LU, the highway safety improvement program (HSIP) was established as a core program, separately funded for the first time, with flexibility provided to allow States to target funds to their most critical safety needs. A total of $5.1 billion is provided for 2006-2009. The HSIP requires States to develop and implement a strategic highway safety plan (SHSP) and submit annual reports to the Secretary of Transportation that describe at least 5 percent of their most hazardous locations, progress in

implementing highway safety improvement projects, and their effectiveness in reducing fatalities and injuries.

The SHSP will be used in the HSIP to identify and analyze highway safety problems and opportunities, include projects or strategies to address them, and evaluate the accuracy of data and the priority of proposed improvements. The SHSP must be based on accurate and timely safety data, consultation with safety stakeholders, and performance-based goals that address infrastructure and behavioral safety problems on all public roads. States are also required to develop an evaluation process to assess results and use the information to set priorities for highway safety improvements. States that do not develop a strategic plan by October 1, 2007, will be locked in at their FY 2007 HSIP apportionment level pending development of a plan. States with SHSPs have additional flexibility to use up to 10% of their HSIP funds for behavioral and other safety projects if they meet rail grade crossing and infrastructure safety needs as defined in their SHSPs.

Project Categories

SHSP funds are primarily used for highway projects

Congestion Mitigation and Air Quality Program

Description

The Congestion Mitigation and Air Quality (CMAQ) program provides a flexible funding source to State and local governments for transportation projects and programs that improve air quality and reduce congestion and help meet the requirements of the Clean Air Act. Federal funds are apportioned according to a formula based on population and severity of pollution in ozone and carbon monoxide areas. A number of projects identified in this report are considered key project in the region's air quality conformance plan. Funds are programmed at the discretion of the MPOs.

CMAQ funds are available for capital and O&M related activities. Projects classified as Transportation Control Measures (TCM) are eligible. TCM projects may be transit, high occupancy vehicle lanes, demand management programs, signal coordination, and bicycle facilities. O&M costs can be funded for up to three years.

Project Categories

CMAQ could be used for all transportation project categories

2.3 Federal Formula Programs

The Federal government can assist project sponsors in securing short and/or long term financing through the extension of credit assistance in the form of loans, loan guarantees, and letters of credit. The major federal credit assistance programs are provided through the Transportation Infrastructure Finance and Innovation Act, the Section 129 loan program, and the Railroad Rehabilitation and Improvement Financing Program.

Transportation Infrastructure Finance and Innovation Act

Description

The Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) was enacted as part of the Transportation Equity Act for the 21st Century (TEA-21), the predecessor to the Safe, Accountable, Flexible, Efficient Transportation Equity Act : A Legacy for Users (SAFETEA-LU), the current transportation authorization bill.

The TIFIA program provides project sponsors with secured loans, loan guarantees, and lines of credit from the Federal government for surface transportation infrastructure projects of national or regional significance. Under SAFETEA-LU, eligibility extends to any highway, transit or railroad project in excess of $50 million in cost, and can include intermodal facilities, border crossing infrastructure, expansion of multi-State highway trade corridors, and other investments with regional and national benefits. The program leverages Federal funds by encouraging co-investment. TIFIA credit assistance cannot exceed 33 percent of total project funding. In addition, an objective of the TIFIA program is to encourage private sector participation in project financing.

The Secretary of U.S. Department of Transportation (U.S. DOT) selects the projects to receive TIFIA credit assistance through a competitive application process administered by the TIFIA Joint Program Office. TIFIA projects are selected on the basis of eight statutory criteria, including national or regional significance; creditworthiness; private participation; acceleration of project schedules; use of new technologies; reduction in the level of federal budget authority required for loans versus grants; environmental stewardship; and reduction of Federal grant assistance.

Over the 1999-2006 period in which TIFIA has been in existence, a total of $10.6 billion in credit assistance has been made available through the program. Of this total, as of February 2006, a total of $3.2 billion in credit assistance has been committed to 15 projects totaling $12.6 billion in cost. The types of credit commitments consist of 12 projects with direct loans, two projects with a combination of direct loan and line of credit, and one project with a loan guarantee.

Table 1 summarizes the types of revenues pledged for repayment of the user-backed financings and tax-backed financing proposed to be issued with TIFIA assistance. While revenues pledged for repayment of user-backed financings are principally from tolls, other forms of repayment include commercial lease payments, retail rents, and rental car customer facility charges. Revenues pledged for repayment of tax-based financings consist of various forms of state, county, and local taxes and multi-year revenue streams, including property, sales, and hotel taxes and fuel excise taxes.

Table 1

Revenues Pledged for Repayment of TIFIA Financing

User-Backed Financings	Credit Instrument Type	Pledged Revenues
Miami Intermodal Center Rental Car Facility	Direct Loan	Rental Car Customer Facility Charges
State Route 125 Toll Road	Direct Loan	Facility Tolls
Farley Penn Station	Direct Loan and Line of Credit	Commercial Lease Payments / Retail Rents
Moynihan Station	Direct Loan and Line of Credit	Lease Income
Central Texas Turnpike	Direct Loan	Facility Tolls
San Francisco/Oakland Bay Bridge	Direct Loan	System-wide Facility Tolls
Warwick Train Station	Direct Loan	User Charges
US 183 A Toll Road	Direct Loan	Facility Tolls
Louisiana 1 Elevated Toll Facility	Direct Loan	Facility Tolls
Tax-Backed Financings	**Credit Instrument Type**	**Pledged Revenues**
Miami Intermodal Center General Program	Direct Loan	State Fuels Excise Taxes
Washington Metro Capital Improvement Program	Loan Guarantee	Local Government Contributions
Tren Urbano, Puerto Rico	Direct Loan	Various Commonwealth Taxes
Cooper River Bridge	Direct Loan	State and County Contributions
Staten Island Ferries and Terminals	Direct Loan	Tobacco Settlement Payments
Reno Transportation Rail Access Corridor	Direct Loan	Local Taxes (Sales, Hotel, Property) and Assessment District Revenues

Source: http://tifia.fhwa.dot.gov/projects.htm, March 2007.

As noted in the *U.S. Department of Transportation: Transportation Infrastructure Finance and Innovation Act Report to Congress, June 2002,* the public policy underlying the TIFIA credit program is for the Federal government to supplement, but not supplant existing capital finance markets for large transportation infrastructure projects. Section 1502 of TEA-21 stated "a Federal credit program for projects of national significance can complement existing funding resources by filling market gaps, thereby leveraging substantial private co-investment."

Because the TIFIA program offers credit assistance, rather than grant funding, its potential users are infrastructure projects capable of generating their own revenue streams through user charges or other dedicated sources of funding. The secured loans, loan guarantees, and lines of credit available through the TIFIA program can be used as an alternative to bonding and/or in combination with bonding.

Project Categories

TIFIA funds can be used on highway, freight rail, and port projects, including intermodal freight transfer facility projects. Projects must meet the applicable Federal grant funding rules, including planning, right-of-way acquisition, competitive procurement, and Buy America requirements.

Section 129 Loans

Description

The National Highway System Designation Act (NHS) established the Section 129 Loan Program as a mechanism to allow States to offer low interest loans to project sponsors. States can use their federal-aid highway apportionment funds for any Federal-aid highway project and can offer loans to either public or private project sponsors.

The Section 129 loan process includes the following activities:

- The State DOT identifies project(s) for a potential loan and the dedicated revenue source(s) for loan repayment;
- The State requests authorization of Federal-aid funding for the loan to the project and provides written assurance that a repayment pledge has been secured;
- The State negotiates a loan repayment schedule and terms with the project sponsor;
- FHWA determines if requirements are met, then approves the project for a loan and executes a project agreement;
- The State DOT makes the loan to the project sponsor;
- The State obligates the funds and receives the Federal share of the loan;
- The project sponsor (borrower) repays the loan on an approved schedule; and
- The State uses the loan repayments to make grants or loans to other eligible projects

Loans can provide funding for up to 80 percent of the total project costs as long as the State can document that sufficient funds have been secured for loan repayment. The loan's interest rate is determined by the State but the rates must below the market rate and the project must receive a financial benefit.

Loan repayment to the State by project sponsors must begin within five years following the project being completed. The total loan must be repaid within 30 years from the date Federal funds were authorized. Two additional requirements on the project sponsors include: 1) committing dedicated revenue source funds to repay the loan; and 2) not being allowed to use federal funds for loan repayment. Dedicated revenue sources for sponsors may include but not be limited to tolls, excise taxes, sales taxes, property taxes, motor vehicle taxes, and/or other beneficiary fees.

Among the benefits of the Section 129 Loan Program are:

- States have an opportunity for the funds to be recycled and re-used in the transportation system through a process where federal-aid highway funds are lent out, repaid by project revenues and then recycled on other projects; and
- States can subordinate Section 129 Loans and give investors and bondholder first lien on the project revenues. This subordination improves debt service coverage owed and acts as a credit enhancement.

There has been limited use of Section 129 loans by project sponsors. One key reason is the competition from the TIFIA program described previously. TIFIA created a federally administered credit opportunity and, more importantly, a new revenue source for the same kinds of projects that would likely use Section 129 loans. Additionally, SAFTEA-LU's reduction of TIFIA's minimal threshold for projects to $50 million makes the Section 129 Loan program less competitive. However, for projects that do not fit the requirements of the TIFIA program, Section 129 Loans remain a good alternative. For example, the George Bush Turnpike in Dallas used a Section 129 loan to overcome significant financial barriers and resulted in the project being completed over a decade sooner than would have been possible under traditional pay-as-you-go financing.

Project Categories

Traditionally, Section 129 Loans have been considered for highway projects. However, the FHWA Resource Center also noted that the Environmental Protection Agency is interested in using this program to support truck rest-stop idling services. Eligible project costs include: engineering; right-of-way acquisition, and construction, as long as the costs are incurred after FHWA authorizes the loan.

Railroad Rehabilitation and Improvement Financing (RRIF) Program

Description

The RRIF program provides financial assistance in the form of direct loans or loan guarantees to eligible participants for the purpose of: 1) acquiring, improving, or rehabilitating intermodal, rail freight, passenger equipment or facilities, including track, components of track, bridges, yards, building or shops; 2) to refinance outstanding debt incurred for these purposes; or 3) to develop or establish new intermodal or rail facilities.

Direct loans can be made for up to 100% of the total project cost, for terms up to 25 years at an interest rate equal to the cost of borrowing for a comparable term based on the current Treasury rate at the time of closing. Loan guarantees can be made up to 80% of the cost of a loan, for terms up to 25 years, at a rate the Secretary determines reasonable taking into account prevailing interest rates and customary fees incurred under similar obligations in the private capital market.

Additionally, the following changes included in SAFETEA-LU amended the RRIF program:

- **Expansion of eligible applicants:** SAFETEA-LU expanded the type of entities eligible for the RRIF program to include limited option shippers and commuter railroads.
- **Expansion of the list of projects to be given priority consideration:** SAFETEA-LU added to the list of eligible projects to include those that "enhance service and capacity in the national rail system" and "would materially alleviate rail capacity problems which degrade the provision of service to shippers and would fulfill the need in the national transportation system." These two types of projects were included to address congestion on the nationally important rail lines.
- **Expanding RRIF assistance levels:** SAFETEA-LU expanded the total authority for outstanding RRIF financial assistance from $3.5 billion to $35 billion and amount reserved for small and

regional railroads increased from $1 billion to $7 billion. Additionally, the Secretary may not establish a limit on the amount that could be used for one direct loan or loan guarantee.

- **Requirement for Collateral:** SAFETEA-LU provides that the Secretary may not require an applicant to provide collateral and that any collateral provided be valued at going concern value after giving effect to the present value of the improvement.

Table **2** summarizes the RRIF loan agreements that have been provided since 2002.

Table 2
Summary of Railroad Rehabilitation and Improvement Financing Program Agreements

Organization	Year	Amount
Iowa Northern Railroad	2006	$25.5 million
Wheeling & Lake Erie Railway	2006	$14 million
Iowa Interstate Railroad	2006	$9.35 million
Great Smoky Mountains Railroad	2005	$7.5 million
Riverport Railroad	2005	$5.5 million
The Montreal, Maine & Atlantic Railway	2005	$34 million
Tex-Mex Railroad	2005	$50 million
Iowa Interstate Railroad	2005	$32.7 million
Stillwater Central Railroad	2004	$4.6 million
Wheeling & Lake Erie Railway	2004	$25 million
Arkansas & Missouri Railroad	2003	$11 million
Nashville and Western Railroad	2003	$2.3 million
Dakota, Minnesota & Eastern Railroad	2003	$233 million
Amtrak	2002	$100 million
Mount Hood Railroad	2002	$2.07 million

Source: http://www.fra.dot.gov/us/content/177, March 2007.

2.4 Freight Programs in SAFETEA-LU

Freight Intermodal Distribution Pilot Grant Program

Description

SAFETEA-LU establishes a new program to facilitate and support intermodal freight transportation initiatives at the State and local levels to relieve congestion and improve safety; and to provide capital funding to address infrastructure and freight distribution needs at inland ports and intermodal freight facilities. Eligible projects from this program would include those that help relieve congestion, improve transportation safety, facilitate international trade, and encourage public/private partnership. Also eligible are projects for the development and construction of intermodal freight distribution and transfer facilities at inland ports.

In selecting projects for grants, the Secretary of DOT gives priority to projects that will:

b) reduce congestion into and out of international ports located in the United States;

c) demonstrate ways to increase the likelihood that freight container movements involve freight containers carrying goods; and

d) establish or expand intermodal facilities that encourage the development of inland freight distribution centers.

SAFETEA-LU provided $30 million over 5 years (2005-2009) for 6 designated projects: (A) Short-haul intermodal projects, Oregon, $5,000,000; (B) The Georgia Port Authority, $5,000,000; (C) The ports of Los Angeles and Long Beach, California, $5,000,000; (D) Fairbanks, Alaska, $5,000,000; (E) Charlotte Douglas International Airport Freight Intermodal Facility, North Carolina, $5,000,000; (F) South Piedmont Freight Intermodal Center, North Carolina, $5,000,000.

Capital Grants for Rail Line Relocation Projects

Description

SAFETEA-LU establishes a new capital grants program for local rail line relocation and improvement projects. A State is eligible for a grant for any construction project for the improvement of the route or structure of a rail line that either is carried out for the purpose of mitigating the adverse effects of rail traffic on safety, motor vehicle traffic flow, community quality of life, or economic development; or involves a lateral or vertical relocation of any portion of the rail line.

The Secretary of DOT considers the following factors when determining if a state is eligible for this grant program:

(1) The capability of the State to fund the rail line relocation project without Federal grant funding.

(2) Equitable treatment of the various regions of the United States.

(3) The effects of the rail line, relocated or improved as proposed, on motor vehicle and pedestrian traffic, safety, community quality of life, and area commerce.

(4) The effects of the rail line, relocated as proposed, on the freight and passenger rail operations on the rail line.

Approximately $350 million per year (2006-2009) is available with a $20 million maximum grant for a project.

2.5 Department of Defense

DHS Preparedness and Recovery Preparedness Grant Program

Description

The Department of Homeland Security has targeted six critical areas for funding: intelligence and warning, border and transportation security, domestic counterterrorism, protecting critical infrastructure, defending against catastrophic terrorism, and emergency preparedness and response. The mission areas focus on preventing terrorist attacks, reducing National vulnerabilities, and on minimizing the damage and maximizing recovery from attacks that do occur. The mission areas provide a framework for aligning the resources of the federal budget directly to the task of securing the homeland.

Of potential relevance to the rail and highway projects included in this report are the protecting critical infrastructure and emergency preparedness and response components of the six targeted areas identified by the Department of Homeland Security.

As determined by the Secretary of Homeland Security, the Preparedness and Recovery Preparedness Discretionary grant program was provided $1.15 billion in grant to state and local agencies in FY 2006. Of this total, $765,000,000 was to be used in high-threat, high density urban areas; $175,000,000 will be for port security grants; and $150,000,000 will be for intercity passenger rail transportation, freight rail, and transit security grants.

Project Categories

DHS discretionary grants could be used for all transportation projects.

DOD Railroads for National Defense Program

Description

Under Department of Defense Directive 4510.11, the Department of Defense established a special program to identify and protect commercial railroad infrastructure important for defense purposes. The program is administered by the Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA). SDDCTEA's mission is to "provide the DOD with the research, engineering, and analytical expertise to improve the deployability of U.S. Armed Forces, the transportability of military equipment, the infrastructure of the defense transportation system, and the management and execution of the DOD transportation programs for national defense." Under this program, DOD assures that its civil and commercial sector rail requirements are met, including:

- Identify and protect the civil rail lines important for movements in peace and war;
- Assist the military services in identifying installations that require rail service;
- Work with FRA, State rail planners, installations, and the commercial rail carriers in developing and coordinating the Strategic Rail Corridor Network (STRACNET) and STRACNET connector lines;
- Develop and publish the STRACNET Report; and
- Work to ensure that necessary commercial rail infrastructure is in place for rapid rail deployment capability from designated power projection platform installations.

DOD funding from this program would be considered annually through the Military Construction (MILCON) appropriations bills considered by Congress and proposed by the Administration.

Project Categories

This program could be used for rail projects only.

3.0 STATE FUNDING SOURCES

Four state funding programs were considered as potential sources for projects listed in this report: the Interregional Improvement Program component of the State Transportation Improvement Program (STIP), Grant Anticipation Revenue Vehicle (GARVEE) bonds, proceeds from the State infrastructure bonding, and the Transportation Finance Bank Revolving Loan Program. As well, there are over $2 billion in goods movement infrastructure projects recommended for funding through the Trade Corridor Improvement Fund Program (TCIF). Refer to Appendix D for more information and the list of projects nominated for funding through the TCIF.

STIP: Interregional Transportation Improvement Program

Description

The STIP is a multi-year capital improvement program of transportation projects on and off the State Highway System. The STIP is funded primarily from the State Highway Account, whose principal sources of funds are excise taxes on motor-vehicle fuels, commercial-vehicle weight fees, and funds from the federal Core programs. This account commits major resources for improving the interregional road system, providing highway safety, and ensuring the efficient operation of the state transportation system.

The CTC adopts the Caltrans five-year estimate of available funds for transportation projects. The Commission schedules most of the State's new transportation projects through the STIP prioritization process, which allows regional agencies and Caltrans to participate. As reflected in the 2006 STIP Guidelines, the CTC has adopted a specific list of performance indicators and measures to assist regional agencies in the quantitative and qualitative evaluation of candidate STIP projects.

STIP capital improvement funding goes to two broad programs: 75 percent of the funding goes to the Regional Improvement Program (see the Regional Sources section below) and 25 percent goes to the Interregional Transportation Improvement Program (ITIP). California state law further subdivides the funding

for both the regional program and a portion of the interregional program by formula into county shares. For the ITIP, Caltrans recommends projects, with input from the regional agencies.

The over-arching theme of the ITIP is to provide "funding for projects to improve the interregional movement of people and goods to and through urbanized areas. The Interregional Transportation Strategic Plan (ITSP) serves as a guide to be used in programming ITIP funds for completion of key portions of the freeway and expressway system and the intercity passenger rail program. Key program themes are:

- Complete the ITSP focus routes;
- Reduce congestion and promote livable communities;
- Improve goods movement; and
- Encourage rural funding partnerships.

As noted above, Caltrans is the responsible agency for prioritizing and programming the 25 percent of STIP funds that comprise the ITIP. Based on the policies and guidelines for ITIP, 60 percent of the ITIP funds are required to be used for interregional roads that are outside the boundaries of urbanized areas with a population of more than 50,000 and for inter-city rail projects. A minimum of 15 percent of these funds (or 9 percent of the entire ITIP) must be used for intercity rail improvements, including grade separation projects.

The remaining 40 percent of the ITIP funds can be for projects that are needed to facilitate the interregional movement of people and goods, including state highway, intercity passenger rail, mass transit guideway, or grade separation projects in either urbanized or non-urbanized areas. Of the 40 percent from the original 25/75 split, 40 percent goes to County Group 1 (the 45 Northern California Counties), and 60 percent goes to County Group 2 (the 13 Southern California Counties). These percents are formula-based: 75 percent is based on county population in relationship to the county group's population, and 25 percent is based on state highway miles in relation to the county group's state highway miles. Thus, the maximum level of funding available statewide provides a ceiling on the level of interregional funds the projects any one county may receive in any one year.

Based on the April 2006 California Transportation Commission Staff Recommendations, two new programming years, 2009-10 and 2010-11, were added to the STIP with over $1.9 billion in new capacity. The 2006 STIP differed from prior STIPs in that it required the programming of projects in three distinct categories, reflecting the restrictions on two of its major funding sources. The new capacity includes about $455 million for highway projects, $1.355 billion for rail and transit projects, and $116 million for transportation enhancement (TE) projects. The most serious challenge facing the Commission is that project nominations from Caltrans and regional agencies far exceeded the available capacity for highway projects. The Commission's adoption of the 2006 STIP left about $780 million in highway proposals out of the STIP while $730 million in rail and transit capacity remained unprogrammed, subject to future STIP amendments.

Project Categories

ITIP funds could be used for all transportation projects.

Grant Anticipation Revenue Vehicle (GARVEE) Bond Program

Description

The State of California has the legal capacity to use GARVEE bond financing to infuse funds into transportation in the near term. GARVEE bonds are tax-exempt debt instruments where future federal-aid highway funds in the State Highway Account are pledged to meet debt service requirements on bonds issued to fund transportation projects. GARVEE bonds are issued by the State and backed by annual federal appropriations for federal-aid transportation projects. In authorizing the use of GARVEE financing in California, the State Legislature intended to accelerate the funding and construction of critical transportation infrastructure projects and provide congestion relief benefits to the public significantly sooner than would be possible using pay-as-you-go traditional funding mechanisms.

By State policy, annual GARVEE debt service is limited to 15 percent of total federal revenues deposited in the State Highway Account for any consecutive 12-month period within the preceding 24 months. Each bond must be structured for debt service payments over a term of no more than 12 years.

The California Transportation Commission has the authority to select projects for accelerated construction through the use of GARVEE bonding. The selection would be through the programming process for the STIP and the State Highway Operation and Protection Program (SHOPP). The projects with the most potential for GARVEE funding are major improvements to corridors and gateways for interregional travel and goods movement. Major improvements include projects that increase capacity, reduce travel times, or provide long-life rehabilitation of key bridges or roadways.

The use of GARVEE bond financing was the result of the State's fiscal situation that severely restricted the level of ITIP (and RTIP) funding prior to 2004. On March 10, 2004, the State issued $657,713,000 State of California (California Department of Transportation) Federal Highway Grant Anticipation Bonds Series 2004A, the first and only issuance of GARVEE obligations to date. The bond proceeds are being used to pay a portion of the costs of acquisition of right-of-way and/or construction for eight projects approved by the CTC for funding.

Until the passage of the 2007 State Budget, the State's transportation funding situation continued to be significantly impaired due to General Fund loans, transfers of transportation funds out of the program, and other factors intended to improve the State's overall General Fund condition. Due to the lack of transportation funds, GARVEE bond financing was suspended until federally-required State matching funds could be identified. With the 2007 Budget, some of the transportation funding borrowed by the State will be repaid, however there were no GARVEEs issued.

Project Categories

If available, GARVEE funds could be used for all transportation projects.

Transportation Finance Bank (TFB) Revolving Loan Program

Description

The TFB Revolving Loan Program was implemented to provide flexible, short-term financing to public entities and public/private partnerships for the purpose of accelerating the delivery of transportation projects in California. The program was initiated in 1998 as one of the State Infrastructure Banks (SIB) authorized in

TEA-21, and was capitalized with $3 million in federal funding. With no activities in the program, in 2002 Caltrans initiated state legislation (AB2996, Chapter 805, Statutes of 2002) to take over responsibility for the program from the California Technology, Trade, and Commerce Agency. Caltrans developed guidelines and loan application documents which were approved by the CTC in January 2003.

Loans are available to local public entities and public/private partnerships. Any local transportation planning agency or county transportation commission may apply for a loan. Additionally, projects must be included in a Federal State Transportation Improvement Program (FSTIP) and must comply with all other Federal requirements, including National Environmental Policy Act, Americans with Disabilities Act, and Davis-Bacon Act requirements, as appropriate. Loans are available for any phase of an eligible project, but funding will be provided only for authorized expenditures incurred after the Commission has approved the loan.

Other requirements include but are not limited to, the following:

- The borrower must agree to provide collateral in the form of a pledge of county share allocations.
- The borrower will be solely responsible for ensuring that the project is in compliance with all applicable federal, state, and local laws, rules, regulations, and/or policies.
- The borrower must provide a financial plan for each project containing the required financial information.
- The borrower must demonstrate that the project has a high probability of resulting in a completed facility.

Under the initial guidelines for the TFB, loan amounts could not be less than $300,000 or over $1 million, with a maximum loan term of 6 years. While the program has not been active, it could potentially be reactivated with improvements in the status of the State's transportation revenues.

Project Categories

If available, TFB funds could be used for all transportation projects.

State Infrastructure Bonding and *GoCalifornia* Program

Description

Governor Schwarzenegger has proposed the Strategic Growth Plan, part of which is a historic comprehensive transportation investment package that incorporates GoCalifornia, a mobility action plan designed to decrease congestion, improve travel times, and increase safety. The Governor's Strategic Growth Plan for transportation proposed to reduce congestion below today's levels while accommodating future transportation demands from growth in the population and the economy. This would be done by both deploying demand management strategies that change how and when people drive and building new capacity to increase "throughput" in the system. It would improve mobility and accessibility to move people, goods, and services through a comprehensive, integrated, multimodal, world class transportation system. This effort would require innovation in transportation planning, construction and management, sustained coordination among regional transportation agencies and the state, and dedicated funding.

The Governor's GoCalifornia plan identified over $100 billion in transportation improvements to be funded through a combination of sources including but not limited to: Proposition 42 funds, general obligation

bonds, GARVEE bonds, revenue bonds, existing and planned local sales tax measures, public-private partnerships and increased federal funding.

As part of the funding for the Governor's GoCalifornia Program, on November 7, 2006 voters statewide approved four bond measures. Of the four, Proposition 1B provides $19.925 billion for transportation and could be a significant state funding source for the many of the projects identified in this report. The $19.925 billion Transportation and Air Quality Bond Package includes the following components:

- **Corridor Mobility Improvement Account (CMIA)** - $4.5 billion will be deposited in the CMIA to be available to the CTC, upon appropriation in the annual Budget Bill by the Legislature, for allocation for performance improvements on the state highway system or major access routes to the state highway system.
- **Trade Corridor Improvement Fund** - $2.0 billion will be deposited in this fund, available to the CTC upon appropriation in the annual Budget Bill by the Legislature and subject to such conditions and criteria as the Legislature may provide by statute, for infrastructure improvements along federally designated "Trade Corridors of National Significance" in this state or along other corridors within this state that have a high volume of freight movement. The CTC is to consult the Trade Infrastructure and Goods Movement Plan, trade infrastructure and goods movement plans adopted by regional transportation planning agencies, regional transportation plans, and Cal-MITSAC Statewide Port Master Plan.
- **STIP Augmentation** - Proposition 1B authorized $2.0 billion in general obligation bond proceeds to be available for projects in the STIP to augment funds otherwise available for the STIP from other sources. Under the Bond Act, the funds will be deposited in the newly created Transportation Facilities Account (TFA) and will be available, upon appropriation by the Legislature, in the same manner as other STIP funds.
- **State - Local Partnership Program Account –**The Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, approved by the voters as Proposition 1B on November 7, 2006, includes $1.0 billion to be deposited into the newly created program. The funds will be available to the California Transportation Commission, upon appropriation by the Legislature and subject to such conditions and criteria as the Legislature may provide by statute, for allocation over a five-year period to eligible transportation projects nominated by an applicant transportation agency. A dollar for dollar match of local funds is required for an applicant transportation agency to receive state funds under this program.
- **SHOPP** - $750.0 million will be deposited in the newly created Highway Safety, Rehabilitation, and Preservation Account for highway safety, rehabilitation, and pavement preservation projects. Of this, $250.0 million will be available for traffic light synchronization projects or other technology-based improvements to improve safety operations and the capacity of local streets and roads. Funds will be available to the Caltrans upon appropriation by the Legislature, for the purposes of the state highway operation and protection program.

Project Categories

State infrastructure bonds could be used for all transportation projects.

California Public Utilities Commission Section 130 Program

Description

The Section 130 Program provides federal funds to improve safety at existing at-grade highway-rail crossings. The purpose of Section 130 Program is to reduce the number, severity and potential of hazards to motorists, bicyclists, and pedestrians at highway-rail at-grade crossings.

The Section 130 program is a cooperative effort between the FHWA, Caltrans, California Public Utilities Commission (CPUC, or the Commission), railroad companies and local agencies. FHWA delegated the authority to manage this program to Caltrans in cooperation with the California Public Utilities Commission.

Crossings are selected for inclusion in the state wide funding list based on their hazard potential. There are a number of sources the Commission staff uses to target crossings that present a high hazard potential. These include the FRA's Web Accident Prediction System, the Commission's database to identify crossings with multiple accidents, local agencies, and railroads.

Commission staff reviews each targeted crossing. The review determines which crossings are considered for Section 130 funds. This is based upon such factors as the federal program requirements, eligibility criteria, and if there are improvements which can be made to reduce hazards that are covered by the Section 130 program.

An in depth diagnostic review is conducted for each crossing that will be considered for Section 130 funds. These crossings are then given a priority ranking based on several factors, including the U.S. DOT Accident Prediction Formula. Due to the finite amount of funding, the final priority list is created based on the highest ranking crossings. Commission staff provides the final priority list to Caltrans. Caltrans develops a funding schedule and solicits plans, specifications, and cost estimates (PS&E) for the scheduled projects. Upon approval of the PS&E, Caltrans will enter into a construction contract agreement with the railroad, and as necessary, the local agency. Caltrans uses the final priority list to allocate funding in order of priority.

All projects with improvements to only warning devices, illumination of the crossing, and signals may be funded 100% under the Section 130 Program. For projects that include safety improvements beyond that scope, the Section 130 Program may fund 90% of the total project cost. The city or the county may be required to pay the remaining 10% of the total cost. The railroad can voluntarily pay the local agency's 10% share.

Two or more crossings that are located within the electronic advance warning circuitry limits are considered a corridor project. PUC staff will not initially nominate corridor projects, as they require a greater commitment from the railroad or local agency. Corridor projects are limited to a maximum coverage of $1 million, and generally require a larger percentage match in funding by the railroad or local agency. New corridor projects will only be approved by joint agreement with Caltrans, the Commission, and the local agency/railroad.

FHWA provides approximately $10 million annual for the State's Section 130 Program to fund improvements to the over 11,000 public grade crossings statewide. On an annual basis, between 20-30 crossing improvements are selected from a screened priority list of over 100 candidate projects. Under SAFETEA-LU, the Section 130 Program will continue as part of the State's larger Strategic Highway Safety Program.

Project Categories

Section 130 funds could be used for highway and rail projects.

California Public Utilities Commission Section 190 Program

Description

Under the California Streets and Highways Code Section 190, $15 million is budgeted annually from the State Highway Account for grade separations statewide. The Section 190 Program provides funds to public agencies to grade-separate existing at-grade crossings, eliminate existing at-grade crossings, and improve existing grade-separated crossings.

Under Streets and Highways Code Section 2452, the California Public Utilities Commission is responsible for establishing and applying the criteria and formula used to prioritize projects nominated for grade separation or alternation. The criteria in the formula weigh vehicular and train volumes at crossing, project cost, accident history, delay caused by trains, sightlines along the crossing approaches, angle of the tracks to the roadway, and other factors.

As the process works, on a bi-annual basis, interested local agencies submit nominations to the CPUC with the data required for project evaluation. The Commission reviews the projects, holds public hearings, solicits testimony from applicants, and establishes a Grade Separation Priority List. After the Commission issues the Priority List, Caltrans accepts funding applications on or before April 1 of each fiscal year. While the priority list ranking is an important factor in whether a project is selected for funding, there are other factors that affect the decision. Projects must have completed design and environmental review, have a maintenance agreement with the host railroad, and have the local funding share committed. As a result, projects selected for funding may rank at the top of the priority list or at 50 or below.

A total of $15 million is available annually from the Section 190 Program. This level of funding has remained unchanged for over 20 years, despite various legislative efforts to increase it. Theoretically, an allocation may be up to 80 percent of the estimated cost to eliminate an existing crossing or reconstruct an existing grade separation. For a grade separation of a proposed new crossing, an allocation can be 50 percent of the project cost, with 50 percent from the local agency. However, an allocation to a project may not exceed $5 million from any one fiscal year. Cumulative allocations to any one project may not exceed $20 million over a multi-year period, not to exceed five years. Further, an agency that has received an allocation greater than $5 million is not eligible for an allocation for another project for a period of 10 years.

Project Categories

Section 130 funds could be used for highway and rail projects.

4.0 LOCAL FUNDING SOURCES

Two local funding programs categories were considered as potential sources for projects listed in this report: Value Capture Mechanisms (impact fees, assessment districts, and tax increment financing) and generation of project revenue (joint development, utility easement and leases, and naming rights).

Value Capture Mechanisms

Description

Value capture mechanisms provide the public sector the ability to capture some of the increased value - typically property value - that results from a transportation project. Without local government efforts to capture this value, the windfall accrues to private landowners. Examples include:

- A new freeway or interchange may increase the value of adjacent properties by improving access;
- Traffic calming investments on a local street may boost residential property values by reducing through traffic; and
- Implementation of a transit stations may create or improve the market for adjacent development.

The most common value capture mechanisms include: development impact fees; special assessment districts; and tax increment finance districts. Depending on the transportation project, the amounts recovered from these mechanisms may range from the partial payment of initial capital costs or partial operating cost payments to full repayment of capital costs and operating expenditures.

- **Development Impact Fees** are charges assessed by the public sector against developing property to recover the cost incurred to provide the transportation facilities required to serve the new or expanded development. The local government examines the proposed development, identifies what capital improvements are needed to sustain the desired level of service, and charges the developer a fee to cover a portion of the cost of the needed improvements. These fees are generally one-time cash payments. The developer of a proposed project pays the impact fee, which may in turn be passed on to the purchaser of the developed property.

- **Special Assessment Districts** are authorized in all 50 states either under explicit enabling legislation or under state constitutional provisions primarily to finance transportation facilities that provide local benefits. These districts cannot be used to finance facilities that provide general, community-wide benefits and as a result special assessments are not a viable alternative to finance major components of the regional transportation system.

  However, many state legislatures have passed new enabling legislation that allows special assessment districts to finance a broader range of facilities than in the past. These districts often go by such names as improvement districts, road districts, metropolitan districts, and building authorities.

  The greatest problem in using special assessment districts to finance regional transportation improvements is that it is difficult to establish a district that includes all those who benefit while excluding those who do not benefit. Special assessment districts are most successful in financing closed systems such as water and sewer systems.

- **Tax Increment Financing (TIF)** Tax increment financing (TIF) is a type of financing whereby municipalities can obtain in the present the fiscal benefit of future increases in the tax base by issuing bonds. TIFs are used primarily to fund redevelopment in blighted or underutilized areas. Under this method of financing, public improvements are financed by establishing an assessed value base in a project area at pre-project levels and dedicating the increment in property values for the repayment of bonds. The assessed valuation of property within the redevelopment area is determined as of a particular date, and is referred to as the frozen base assessed value. After the bonds are sold and redevelopment occurs, the assessed valuation in the project area generally rises, thus resulting in additional ad valorem revenues being generated within the project area. The difference in ad valorem

tax revenue received before and after the redevelopment is referred to as the tax increment. This revenue is paid into a special fund and used for repayment of tax allocation bonds, or bonds which are repaid through the dedication of tax increments. Only revenues above and beyond what would have been collected from the property owners under the base year assessed valuation are diverted into the repayment fund. When the bonds are fully repaid from the captured tax increments, the allocation to the special fund terminates, and the full value of the ad valorem taxes are disbursed to the involved taxing authorities.

Project Categories

Value capture mechanisms can be used to contribute funding for the capital cost of most transportation modes.

Generation of Project Revenues

Description

The most common mechanisms to generate project revenue are: joint development; utility easements and leases; and naming rights. Depending on the transportation project, the amounts recovered from these mechanisms typically provide partial support for on-going operating costs or partial repayment of capital costs.

- **Joint Development** is a process through which public transportation investments are coordinated with private land development investments so that they will generate a maximum stimulus to economic development and urban revitalization. Joint Development occurs when public and private sectors work cooperatively in the planning, financing, and construction of development projects adjacent to and integrated with transportation facilities.

- **Utility Easements and Leases** provide an opportunity for government entities to derive revenue from sharing use of the right-of-way with other non-interfering users. The types of uses generally interested and allowed to obtain easements or leases for use of transportation rights-of-way include utilities, fiber-optic networks and other forms of cable, communication systems, and other related uses.

- **Naming Rights** are a form of sponsorship provided through the provision of equity investments in the system. In return, sponsors receive a combination of advertising, promotion of image, and/or a commitment that their products will be used by the entity they are sponsoring. Sponsorships have become an increasingly important mechanism for funding large public projects, most notably stadiums, aquariums, and similar facilities that attract large attendance and/or provide high visibility.

Project Categories

Generation of project revenue can be used to contribute funding for the capital cost of most transportation modes.

5.0 USER FEES

While used in many areas of the country, enabling legislation is required to authorize use of fees/tolls for individual projects within the State of California. The following sections summarize alternate forms of users fees including: multiple variations of tolling highways or bridges, the Pier Pass Program, container fees and gate fees.

Tolls

Description

Tolls could provide a mechanism to generate revenue, moderate traffic demand, and/or provide incentive to use particular facilities. Tolling could be part of an overall funding strategy with toll revenues providing part of a larger revenue stream pledged for debt repayment. In addition to traditional tolling, the following sections summarize alternative forms of tolling that could be considered for future highway projects:

Transportation Development Credits/Toll Credits: Transportation Development Credits (TDCs), formerly known as toll credits, allow states which have toll road facilities that are part of the state and national highway system to utilize revenues derived from the facilities as a “credit” or “match” to any federally funded highway and/or transit related program. Toll credits are designed to 1) encourage states to increase capital investment in infrastructure; 2) increase the flexibility of state transportation finance programs; and 3) enable states to more effectively utilize existing resources.

The use of TDCs by a transportation agency does not generate new revenue for use on projects, rather they replace what otherwise would be local cash to meet federal matching requirements. By using toll credits to substitute for the required nonfederal share on a new Federal-aid project, the Federal share can effectively be increased to 100 percent.

Traditionally, the federal government would provide credits to states when only local and state funds were used to build toll facilities. However, SAFETEA-LU added a new provision that states are now given credit on a pro rata basis for their investments in toll projects.

Shadow Tolls: A Shadow Toll occurs on a roadway typically constructed under a Design Build Finance Operate (DBFO) arrangement where the government entity will pay the private contractor on an annual basis depending upon the volume of traffic using the road. The term "shadow tolling" is used since there are no tollbooths and the users do not pay tolls. Shadow tolls are not a financing source in themselves, but rather a payment approach which can employ a range of financing methods, innovative or traditional, and can permit a viable financing structure that fits the characteristics and needs of certain projects.

The potential benefits of shadow tolls to governments include:

- Transferring traffic risk to a developer/operator;
- Traffic levels are not impacted by users’ tolls or increased tolls;
- Multiple sources of revenues can be drawn upon to contribute to a shadow toll fund; and
- Project cost obligations can be reasonably known in advance and guaranteed for a particular traffic level.

Additionally, the traffic risk given to a developer/operator can be dampened by thresholds or guarantees. For example, if the traffic is less than specified in the agreement, a portion of the revenue shortfall could be made up by the Government. Conversely, if traffic is significantly greater than specified, a portion of the additional shadow toll revenues could be shared with the government sponsoring entity.

To date shadow tolls have only been implemented outside of the U.S., primarily in England. As a result there are no case studies within the U.S. to determine their effectiveness.

Pass-Through Tolling: Pass-through toll financing is a variation of the shadow tolling approach. Pass through tolling is an agreement between local communities and a state DOT where the local communities provide funding to build a state highway project and the state partially reimburses the community over time by paying a fee for each vehicle that drives on the new highway. In addition to supporting the construction of a project, the State DOT would also make repayment arrangements with communities that choose to maintain the new roadway facilities as well.

Pass-through toll financing can be used on toll or non-toll road facilities. However, this financing method is typically applied to non-toll roads. Pass-through agreements could be implemented with regional tollway authorities, counties, cities, and public or private entities.

Typically, the repayment schedule is based on traffic levels. If traffic levels are higher than projections in the agreement, the State DOT would repay at a faster rate. Conversely if traffic is lower than projected, repayment will occur over a longer period.

Truck Toll (TOT) Lanes: Truck only toll (TOT) lanes are highway lanes that are reserved for the use of commercial vehicles, primarily trucks. Commercial vehicles can pay a fee to use the lanes if so desired, or they can continue to use the general purpose lanes. TOT lanes can either be newly constructed facilities, or they can be created by reallocating the use of existing lanes. Similar in concept to HOT lanes, the pricing strategy for TOT lanes corresponds to a cost per mile that will keep the TOT lanes performing at a level of service that provides more reliable travel. The I-710 Corridor from Port of Long Beach/Los Angeles to SR-60 could potentially be a TOT facility.

Bonds leveraged from anticipated truck toll revenue could potentially be a component of the funding and financing proposed for the truck toll lane projects. However, since cost data and traffic forecasts are only conceptual at this time, the toll revenue and bonding potential described below should only be considered as order of magnitude estimates. The following assumptions were used to generate order of magnitude toll revenue bond estimates for each of the truck lane projects:

- Truck toll project opens in the Year 2030, the revenue begins Year 2030, and construction is completed in the Year 2030.
- First year total truck toll revenue estimates:
  - $255M year
  - $308M year
  - $435.5M
- The range of annual operating and maintenance (O&M) cost were assumed to be between $6.2 million and $13.6 million.
- Revenue and O&M costs will increase 110% over 30 years

- A debt coverage rate of 1.4 was assumed for all projects.
- Bonds would be issued at an interest rate of 5.75 percent with a 30 year repayment schedule and one scenario with a 40 year repayment schedule.
- No transaction fees, debt service costs, or debt service reserves have been included at this time, but would be included in future financial strategy development.
- As a rough estimate, the level of bond proceeds that could be issued under the truck toll projects was estimated to be roughly equal to 14 times the net revenue available for payment of debt service, assuming a 1.4 coverage ratio.
- In the absence of a real cost or schedule, the analysis was done in constant dollars. Any future financial strategy development would be based on refined project cost estimates and a proposed project implementation schedule and would be based on year of expenditure dollars.

As shown on the table below, based on the 2030 annual toll revenue estimates, bonds could issued to cover on the order of 20 percent of the truck toll projects cost.

Table 3
Order of Magnitude Truck Toll Revenue Bond Levels

2030 Toll Revenue	Bond Term	Estimated Toll Revenue for Mid-Point of Bonding Period	Average Available for Debt Service Payment (2007 $, Millions)*		Bonding Capacity (in Millions)	
(2007$, Millions)		(2007 $, Millions)	Low Maintenance Cost	High Maintenance Cost	Low Maintenance Cost	High Maintenance Cost
$255	30 years	$369	$259	$254	$3,670	$3,595
$308	30 years	$446	$314	$309	$4,446	$4,371
$436	30 years	$631	$446	$441	$6,312	$6,237
$255	40 years	$418	$294	$289	$4,161	$4,086

PierPass Program

Description

PierPass is a not-for-profit organization created by marine terminal operators to reduce congestion and improve air quality in and around the Ports of Los Angeles and Long Beach. PierPass created the OffPeak program to provide an incentive for cargo owners to move cargo at night and on weekends. For marine containers moving through the Ports of Long Beach and Los Angeles during peak periods, there is a $50 per TEU ($100 per FEU) fee. The fee is intended to provide an incentive for cargo owners to move shipments at night and on weekends, when there is no fee. The goal of the program is to reduce port-related truck traffic congestion on local freeways, curb port congestion and eliminate pollution caused by idling trucks during peak daytime traffic hours.

According to the PierPass website, during the first six months of operation, between 30 and 35 percent of all gate activity went to OffPeak operations. Prior to the program's implementation, PierPass officials had estimated that OffPeak would divert 15 to 20 percent of daytime movements to nights and weekends by the end of the first year.

Project Categories

Working in cooperation with the marine terminal operators, the potential exists to expand the use of funds for the PierPass provide for specific highway and port improvement projects.

Container Fees

Description

On February 23, 2007, State Senator Alan Lowenthal introduced a bill would require the Ports of Los Angeles and Long Beach, as well as the Port of Oakland, to collect a user fee on the owner of container cargo moving through the Ports. The fee would be set at a rate of $30 per twenty-foot equivalent unit (TEU) and would require the Ports of Los Angeles and Long Beach to:

- Transmit half of the funds from fee to the Southern California Port Congestion Relief Trust Fund, which the bill would establish in the State Treasury; and
- Transmit the other half of funds to the Southern California Port Mitigation Relief Trust Fund, which the bill would establish in the State Treasury.
- Senator Lowenthal's bill would require the moneys transmitted to each trust fund be available, upon appropriation, for expenditure by:
- the CTC exclusively for the purposes of funding projects that improve the flow and efficiency of container cargo to and from the ports, and to fund the administrative costs of this program; and
- the State Air Source Resources Board to develop a list of projects to mitigate environmental pollution caused by the movement of cargo to and from those ports, and for the administration of this program.

The bill would prohibit moneys deposited in those funds from being loaned or transferred to, or allocated or appropriated in any other way to, the General Fund.

A similar bill was vetoed last year by Governor Arnold Schwarzenegger. At that time, the governor urged industry leaders to come up with an alternative funding plan.

Finally, a similar bill introduced in the Washington State Legislature in February; however this bill has run into heavy opposition not only from retailers, but also from port authorities and labor groups worried about losing volume to Canadian ports.

Based on analysis conducted as part of this study, there is little support for the implementation of container fees to establish a trust fund for transportation and air quality improvement projects. However, establishment of a fee program similar to what was implemented for the Alameda Corridor may be supported by both the ports and private industry. Under the Alameda corridor approach, container fees implemented to address specific projects. Under this pay as you go approach, when the project is completed the fee ends.

Another approach with container fees could be to issue revenue bonds. Table 5 provides three order of magnitude bond issuance levels based on the following assumptions:

- Three projected forty-foot equivalent units (FEU) scenarios for 2030: Low (12.25 million); Medium (16.65 million), and High (21.25 million)
- Seven levels of container fees ranging from $10 to $200.

- A debt coverage rate of 1.4 was assumed for all projects.
- Bonds would be issued at an interest rate of 5.75 percent with a 30 year repayment schedule.
- No transaction fees, debt service costs, or debt service reserves have been included at this time, but would be included in future financial strategy development.
- As a rough estimate, the level of bond proceeds that could be issued under the truck toll projects was estimated to be roughly equal to 14 times the net revenue available for payment of debt service, assuming a 1.4 coverage ratio.
- In the absence of a real cost or schedule, the analysis was done in constant dollars. Any future financial strategy development would be based on refined project cost estimates and a proposed project implementation schedule and would be based on year of expenditure dollars.

Table 4
Potential Bonding Capacity From Container Fees
($, 000)

Scenario	2030 Projected FEUs (000)	$10	$20	$30	$40	$50	$100	$200
Low	12,250	$1,238	$2,476	$3,714	$4,953	$6,169	$12,338	$24,675
Medium	16,650	$1,683	$3,366	$5,049	$6,731	$8,384	$16,769	$33,538
High	21,250	$2,148	$4,296	$6,443	$8,591	$10,701	$21,402	$42,804

A second bonding scenario analysis examined the potential of implementing an alternative technology system that would connect the San Pedro Bay ports and an inland staging yard. It was assumed this the alternative technology system would accommodate approximately 1,215,000 FEUs per year (equivalent to the existing Hobart yard). As shown below, under this scenario revenue bonds in the range of $122 million and $2.45 billion could potentially be issued:

- $10 container fee: $122.8 million bond issue
- $20 container fee: $245.8 million bond issue
- $30 container fee: $368.4 million bond issue
- $40 container fee: $491.2 million bond issue
- $50 container fee: $611.8 million bond issue
- $100 container fee: $1,223.7 billion bond issue
- $200 container fee: $2,447.4 billion bond issue

Project Categories

If an agreement can be found among the ports and the private sector, container fees could provide a funding source for highway, port and rail projects.

Gate Fees

Description

At present, significant portions of the $2 billion Clean Air Action Plan remain under-funded. Along with the Southern California Air Quality Management District's $36 million commitment, the Ports of Long Beach and Los Angeles have committed $166 million and are researching a variety of mechanisms to achieve the Clean Air Action Plan goals including private industry fees and state General Obligation bonds. One mechanism being considered in the implementation of impact fees associated with the movement of cargo or sources (i.e., trucks, locomotives, vessels, etc.) as an approach to accelerate emission reductions from all source categories.

As stated in the *Clean Air Action Plan*, for impact fees to achieve the desired results, they must be structured appropriately. The following principles were included in the *Clean Air Action Plan* to provide guidance when crafting any fee with the goal of reducing pollution.

1) The fee should target the source of pollution, not cargo in general, and the fee must be higher for those individual sources that cause the greatest impact, while bypassing those sources that meet clearly defined goals/standards. For instance, a truck that does not meet the goals of the Clean Air Action Plan could be assessed a fee based on how old and/or dirty that truck was; while a clean truck meeting the goals could assessed no fee or a small administrative fee necessary to cover the costs of monitoring compliance.

2) Fees collected should be used to clean up the source that generated the fee (i.e., fees assessed against a dirty truck should fund a retrofit or replacement truck).

3) Costs should ultimately be borne by those who benefit from goods movement. To the extent possible, fees should be shifted to the beneficial cargo owners (BCO). Programs similar to the successful PierPass program provide an example of how this can be done.

4) When a specific program achieves its goal, the fee must end. Broad-based fees that have no defined use may fail to garner sufficient support to be successful. In addition, they undermine the goals of the program by not rewarding those who achieve the goals.

According to the *Clean Air Action Plan,* these principal will provide success in two ways. First, the resulting program would generate the funding necessary to achieve the emission reduction goals. Second, they hold the BCO accountable for their shipping decisions, making them pay the price for dirty modes of shipping and financially encouraging them to make more environmentally sound shipping decisions. While these principles are not absolute, adherence to them will more likely result in reduced emissions and increase the chances of broad-based support.

Project Categories

If implemented, impact fees could provide a funding source for highway, port and rail projects.

6.0 INNOVATIVE FINANCE

Around the country, as competition for federal, state, and local funding has becomes more competitive, the use of innovative finance techniques has increased. This section provides an overview of innovative financing techniques that are or have been used by other transportation agencies. In general, innovative

finance encompasses a mixture of: financing mechanisms; management techniques; and project delivery approaches to supplement traditional sources and methods.

The traditional approach to funding transportation projects has been through a combination of the Federal, State, regional and local sources described above. This funding approach typically leads to projects being incrementally implemented as funds become available over a number of years. The primary benefits of this "pay-as-you-go" approach to project funding are the simplicity of funds management and the lack of debt financing. However, there are negative implications with this approach as well including the potential for delays in implementing projects as a result funds not being available. These project delays could also contributed to additional negative implications related to the impact of inflation on project costs, and deferral of congestion, safety, air quality, and economic development benefits.

Innovative finance has evolved as a mechanism for transportation agencies to build projects faster by providing an alternative and/or a supplement to the traditional grant-based funding approach. As stated by the FHWA in its *Innovative Finance Primer*, the primary objectives of innovative finance are to:

- Maximize the ability of states and other project sponsors to leverage Federal capital for needed investment in the transportation system;
- More effectively utilize existing funds;
- Move projects into construction more quickly than under traditional financing mechanisms; and
- Make possible major transportation investments that might not otherwise receive financing.

As described in more detail below, innovative finance techniques typically fall into three main categories:

Innovative Financing Mechanisms consist of short and long term credit assistance and debt finance instruments. Included in this category are Federal and state credit assistance, general obligation bonds, revenue bonds, grant anticipation notes (GANs), certificates of participation (COPs), and private activity bonds.

Innovation and Management of Revenue Sources consist of approaches to manage the use of federal funds.

Innovative Project Delivery and Management Systems/ Public Private Partnerships consist of alternative forms of contracting beyond traditional design-bid-build through the use of public-private partnerships and/or leveraging of a project asset.

6.1 Innovative Financing Mechanisms

The sections below describe four types of long-term and short-term bonding and debt instruments. These include General Obligation (GO) Bonds, Revenue Bonds, Certificates of Participation (COPs), and Private Activity Bonds.

General Obligation Bonds

Description

General obligation bonds (GO bonds) are bonds that are legally backed by the full faith and credit of the issuing government. GO bonds are considered the most secure type of revenue bond, and therefore have

the lowest interest rates. The security is based on the issuing government's ability to use its full taxing power, if necessary, to assure repayment.

The primary advantages of GO bonds are the following:

- Ability to sell at lowest rates of interest due to their low risk;
- Lower administrative costs in preparing for bond issuance;
- Passage of a bond referendum by the voters can confirm the extent of population support for the project or program being financed.

Offsetting these advantages are the following disadvantages:

- Potential for delay due to need for voter referendum;
- In the absence of voter approval, agency officials must identify alternative ways to finance the project or else cancel it outright;
- Legal debt limits limit the magnitude of the debt issues; and
- With debt repayment from general tax revenues, the taxpayers paying for the project may be the same as the taxpayers benefiting from the project.

Project Categories

GO bonds can be used on all public sector transportation projects.

Revenue Bonds

Revenue bonds are municipal bonds distinguished from other bonds by the guarantee of repayment exclusively from revenues generated by a project. Unlike GO bonds which encumber tax revenue and the general credit of the issuing entity, only the project specific revenues specified in the legal contract between the bond holder and bond issuer are required to be used for repayment the Revenue Bonds. Interest rates may be slightly higher for revenue bonds since the security pledge is not as strong as GO Bonds. As a result, Revenue Bonds generally require establishment of a debt service reserve fund.

Policy Considerations

Compared with other forms of bonding, Revenue Bonds are considered the second-most secure type of municipal bonds. In general, any government agency generating operating revenues and expenses can issue revenue bonds.

Project Categories

Revenue bonds can be used on transportation revenue-generating projects including toll roads and bridges; airports; and ports.

Certificates of Participation (COPs)

Description

COPs are tax-exempt bonds, issued by a state-authorized, tax-exempt entity (typically called Finance Corporation) that allows government entities to finance capital projects. The proceeds of the bond sale are

used to acquire capital assets. The capital assets are leased to a government entity, which makes semi-annual lease payments using a combination of local funds and Federal grant funds. Additionally, COPs can provide government entities a long-term debt instrument that does not require voter approval or fall under other state constitutional and statutory requirements. Across the country, COPs have been used by municipalities to pay for prisons, office buildings, vehicles (including transit vehicles), and even parks.

The primary transportation use of COPs has been for transit investments since transit agencies are reliant on capital equipment (rolling stock, buses, or depots) that is well suited to lease agreements. COPs have not been used regularly for roadway projects, but they provide a potential creative financing option for specific highway related investments, such as automated toll collection or ITS equipment.

Examples of COPs financing include the California Transit Finance Corporation, which has funded bus purchases for several California transit agencies. Transit agencies in Los Angeles, New York, and Denver have also issued locally-funded Equipment Trust Certificates, COPs, and Beneficial Interest Certificates to finance bus purchases. These securities are very similar and differ primarily in the specifics of their implementation and documentation.

Benefits of COP's to transit agencies include:

- Freeing up of Federal grants that had been committed to vehicle purchase. This allows the agency to reprogram the grant funds for other capital projects and accelerate their completion;
- Potentially lower vehicle unit costs from a larger order size;
- Reduction in the risk of higher future vehicle prices due to inflation or changes in environmental or other laws;
- Potential lower operating costs from accelerated retirement of older vehicles and maintaining a more standardized fleet;
- Better conformance with mandates for air quality, or service to persons with disabilities; and
- Net cost savings from interest earned on cash balances.

Project Categories

COPs have been used primarily for transit projects but could be used for highways, airports, or ports.

Private Activity Bonds

Description

Private Activity Bonds are bonds that allow a portion of the proceeds to be used for non-governmental purposes. By definition, a Private Activity Bond is either:

- A bond of which more than 10 percent of the proceeds will be used for non-governmental purposes and which is going to be repaid from revenues received from a private entity; or
- A bond that will have the lesser of 5 percent or $5 million of the proceeds used for loans to non-governmental entities.

As part of SAFETEA-LU, Section 142 of the Internal Revenue Code was amended to add highway and freight transfer facilities to the types of privately developed and operated projects for which private activity

bonds may be issued. This change allows private activity on these types of projects, while maintaining the tax-exempt status of the bonds. However, the law sets a $15 billion limit on the total amount of these bonds and directs the Secretary of Transportation to allocate this amount among qualified facilities. The U.S. DOT is presently accepting applications from sponsors interested in using a portion of the $15 billion in exempt facility bonds.

The types of highway and freight transfer facility projects that would qualify for this revenue source include:

- Any surface transportation project which receives Federal assistance under Title 23;
- Any project for an international bridge or tunnel for which an international entity authorized under Federal or State law is responsible and which receives Federal assistance under Title 23; and
- Any facility for the transfer of freight from truck to rail or rail to truck which receives Federal assistance under Title 23 or Title 49.

Finally, to provide additional incentives for private equity investment, SAFETEA-LU also states that any surface transportation project which receives Title 23 assistance is qualified to benefit from private activity bonds. This includes projects that receive TIFIA credit assistance since these are Title 23 projects. As a result, this provision extends eligibility to TIFIA-assisted public transportation, intercity bus or rail facilities and vehicles, including vehicles and facilities owned by Amtrak, public freight rail facilities or private facilities providing public benefit for highway users, and intermodal freight transfer facilities.

Private Activity Bonds represent a dual interest by allowing private benefit in order to stimulate investment in infrastructure that will provide a public benefit. To increase private developer and operator investment in U.S. transportation infrastructure, SAFETEA-LU included provisions to facilitate private access to tax-exempt interest rates. The goals of these provisions are to lower the cost of capital, enhance private investment, and attract new sources of revenue through the increased involvement of private investors.

Project Categories

Private Activity Bonds are primarily designed for use on highway and freight transfer facility projects.

6.2 Innovation and Management of Federal Funds

Federal transportation law provides various mechanisms that facilitate better cash management and enhance opportunities to leverage future federal funds. These mechanisms include Tapered Match, Flexible (or Soft) Match, and Advanced Construction Authority.

Tapered Match

Description

Historically, local match for Federal grants on individual transportation projects was on a payment-by-payment basis. Under this approach, project sponsors had to shoulder the required non-Federal matching

share of project costs each and every time they sought reimbursement of eligible project costs. This requirement not only ensured that the state would pay the required non-Federal share over the life of a project's construction, but also that the state would do so at every step of the way to completion.

A legislative change as a result of TEA-21 removed the requirement for a payment-by-payment match. The removal of this requirement created the opportunity for project sponsors to use the tapered match approach, which imposed the non-Federal matching ratio on the project total rather than individual payments.

The tapered match approach allows project sponsors to seek Federal reimbursement of expenditures as high as 100 percent in the early phases of a project provided that by the time the project is complete, the overall Federal contribution does not exceed the statutory Federal-aid limit for the project.

Most Title 23 projects may request may request the use of a tapered match approach, with the following exceptions which are considered to be inconsistent with the intent of tapered match:

- Advance construction projects;
- STP projects for which the non-Federal match is being provided on a program-wide basis, or
- Projects that are financed with GARVEE bonds.

Tapered match is most useful in cases where the government sponsor of a Federal-aid project lacks sufficient funds to match Federal grants at the start of the project, but expects to accumulate the match over the life of the project.

When requesting approval to use the tapered match approach, project sponsors must document the approach will achieve one of the following:

- The use of tapered match, when compared to the use of traditional match procedures, would result in an earlier project completion.
- The project costs would be reduced by using a tapered match
- Tapered match would provide for additional non-Federal funds to be leveraged for the project.

Project Categories

The tapered match approach can be used on all transportation projects.

Flexible (or Soft) Match

Description

Traditionally, Federal-Aid programs required that recipients of Federal funds contribute to the total cost of a project. Additionally, Federal law placed limits on both the types and sources of contributions that could satisfy the matching requirement. For instance, cash contributed by state and local governments could satisfy the matching requirement while other types and sources of funding simply reduced the total project cost and the standard matching requirement continued to be applied to the remaining project cost.

Provisions in the NHS Act and TEA-21 introduced flexibility by allowing certain public donations of cash, materials, and services to satisfy the non-Federal matching requirement. These matching options included:

- The value of private and certain state and local contributions, including publicly-owned property;
- Funds from other Federal agencies may count toward the non-Federal share of recreational trails and transportation enhancement projects;

- Funds from the Federal Lands Highway Program may be applied as non-Federal match for projects within or providing access to Federal or Indian lands; and
- Funds from Federal land management agencies may be used as the match for most Federal-aid highway projects.

These legislative changes, known collectively as Flexible Match provisions, increased a project sponsor's ability to fund its project by:

- Accelerating certain projects that receive donated resources;
- Allowing the reallocation of funds that otherwise would have been used to meet Federal-aid matching requirements; and
- Promoting public-private partnerships by providing incentives to seek private donations.

Most of the conditions related to the use of flexible match concern the types of contributions that are eligible. The critical part of this eligibility determination is the combination of the source of the contribution (private, local, state, or Federal) and the nature of the contribution (cash, materials, land, services, or buildings and equipment).

Table 5 provides the basic tests that determine whether a given non-Federal contribution can satisfy Federal-aid matching requirements under the flexible match provisions.

Table 5

Requirements for Flexible Match Contributions

Type of Donation	Source of Donation	Conditions
Funds	Private - Yes	Funds must be received during the period between project approval and submittal of final voucher
Funds	State - Yes	Same as above
Funds	Local Govt. - Yes	Same as above
Land (right-of-way)	Private - Yes	Property must be appraised to determine fair market value
		Value must be included in total project cost
		Property may be donated anytime during the project development
		Donation does not influence environmental assessment
Land (right-of-way)	State - Yes	Same as above
Land (right-of-way)	Local Govt. - Yes	Same as above
Materials	Private - Yes	Materials must be appraised to determine fair market value
Materials	State - No	
Materials	Local Govt. - Yes	Materials must be appraised to determine fair market value
Services	Private - Yes	Grantee must document the market value of services
Services	State - Limited	Publicly-contributed services count toward match for only Transportation Enhancement projects
Services	Local Govt. – Limited	Publicly-contributed services count toward match for only Transportation Enhancement projects

Source: http://www.fhwa.dot.gov/innovativefinance/ifp/innoman.htm, March 2007.

Project Categories

The tapered match approach can be used on all transportation projects.

Advanced Construction Authority

Description

Advanced Construction Authority provides a project sponsor the ability to request and receive approval to construct Federal-aid projects in advance of the apportionment the federal dollars. This technique gives project sponsors a cash flow management tool which allows for the accelerated start of projects using their own funds with a future conversion to Federal assistance. Typically, project sponsors "convert" advance-constructed projects to Federal aid when sufficient Federal funds and obligation authority are available, and do so all at once.

Project sponsors also have the option of a partial conversion of advanced construction where they obligate funds for an advance-constructed project in stages. This removes any requirement to wait until the full amount of obligational authority is available. Project sponsors can convert an advance constructed project to a Federal-aid project in stages, based on cash flow requirements and availability of obligational authority, rather than all at once on a single future date. This flexibility enables a project sponsor to begin some projects earlier which will then be delivered to the public sooner.

The use of Advanced Construction Authority minimizes the need to set aside full obligational authority before starting projects. As a result, implementing agencies can accomplish a greater number of concurrent projects that would otherwise not be possible. In addition, Advanced Construction Authority can facilitate construction of large projects, while maintaining obligational authority for smaller projects.

Project Categories

Advanced construction authority can be used on all transportation projects.

6.3 Innovative Project Delivery and Management Systems/Public Private Partnerships

Innovative project delivery and management systems represent a partnership between a public agency and private sector entity, which expands on the traditional, private sector role in the delivery of transportation projects, also known as Public Private Partnerships (PPP).

According to FHWA's website, public-private partnerships (PPPs) refer to contractual agreements formed between a public agency and private sector entity that allow for greater private sector participation in the delivery of transportation projects.

By expanding the private sector's role on projects, public agencies are able to tap private sector's technical, management and financial resources in new ways to achieve objectives such as greater cost and schedule certainty, supplementing in-house staff, innovative technology applications, specialized expertise or access to private capital.

Conversely, business opportunities for the private partner can expand in return for assuming the new or expanded risks and responsibilities.

Key reasons public agencies have established PPPs include:

- Accelerating the implementation of high priority projects by packaging and procuring services in new ways;

- Turning to the private sector to provide specialized management capacity for large and complex programs;
- Enabling the delivery of new technology developed by private entities;
- Drawing on private sector expertise in accessing and organizing the widest range of private sector financial resources;
- Encouraging private entrepreneurial development, ownership, and operation of highways and/or related assets; and
- Allowing for the reduction in the size of the public agency and the substitution of private sector resources and personnel.

The following sections discuss options that expand private sector responsibilities through the use of partnerships. Table 6 summarizes the variation in roles and responsibilities between the contracting approaches.

Table 6

Innovative Contracting Roles and Responsibilities

	Own	Conceive	Design	Build	O&M	Financial Responsibility
Design-Build	Public	Public	Private by Fee Contract		Public	Public
Design-Build-Operate	Public	Public	Private by Fee Contract			Public
Design-Build-Finance	Public	Public or Private	Private by Fee Contract			Public, Public/Private, or Private

Source: http://www.fhwa.dot.gov/ppp.htm, and Sharon Greene & Associates, November 2006.

Design-Build Project Delivery

Description

Design-Build is a project delivery method that combines two traditionally separate services into a single contract. With Design-Build procurements, project sponsors execute a single fixed-fee contract for both architectural/engineering services and construction. Historically, the design-build project delivery method has been more prevalent in private sector work, however it is becoming increasingly popular in the public sector.

With Design-Build, the private contractor assumes primary responsibility for the design work and all construction activities. Additionally, the contractor assumes the risks associated with providing these services for a fixed fee. The project sponsor is typically responsible for project financing and operating and maintenance when construction is completed.

Under the Design-Build approach, a certain amount of preliminary engineering and project definition must be completed by the project sponsor in order to prepare bid documents. Experience in the highway sector suggests that preliminary design efforts of 10 to 15 percent completion are usually adequate. While a greater level of design may be advantageous from the perspective of greater accuracy in cost estimation, it may serve to minimize opportunities for private sector innovation.

The typical design-build procurement practice is to rely upon best value, which is also encouraged by Federal guidelines. The best value approach takes into account both the technical capabilities and qualifications of the design-build team, and cost. There is no universally accepted approach for determining

best value, with the request for proposal usually specifying the relationship between technical factors and price.

Project Categories

All transportation modes can use Design-Build

Design-Build-Operate–Maintain Project Delivery

Description

The Design-Build-Operate-Maintain (DBOM) model (also know as build-operate-transfer (BOT)) adds operations and maintenance (O&M) to the design and construction responsibilities of design-build procurements. This “turn-key” delivery approach transfers design, construction, and operation of a single facility or group of assets to a private sector partner and is practiced by several governments around the world.

With DBOM, the contractor assumes primary responsibility for the design work, all construction activities, and on-going O&M for the transportation project. Additionally, together with the design-builder assumes the risks associated with providing these services for a fixed fee. The project sponsor is typically responsible for project financing and retains the operating revenue risk as well as any surplus operating revenue.

The advantage of the DBOM approach include:

- Combining responsibility for usually disparate functions—design, construction, and maintenance—under a single entity which allows the private partners to take advantage of a number of efficiencies;
- Requires the establishment of a long-term maintenance program up front, together with estimates of the associated costs; and
- Provides the benefits of "life cycle costing" as part of the process since contractors understand that most infrastructure owners spend more money maintaining their systems than on expansion.

DBOM contracts are typically awarded through a competitive bid process following a transparent tender process. In response to the specifications provided in the tender documents, bidders provide a single price for the design, construction and maintenance of the facility for whatever period of time is specified.

Policy Considerations

While the DBOM approach has the potential to reap substantial rewards, project sponsors must be able to specify all standards to which they want their facilities designed, constructed, and maintained. Project sponsors relinquish much of the control they typically possess with traditional project delivery.

Project Categories

All transportation modes can use Design-Build-Operate-Maintain

Design-Build-Finance Project Delivery

Description

The Design-Build-Finance-Operate (DBFO) approach transfers to the private sector the responsibilities for a project's design, construction, finance and O&M bundled together. Within the US, there is a great deal of variety in DBFO arrangements especially related to the degree to which financial responsibilities are actually transferred to the private sector. However, one common component of all DBFO projects is that they are either partly or wholly financed by debt leveraging revenue streams dedicated to the project. These revenue streams are primarily direct user fees (tolls), however, others sources include lease payments, shadow tolls, and vehicle registration fees. Future revenues are leveraged to issue bonds or other debt that provide funds for capital and project development costs. Additionally, they are also often supplemented by public sector grants in the form of money or contributions in kind, such as right-of-way. In certain cases, private partners may be required to make equity investments as well.

The DBFO approach is more commonly used to develop new toll road projects in Europe, Latin America, and Asia. In these areas the project's debt is usually raised by private concession companies who are fully responsible for designing, building, financing, and operating the projects. However, in the US, given public sector agencies' ability to issue low-interest tax-free debt, it is often more cost-effective for public project sponsors to issue debt than their private sector partners. Because of this, public project sponsors using the DBFO approach in the US often issue project debt themselves, but rely on their private partners to study the different options for doing so and to recommend a final financing package. In such cases, the revenue risk may be passed on to the private partner or retained by the public project sponsor.

Policy Considerations

DBFO procurements can be expected to shift a great deal of the responsibility for developing and operating surface transportation infrastructure to private sector partners. In nearly all cases, the public agency sponsoring a project would retain full ownership over the project. However, as with the DBOM approach, the private partner would have design-build responsibilities and would then maintain and operate the infrastructure for a fixed fee. Depending on the revenue sources used and revenue risk allocation, private partners in the United States may or may not be exposed to revenue risks.

Project Categories

All transportation modes can use Design-Build-Finance-Operate.

Leasing of Publicly-Owned Assets

Description

This PPP approach involves the long term leasing of an existing, publicly-financed toll facility to a private sector concessionaire. The lease would be for a prescribed period during which the concessionaire would have the right to collect tolls. In exchange for the lease, the private partner must operate and maintain the facility, in some cases make improvements, and pay an upfront concession fee. The potential benefits of long term leases include:

- De-politicizing the toll setting process by transferring responsibility to the private sector;
- Ability of leases to increase toll revenues generated by existing facilities;

- Ability to generate extremely large up-front lease payments that can be used to fund other needed transportation improvements;
- Ability to reduce on going public sector operating, maintenance and capital improvement costs; and
- Potential to capture private sector operational and maintenance efficiencies.

Long term leases are procured on a competitive basis, with awards going to the qualified bidder making the most attractive offer to the sponsoring agency. Typically, the most important criterion is the concession fee amount. Other criteria related may include the length of the concession period, the bidder's credit worthiness and the bidder's professional qualifications.

Recent Experience

Within the US, three major long term lease transactions have recently closed:

- The 99-year lease of the 7.8 mile Chicago Skyway for a fee of $1.8 billion in January 2005;
- The 99-year lease of the 8.8 mile Pocahontas Parkway in Richmond, Virginia for $548 million,
- The 75-year lease of the 167 mile Indiana Toll Road for $3.85 billion in July 2006.

Factors Affecting the Use of Long Term Leases

For both the public and private sectors, there are a number of factors that influence the use of long term leasing arrangements.

- The public sector's most basic factors are the political and financial situation of individual states and local jurisdictions. When these two factors coincide, local leaders may make the decision to consider leasing arrangements. However, in cases where there is not a pressing financial need, local decision makers may explore the possibility of leasing toll road assets to determine if the terms of a potential transaction would be attractive enough to move forward with an actual transaction.
- The private sector's primary motivation for pursing leasing opportunities is the potential to gain an adequate rate of return on their investment.

Additionally, Moody's Investors Service has identified the following key characteristics that may make certain toll facilities good candidates for lease arrangements:

- Established toll roads that have political limits on toll raising ability;
- Government owned roads that are short of capital to fund improvement programs;
- Roads with a significant number of non-resident users, such as truckers or tourists, who may be less able to effectively protest against privatization; and
- Roads that are financially distressed but which may present a strategic business opportunity for concessionaires seeking to enter the U.S. market.

Role of Overseas Investors in the U.S. Leasing Market

To date all private long term lease investors active in the U.S. market are overseas investors. In contrast the PPP markets in Europe and Australia are more mature than those in the U.S. and experienced investors from both continents are actively seeking out new investment opportunities in this country. Enhancing this trend has been the weakened U.S. dollar together with the perception that toll road investments in the U.S. are less risky than those in developing countries. Additionally, due to the strong tax incentives that compel the U.S. capital markets to prefer municipal debt, the market for private activity debt is far greater outside the U.S.

As a result of the overseas investors' interest in the emerging U.S. market for toll road, PPPs are generating interest among U.S. banks and investment funds. A number of U.S. financial institutions are now in the process of establishing infrastructure investment funds. Additionally, SAFETEA-LU's provision to issue tax exempt private activity bonds for transportation projects should encourage U.S. investors to expand their activity in the domestic toll road market.

The Pros and Cons of Long Term Leases

Even with the significant upfront fees paid to the Chicago Skyway and Indiana Toll, the merits of long term leasing are still uncertain. Currently, potential long-term leases of toll roads and bridges are being considered in New York, New Jersey, Delaware, Pennsylvania and Illinois. As a result, the potential lease of some of the nation's most valuable toll road assets has generated a great deal of discussion, including hearings on the subject conducted by the U.S. House of Representatives Transportation Committee in May 2005.

Two examples of toll road owners that have decided not to pursue long term leases are the Harris County Toll Road Authority (HCRTA) and the Metropolitan Washington Airport Authority (MWAA).

- The HCRTA studied the feasibility of leasing its 82 mile toll road network in Houston and found that a 75-year lease of these facilities could attract as much as a $7 billion fee. However, Harris County commissioners unanimously rejected a possible lease in July 2006. The commissioner's preferred maintaining public control over the toll road network and to use the revenues generated to help fund other transportation needs.
- The MWAA, recently ended attempts to lease the Dulles Toll Road. Rather than seeing toll revenues leave the corridor, MWAA submitted a counter proposal to the Governor of Virginia to assume the operation of the toll road outright. MWAA's proposal calls for the increase in toll rates similar to the proposals of the private sector bidders, but the MWAA would invest all the proceeds in rail and roadway improvements within the corridor.

Policy Considerations

The primary issue for policy makers is whether ceding control of toll road income and assets for extremely long periods of time is in the public's best interest. Unfortunately, the easy answers to several basic questions will not be realized until the lease arrangements end some 70 to 90 years in the future. Did the private sector partners derive reasonable profits or were they excessive? Were the transactions associated with legal battles? Were local residents overburdened by toll increases? Were there alternative ways that the public sector could have extracted comparable revenues from their toll road assets?

Policy issues that would need to be assessed before entering into a long term lease arrangement include:

- The potential undervaluation of an asset to be leased. Competition can help prevent undervaluation. The Chicago Skyway procurement provides an example where the value of the winning proposal was 2.6 times greater than the next highest bid. Those agencies considering leasing options should seek the advice of financial advisors in order to better identify fair market values of lease transactions based on the anticipated revenue streams.
- The legal terms and conditions underpinning lease transactions to ensure a fair outcome and protect the public. For example, the terms and conditions can include language to preserve some public control over toll rates; set of caps on the private sector's rate of return; and ensure that the lease proceeds are used to support transportation improvements in prescribed areas. Additionally, governments provide oversight of the private sector partner's performance as well as include capital reinvestment, availability, safety, and customer services requirements in their lease agreements.

Project Categories

Currently, only highways may be developed under long-term lease arrangements.

7.0 CONCLUSION

As stated previously, based on a review of existing funding plans for the 249 goods movement projects identified in this study, a shortfall in the range of $37 billion currently exists. Due the scarcity and competition for funding, as individual projects or packages of projects move forward it will be important for project sponsors to evaluate the strengths and weaknesses of a variety of funding sources identified in the previous sections. This will allow sponsors to target their efforts on the federal, state, regional, local, and user fee funding sources and innovative financing mechanisms that will have the highest probability of success.

MULTI-COUNTY GOODS MOVEMENT ACTION PLAN
VOLUME 1, APPENDIX B: SUPPORTING TABLES

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List of Tables

Table 1: Environmental Regulatory Agencies B-1
Table 2: Southern California Air Districts and Air Basins B-4
Table 3: CARB Emission Reduction Plan for Ports and Goods Movement in California B-5
Table 4: San Pedro Bay Ports Clean Air Action Plan B-8
Table 5: MCGMAP Preliminary Regional Goods Movement Projects/Strategies B-10
Table 6: Preliminary County-Specific Goods Movement System Improvements B-14
Table 7: Comprehensive List of Goods Movement Projects B-21
Table 8: Roles and Responsibilities B-30
Table 9: Detailed Actions B-37
Table 10: Potential Funding Sources for Goods Movement Projects B-44

Table 1
Environmental Regulatory Agencies

AGENCY	RESPONSIBILITY	JURISDICTION	KEY REGULATION(S)
International Civil Aviation Organization (ICAO)	International civil aviation standards established by Convention	International, but not preemptive of FAA	Annex 16: Environmental Protection, Volume II - Aircraft Engine Emissions
International Marine Organization (IMO)	International marine safety and pollution prevention law established by the United Nations	International	MARPOL Annex I-VI
U.S. Congress	Established federal environmental protection and Council of Environmental Quality (CEQ) to further NEPA.	Nationwide	National Environmental Protection Act (NEPA)
U.S. Environmental Protection Agency (EPA)	Regulation and enforcement for protection of human health and the environment.	Nationwide	Clean Air Act, Clean Water Act, Oil Pollution Prevention Regulation
Federal Aviation Administration (FAA)	Regulation and enforcement of aviation standards for airport, aircraft, and airmen.	Nationwide	Airport Noise & Compatibility Act; Commercial Airport Certification; Aircraft Certification
U.S. Fish and Wildlife	Conservation and protection of fish, wildlife, and plants and their habitats.	Nationwide	Endangered Species Act
U.S. Department of Transportation (DOT)	Ensuring a fast, safe, efficient, accessible, and convenient transportation system; oversees federal railroad, federal transit, and federal highway regulations.	Nationwide	Title 49 of the Code of Federal Regulations (Transportation), including Hazmat transport.
Bureau of Land Management (BLM)	Sustain the health, diversity, and productivity of the public lands.	Nationwide	Federal Land Policy and Management Act
Army Corps of Engineers (ACE)	Water resource and environmental restoration and stewardship.	Nationwide	Permitting of projects/actions affecting navigable waters of the U.S.
California Legislature	Established state environmental protection and the State Clearinghouse and Office of Planning and Research (OPR) to further CEQA.	Statewide	California Environmental Quality Act (CEQA)
Business, Transportation, & Housing Agency	Oversees 13 state agencies, including Caltrans, California Highway Patrol, Department of Motor Vehicles, and Department of Alcoholic Beverage Control; Regulates managed health care plans as well as the banking, and financial and securities industries	Statewide	Oversight of law enforcement activities of subordinate state agencies.

Table 1
Environmental Regulatory Agencies

AGENCY	RESPONSIBILITY	JURISDICTION	KEY REGULATION(S)
California Fish & Game	Manage fish, wildlife, and plant resources and their habitats	Statewide	California Endangered Species Act
California EPA	Oversees CARB, SWRCB, Department of Pesticide Regulation, Department of Toxic Substances Control, Office of Environmental Health Hazard Assessment, Integrated Waste Management Board	Statewide	California Clean Air Act
California Air Resources Board (CARB)	Part of CalEPA; to promote and protect public health, welfare, and ecological resources through effective reduction of air pollutants while recognizing and considering effects on the economy.	Statewide	California Air Pollution Control Laws
State Water Resources Control Board (SWRCB)	Water allocation and water quality protection; Oversees nine regional boards	Statewide	Porter-Cologne Water Quality Control Act (California Water Code, Division 7)
Native American Heritage Commission	Identify and catalogue Native American cultural resources, and prevent damage to and insure Native American access to sacred sites. Also, identify a Most Likely Descendant (MLD) when Native American human remains were discovered any place other than a dedicated cemetery -- MLDs were granted the legal authority to make recommendations regarding the treatment and disposition of the discovered remains.	Statewide	
Regional Air Quality Management Districts	*See CARB*	Regional	
South Coast AQMD	*See CARB*	Portions of Los Angeles, Orange, Riverside, and San Bernardino counties	Emissions regulations
South Central AQMD	*See CARB*	Ventura County	Emissions regulations
Mojave Desert AQMD	*See CARB*	Portions of Los Angeles, Riverside, and San Bernardino counties	Emissions regulations

Table 1
Environmental Regulatory Agencies

AGENCY	RESPONSIBILITY	JURISDICTION	KEY REGULATION(S)
Antelope Valley AQMD	*See CARB*	Portion of Los Angeles County	Emissions regulations
Regional Water Quality Control Boards	*See SWRCB*	Regional	
Los Angeles RWQCB	*See SWRCB*	Portions of Los Angeles and Ventura counties	Water allocation and water quality protection regulations
Santa Ana RWQCB	*See SWRCB*	Portions of Orange, San Bernardino, and Riverside Counties	Water allocation and water quality protection regulations
Colorado River Basin RWQCB	*See SWRCB*	Portions of San Bernardino, Riverside, and San Diego Counties	Water allocation and water quality protection regulations
Lahontan RWQCB	*See SWRCB*	Portions of Los Angeles and San Bernardino Counties	Water allocation and water quality protection regulations
San Diego RWQCB	*See SWRCB*	Portions of Orange and Riverside Counties	Water allocation and water quality protection regulations
Central Coast RWQCB	*See SWRCB*	Portion of Ventura County	Water allocation and water quality protection regulations

Source: Jones & Stokes, 2006.

Table 2
Southern California Air Districts and Air Basins

COUNTY	AIR BASIN	AIR DISTRICT
Imperial	Salton Sea Air Basin	Imperial County Air Pollution Control District
Los Angeles	South Coast	South Coast AQMD
	Mojave Desert	Mojave Desert AQMD and Antelope Valley AQMD
Orange	South Coast	South Coast AQMD
Riverside	South Coast	South Coast AQMD
	Mojave Desert	Mojave Desert AQMD
	Salton Sea	Mojave Desert AQMD
San Bernardino	South Coast	South Coast AQMD
	Mojave Desert	Mojave Desert AQMD
San Diego	San Diego Air Basin	San Diego Air Pollution Control District
Ventura	South Central Coast	Ventura County AQMD

Source: Jones & Stokes, 2006.

Table 3
CARB Emission Reduction Plan for Ports and Goods Movement in California
List of Strategies to Reduce Emissions
March 2006

Strategy	Status (Adopted or New Strategy)	Implementation Could Begin		
		2006-2010	2011-2015	2016-2020
SHIPS				
Vessel Speed Reduction Agreement for Southern California	2001	✓		
U.S. EPA Main Engine Emissions Standards	2003	✓		
U.S. EPA Non-Road Diesel Fuel Rule	2004	✓		
ARB Rule for Ship Auxiliary Engine Fuel	New (2005)	✓		
Cleaner Marine Fuels	New	✓	✓	✓
Emulsified Fuels	New	✓	✓	✓
Expanded Vessel Speed Reduction Programs	New	✓	✓	✓
Engines with Emissions Lower than IMO Standards in New Vessels	New	✓	✓	✓
Dedication of Cleanest Vessels to California Service	New	✓		
Shore Based Electrical Power	New	✓		
Extensive Retrofit of Existing Engines	New		✓	✓
Highly Effective Controls on Main and Existing Engines	New		✓	✓
Sulfur Emission Control Area (SECA) or Alternative	New		✓	
Expanded Use of Cleanest Vessels in California Service	New		✓	
Expanded Shore Power and Alternative Controls	New		✓	
Full Use of Cleanest Vessels in California Service	New			✓
Maximum Use of Shore Power or Alternative Controls	New			✓
COMMERCIAL HARBOR CRAFT				
Incentives for Cleaner Engines	2001-2005	✓		
ARB Low Sulfur Diesel Fuel Rule	2004	✓		
ARB Rule to Clean Up Existing Engines	New	✓		
Shore Based Electrical Power	New	✓		
U.S. EPA or ARB New Engine Emission Standards	New		✓	
CARGO HANDLING EQUIPMENT				
ARB Low Sulfur Diesel Fuel Rule	2003	✓		
ARB/U.S. EPA Tier 4 Emission Standards	2004	✓		

Table 3
CARB Emission Reduction Plan for Ports and Goods Movement in California
List of Strategies to Reduce Emissions
March 2006

Strategy	Status (Adopted or New Strategy)	Implementation Could Begin		
		2006-2010	2011-2015	2016-2020
ARB Stationary Diesel Engine Rule	2004	✓		
ARB Portable Diesel Equipment Rule	2004	✓		
Incentives for Cleaner Fuels	2001-2005	✓		
CARGO HANDLING EQUIPMENT, continued				
ARB Rule for Diesel Cargo Handling Equipment	New (2005)	✓		
ARB Rule for Gas Industrial Equipment	New	✓		
Upgrade to 85 Percent Diesel PM Control or Better	New		✓	
Zero or Near Zero Emission Equipment	New			✓
TRUCKS				
ARB/U.S. EPA 2007 New Truck Emission Standards	2001	✓		
Vehicle Replacement Incentives	2001-2005	✓		
ARB Low Sulfur Diesel Fuel Rule	2003	✓		
ARB Smoke Inspections for Trucks in Communities	2003	✓		
Community Reporting of Violators	2005	✓		
ARB Truck Idling Limits	2002-2005	✓		
ARB Low NOx Software Upgrade Rule	2005	✓		
ARB International Trucks Rule	New (2006)	✓		
ARB Private Truck Fleets Rule	New	✓	✓	
Port Truck Modernization	New	✓	✓	✓
Enhanced Enforcement of Truck Idling Limits	New	✓		
LOCOMOTIVES				
ARB Low Sulfur Diesel Fuel Rule	2004	✓		
ARB 2005 Agreement with Railroads to Cut PM Statewide	2005	✓		
Idle Enforcement Training	2006	✓		
Upgrade Engines in Switcher Locomotives	New	✓		
Retrofit Diesel PM Control Devices on Existing Engines	New	✓		
Use of Alternative Fuels	New	✓		
More Stringent National Requirements	New		✓	
Concentrate Tier 3 Locomotives in California	New		✓	✓

Table 3
CARB Emission Reduction Plan for Ports and Goods Movement in California
List of Strategies to Reduce Emissions
March 2006

Strategy	Status (Adopted or New Strategy)	Implementation Could Begin		
		2006-2010	2011-2015	2016-2020
OPERATIONAL EFFICIENCY				
Efficiency Improvements	New	✓	✓	✓
Transport Mode Shifts	New	✓	✓	✓
LAND USE DECISIONS	New	✓	✓	✓
PROJECT AND COMMUNITY SPECIFIC MITIGATION	New	✓	✓	✓
PORT PROGRAMS TO REDUCE EMISSIONS	Ongoing/New	✓	✓	✓

Table 4
San Pedro Bay Ports Clean Air Action Plan
November 2006

All new projects to meet or be below acceptable health risk standards (<10 in 1,000,000 excess residential cancer risk threshold)
Heavy Duty Vehicles
▪ By the end of 2011, all trucks calling at the ports frequently or semi-frequently will meet or be cleaner than the EPA 2007 on-road PM emissions standards and be the cleanest available NOx at the time of replacement or retrofit.
Ocean-Going Vessels
▪ 100% compliance with the Vessel Speed Reduction Program, initially out to a distance of 20 nautical miles from Point Fermin, expanded to 40 nautical miles (nm).
▪ The use of <0.2% sulfur MGO fuel in vessel auxiliary and main engines at berth and during transit out to a distance of 20 nm from Point Fermin and expanded to 40 nm or equivalent reduction (starting 1st quarter 2008).
▪ The use of shore power (or equivalent) for hotelling emissions implemented at all major container, selected liquid bulk, and cruise terminals in the Port of Los Angeles within five years and at all container terminals and one crude oil terminal in the Port of Long Beach within five to ten years.
▪ The use of DPM and NOx control devices on auxiliary and main engines mandated on new vessel builds and existing frequent callers.
Cargo Handling Equipment
Beginning 2007, all purchases will meet one of three performance standards: ▪ Cleanest available NOx alternative-fueled engine, meeting 0.01 g/bhp-hr PM, available at time of purchase. ▪ Cleanest available NOx diesel-fueled engine, meeting same standard as above, available at time of purchase. ▪ If there are no engines meeting above standard, then must purchase cleanest available engine (engine fuel type) and install cleanest Verified Diesel Emissions Controls (VDEC) available.
By the end of 2010, all yard tractors operating at the San Pedro Bay Ports will meet at a minimum the EPA 2007 on-road or Tier IV engine standards.
By the end of 2012, all pre-2007 on-road or pre-Tier IV top picks, forklifts, reach stackers, rubber tired gantries (RTG), and straddle carriers < 750 hp will meet at a minimum the EPA 2007 on-road engine standards or Tier IV off-road engine standards.
By end of 2014, all cargo handling equipment with engines >750 hp will meet at a minimum the EPA Tier IV off-road engine standards. Starting 2007 (until equipment is replaced with Tier IV), all cargo handling equipment with engines >750 hp will be equipped with the cleanest available VDEC verified by the California Air Resources Board.
Harbor Craft
▪ By the second year of the Plan, all harbor craft home-based at San Pedro Bay Ports will meet EPA Tier 2 for harbor craft and equivalent reductions.
▪ By the fifth year, all previously repowered harbor craft home-based at San Pedro Bay Ports will be retrofitted with the most effective CARB verified NOx and/or PM emission reduction technologies.
▪ When Tier 3 engines become available, within five years all harbor craft home-based at San Pedro Bay Ports will be repowered with the new engines.
Railroad Locomotives
▪ By 2008, all existing Pacific Harbor Lines switch engines in the ports will be replaced with Tier 2 engines equipped with 15-minute idling limit devices, retrofitted with either DOCs or DPFs, and shall use emulsified or other equivalently clean alternative diesel fuels available
▪ Any new switch engine acquired after the initial Pacific Harbor Line replacement must meet EPA Tier 3 standards or equivalent to 3 grams NOx/bhp-hr and 0.023 g PM/bhp-hr.
▪ By 2011, all diesel-powered Class 1 switcher and helper locomotives entering port facilities will be 90% controlled for PM and NOx, will use 15-minute idle restrictors, and after January 1, 2007, use ULSD fuels.
▪ Starting in 2012 and fully implemented by 2014, the fleet average for Class 1 long haul locomotives calling at port properties

Table 4
San Pedro Bay Ports Clean Air Action Plan
November 2006

will be Tier III equivalent (Tier 2 equipped with DPF and SCR or new locomotives meeting Tier 3) PM and NOx and will use 15-minute idle restrictors. Class 1 long haul locomotives will operate on ULSD while on port properties by the end of 2007. Technologies to get to these levels of reductions will be validated through the Technology Advancement Program.
▪ Any new rail yard development or significantly redesigned rail yard at the San Pedro Bay Ports shall be required to operate the cleanest available technology for switcher, helper, and long-haul locomotives, utilize idling shut-off devices and exhaust hoods, use only ULSD or alternative fuels and have only clean cargo handling equipment and HDVs consistent with the Clean Air Action Plan.
Implementation Strategies (Proposed) ▪ Facilities required by lease to meet emission reduction requirements. ▪ Port tariffs changed to influence activity and implement uniform rules affecting most or all port users. ▪ New projects or changes to existing facilities must meet health risk requirements as part of environmental review process. ▪ Incentive funding targeted toward specific sources to accelerate emission reductions. ▪ Voluntary emission reduction actions encouraged. ▪ Reward participants for accepting emission reduction responsibility if they achieve reductions early or outperform program expectations. ▪ Allow a port to cover initial capital costs for equipment associated with a measure and then lease back or lease-to-own the cleaner equipment purchased. ▪ Loan guarantees ▪ Loans through a third party available to driver/owners. ▪ Provide trucking companies meeting clean truck requirements exclusive rights to operate on port property. ▪ Joint Powers Authority Nonprofit Trucking Entity to directly purchase trucks, hire drivers, etc. ▪ Recognize industry efforts under Clean Air Action Plan.

Table 5
MCGMAP Preliminary Regional Goods Movement Projects/Strategies
(Expanded Descriptions for Table 5 in Executive Summary)
NOTE: REGIONAL AND COUNTY-SPECIFIC LISTS ARE BOTH CONSIDERED TO BE OF EQUAL PRIORITY IN MCGMAP. MODES AND PROJECTS ARE NOT LISTED IN PRIORITY ORDER. ALL PROJECTS WILL REQUIRE FURTHER STUDY PRIOR TO IMPLEMENTATION UNLESS ALREADY COMPLETED..

MITIGATION/ MODE / SYSTEM	PROJECT / STRATEGY	DESCRIPTION	2007 COST[1] (MILLIONS)	COMMITTED FUNDS (MILLIONS)	TIME FRAME[2]
	ENVIRONMENTAL MITIGATION				
	PROJECT SPECIFIC MITIGATION	Implementation of goods movement infrastructure projects could require mitigation of project specific impacts such as noise, vibration, hazardous waste, visual, light, and glare.	TBD	TBD	S, M, L
	EMISSIONS REDUCTION	San Pedro Bay Ports Clean Air Action Plan	$2,067	$464	S
		Other Goods Movement Emission Reduction Plans and Identified Needs	TBD	TBD	S, M
RAIL	GRADE SEPARATIONS	• Alameda Corridor East (ACE) Grade Separations and Grade Crossings Improvements	$4,450	$961	S, M
		ACE County subtotals:			
		○ Los Angeles County – San Gabriel Valley	$1,891	$343	S, M
		○ Orange County	$731	$115	S, M
		○ Riverside County	$1,048	$257	S, M
		○ San Bernardino County	$840	$168	S, M
		• Gateway Cities BNSF Mainline Grade Separations (on ACE list)	$196	$78	S, M
	MAINLINE CAPACITY ENHANCEMENTS	• Rail Capacity Improvements (e.g., additional rail track, Colton Crossing)[3]	$2,200	$0	S, M
	REGIONAL FREIGHT LINKS	• Reconnect Santa Paula Branch Rail Line – Port of Hueneme to Santa Clarita	$450	$0	M
INTERMODAL GROUND ACCESS	ON DOCK RAIL	• San Pedro Bay Ports Rail Systems	$631	TBD	S, M

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MITIGATION/ MODE / SYSTEM	PROJECT / STRATEGY	DESCRIPTION	2007 COST[1] (MILLIONS)	COMMITTED FUNDS (MILLIONS)	TIME FRAME[2]
	INTERMODAL YARDS/ FACILITIES	• Ports of Los Angeles/Long Beach Union Pacific Intermodal Container Transfer Facility Modernization[4] • BNSF Port of Los Angeles/Long Beach Near Dock Facility (Southern International Gateway – SCIG) [4]	$300 $300	$0 $0	S S
	INLAND PORT	• Further investigation of inland port strategy	TBD	$0	M
ALTERNATIVE TECHNOLOGY	TRUCK LANES/DEDICATED FREIGHT GUIDEWAY SYSTEM	• Dedicated Freight Guideway System/Regional Truck Lanes (I-710 From Port of Long Beach to SR-60; East-West Corridor between the I-710 to I-15; and I-15 to Victorville)	$18,268	$35	M, L

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MITIGATION/ MODE / SYSTEM	PROJECT / STRATEGY	DESCRIPTION	2007 COST[1] (MILLIONS)	COMMITTED FUNDS (MILLIONS)	TIME FRAME[2]
FREEWAY / HIGHWAY	FREIGHT CORRIDOR CAPACITY ENHANCEMENT AND OPERATIONAL IMPROVEMENTS	• High Desert Corridor[5] (SR-14 to I-15)	$5,600	$0	M, L
		• Alameda Corridor SR-47 Expressway including Schuyler Heim Bridge Replacement	$662	$265	S
		• Replace/Reconstruct Gerald Desmond Bridge	$800	$337	S
		• I-710 Early Action Projects	$500	$12	S
		○ City of Long Beach – Shoemaker Ave. bridge interchange/PCH interchange/Anaheim St. interchange			S
		○ City of South Gate-Firestone Blvd interchange			
		○ City of Vernon - Atlantic Blvd/Bandini Blvd ramp reconfiguration			M
		• I-5 Truck Lanes			
		○ Southbound from Pico Canyon Rd/Lyons Avenue to Weldon Canyon Road and Northbound From Weldon Canyon Road to Calgrove	$148	$12	M
		○ Southbound from Parker Road to Pico Canyon Road and northbound from Calgrove to Parker Road	$244	$0	M
		• SR-86 NAFTA Corridor Interchange Construction (to facilitate grade separation for trucks)	$150	$0	M
		• SR-58 Corridor			
		○ Realignment and Widening Project between Hinkley & Barstow	$113	$0	
		○ Widening project between Kern Co. Line and east of US-395	$188	$0	

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MITIGATION/ MODE / SYSTEM	PROJECT / STRATEGY	DESCRIPTION	2007 COST[1] (MILLIONS)	COMMITTED FUNDS (MILLIONS)	TIME FRAME[2]
	BORDER CROSSING IMPROVEMENTS	• Access Improvements to the California/Mexico Ports of Entry at Otay Mesa, Otay Mesa East, and Calexico East: ○ SR-905: 6-lane freeway and truck route (From I-805 to Otay Mesa Port of Entry) ○ SR-11/Otay Mesa East Port of Entry: 4-lane freeway (From SR-905/125 to Border) and new port of entry ○ SR-78 Brawley Bypass: 4-lane highway (SR-111-SR-78)	$848 $650 $201	$348 $13 $163	S, M S S
		TOTAL	**$39,081**	**$2,610**	

NOTES:
1. All figures includes environmental mitigation costs
2. S=Short-term (2007-2015); M=Mid-term (2015-2025); L=Long-term (post 2025)
3. Project must demonstrate regional public benefit to qualify for public funds
4. Private sector fund sources
5. Requires further analysis west of US-395, private sector primary fund source, with possible exception of short-term project to construct section between Phantom East and I-15 ($490 million)

Table 6
Preliminary County-Specific Goods Movement System Improvements

(Expanded Descriptions for Table 6 in Executive Summary)

(NOTE: REGIONAL AND COUNTY-SPECIFIC LISTS ARE BOTH CONSIDERED TO BE OF EQUAL PRIORITY IN MCGMAP. MODES AND PROJECTS ARE NOT LISTED IN PRIORITY ORDER. ALL PROJECTS WILL REQUIRE FURTHER STUDY PRIOR TO IMPLEMENTATION UNLESS ALREADY COMPLETED.)

MODE / SYSTEM	TYPE	COUNTY	DESCRIPTION	2007 COST (IN MILLIONS)	TIME FRAME[1]
RAIL	GRADE SEPARATIONS	VEN	• Construct Rice Avenue/UP Grade Separation Coast Main Line & Designated Access for Port Hueneme	$45	TBD
		VEN	• Construct Rose Avenue/UP Grade Separation Coast Main Line	$45	TBD
		VEN	• SR-118/Coast Line – Construct Grade Separation	TBD	TBD
		LA	• Nogales Street (LA Subdivision) grade separation project	$29	S
	MAINLINE CAPACITY ENHANCEMENT	SD	• Coastal Rail Corridor – Sidings, Passing Track, Rehabilitation, and Shared Use Improvements	$1,350	S, M
		SD	• South Line Rail/Trolley – Sidings, Passing Track, Intermodal Yards to Port of San Diego, Mexico Trade Connectivity, and Coronado Branch Rehabilitation	$328	S, M
		LA	• Relief siding between Lang and Ravenna sidings on the Antelope Valley Line	$3	S

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Preliminary County-Specific Goods Movement System Improvements

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MODE / SYSTEM	TYPE	COUNTY	DESCRIPTION	2007 COST (IN MILLIONS)	TIME FRAME[1]
		LA	• Relief siding between Vincent and Lancaster sidings on the Antelope Valley Line	$3	S
		LA	• Upgrade 7 existing sidings on the Antelope Valley Line to 40 mph	$9	S
INTERMODAL GROUND ACCESS	INTERMODAL YARDS/ FACILITIES	SBD	• Build New BNSF Intermodal Yard in Victorville	TBD	TBD
		LA	• Shuttle Train Intermodal Service to Inland Empire; Inland Terminal	$60	TBD
	MARITIME	SD	• San Diego Port District Marine Terminal Ground Access	$822	S, M
ALTERNATIVE TECHNOLOGY	ITS APPLICATIONS	LA	• San Pedro ATSAC System in City of Los Angeles - provided ATSAC control of all signalized intersections within the project limits to aid motorists. Use available ITS technology to manage traffic accessing the Vincent Thomas Bridge and provide optimal route information	$6	TBD

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MODE / SYSTEM	TYPE	COUNTY	DESCRIPTION	2007 COST (IN MILLIONS)	TIME FRAME[1]
		LA	• Wilmington ATSAC System in City of Los Angeles - provided ATSAC control of all signalized intersections within the project limits to aid motorists. Use available ITS technology to manage traffic accessing the Vincent Thomas Bridge and provide optimal route information	$7	TBD
		LA	• Transportation Management, Information and Security System	$10	TBD
FREEWAY / HIGHWAY	FREIGHT CORRIDOR CAPACITY ENHANCEMENT AND OPERATIONAL IMPROVEMENTS	VEN	• Reconstruct US 101/Rice Avenue IC	$75	M
		LA LA	• Key Goods Movement Arterial Improvements • Reconstruct SR-91/I605 interchange • Reconstruct I-605/SR-60 interchange	TBD $240 $1,000	TBD S S

Table 6
Preliminary County-Specific Goods Movement System Improvements

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MODE / SYSTEM	TYPE	COUNTY	DESCRIPTION	2007 COST (IN MILLIONS)	TIME FRAME[1]
		LA LA LA	• Reconstruct I-605/I-10 interchange • Reconstruct SR-60/SR-57 interchange • I-110 8th/9th Street Interchange – Add Auxiliary Lanes and Modify/Reconstruct Ramps (Two Projects)	$1,000 $550 $39	S S TBD
		LA	• Washington Blvd. Widening and Reconstruction project	$14	S
		LA	• Alameda Street Widening and Reconstruction in Los Angeles (101 Freeway to 7th Street; I-10 to 7th Street)	$29	TBD
		LA	• Seaside Avenue/Ocean Blvd (SR-47) and Navy Way Interchange	$43	TBD
		LA	• I-110 Connector Improvement Program includes: South Wilmington Grade Separation ($53 M), I-110 Freeway/"C" Street Interchange Improvements ($22 M), I-110/SR-47 Interchange & John S. Gibson Blvd Intersection/NB I-110 Ramp Access Improvements ($39 M), SR-47 On-Ramp and Off-Ramp at Front Street ($20 M)	$134	TBD
		OR	• I-5 From the I-5/SR-22/SR-57 Interchange to SR-91 add a General Purpose Lane in Each Direction	$430	M

Table 6
Preliminary County-Specific Goods Movement System Improvements

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MODE / SYSTEM	TYPE	COUNTY	DESCRIPTION	2007 COST (IN MILLIONS)	TIME FRAME[1]
		OR	• I-5 Reconstruct El Toro Interchange to provide separate moves to El Toro Road East and El Toro Road West	$120	S
		OR OR	• I-5 between SR-55 and the SR-133 (near El Toro "Y") add one general purpose lane in each direction and improve interchanges in the vicinity • I-5 between the vicinity of El Toro "Y" to near SR-73 add new lanes in each direction	$319.2 $315	M M
		OR	• I-5 Northbound Extend Existing Truck Bypass Lane From Alicia Parkway to El Toro Road. Add Auxiliary lane where needed.	$240	L
		OR OR	• I-5 Southbound From Alicia Parkway to the Crown Valley Interchange Lane add a General Purpose Lane • I-5 Construct new interchange at Crown Valley (Saddleback) and reconstruct interchange at Avery Parkway with collector distributor road between Crown Valley and Avery	$411 $260	M L
		OR	• SR-57 Northbound From Lambert Road to the SR-60 Interchange Add Truck Climbing Lane (Orange County Line)	$157	M

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Preliminary County-Specific Goods Movement System Improvements

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MODE / SYSTEM	TYPE	COUNTY	DESCRIPTION	2007 COST (IN MILLIONS)	TIME FRAME[1]
		OR	• SR-57 Northbound From Orangethorpe to Lambert Road, Add Auxiliary Lane & 5h Through Lane	$140	S
		OR	• SR-57 in the Northbound Direction Extend General Purpose Lane #5 Between Orangewood and SR-91 and Add Auxiliary Lane Where Needed	$190.8	S
		OR	• SR-91 Westbound From SR-57 to I-5, Add One General Purpose Lane and Add Auxiliary Lane	$152	S
		OR	• SR-91 Westbound- Provide a General Purpose Lane from SR-55 to SR-57 and add Auxiliary Lane	$120	M
		OR	• SR-91 Eastbound Add a Lane between SR-55 (Lakeview and SR-241 and Westbound From SR-241 to Imperial Highway).		
		OR	• I-405 from the I-5 to SR-55 add 1 general purpose lane in each direction	$96 $328.9	S L
		RIV	• SR-60/10 Truck Climbing Lane	$50	S
		RIV	• March ARB/Global Cargo Port Van Buren Interchange Project	$75	S
		RIV	• I-10/SR60 New Interchange Construction	$100	L
		SBD	• I-15 Widening and Devore Interchange (at I-215) Reconstruction	$200	S

Table 6
Preliminary County-Specific Goods Movement System Improvements

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MODE / SYSTEM	TYPE	COUNTY	DESCRIPTION	2007 COST (IN MILLIONS)	TIME FRAME[1]
		SBD	• Interstate 10 Widening and Interchange Improvements (LA Co. Line to I-215)	$700	S
		SD	• I-5 Widen/Managed Lanes (From La Jolla Village Dr. to Vandergrift)	$962	S
		SD	• I-15 Widen/Managed Lanes & Operational Improvements (From SR-163 to SR-78)	$608	S
		SD	• I-805 Widen/Managed Lanes (From SR-905 to I-5)	$1,801	S
		SD SD	• San Diego International Airport Truck Access to I-5 (Truck route/Interchange improvements) • Pipeline Truck Access (Petroleum Terminal) to I-15 (Truck route/Interchange improvements)	$32 $32	M M
			TOTAL	**$13,680.9**	

NOTES 1: S=Short-term (2007-2015); M=Mid-term (2015-2025); L=Long-term (post 2025)

Table 7
Comprehensive List of Goods Movement Projects (INITIAL EVALUATION)

County	Description	Cost ($Mill's)
All	Extend Delivery Hours to 24 hours	
All	Evaluate Use of LCVs on Dedicated Facilities	
All	Improve demand forecasts for labor and equipment across all modes	
All	Employ better trade and transportation forecasting	
All	Enact expanded public-private partnership legislation	
All	Enact design-build and design sequencing legislation	
N/A	Increase "destination loading" on ships from the far east	
Los Angeles County		
LA	Reconfiguration of Control Point (CP) Mole including computerized train control	$20.0
LA	Pier B Street Rail Yard and ICTF	$257.9
LA	New Three-track Cerritos Channel rail bridge	$91.0
LA	Mainline improvements within LA/LB Harbor District	$184.7
LA	Construct BNSF "Southern California International Gateway" Near Dock Facility	$200.0
LA	Modernization of UP Near Dock Intermodal Container Transfer Facility (ICTF)	$300.0
LA	Triple track s/o Thenard	$16.5
LA	Continue PierPass program at the San Pedro Bay ports and eventually extend to 24-hour operations when warranted.	
LA	I-5 SR-14 to Calgrove Ave. truck lanes	$50.0
LA	I-5 from Calgrove Ave. to SR-126 West truck lanes	$100.0
LA	I-5 from SR-126 West to Kern County line truck lanes	$366.0
LA	I-710 Corridor from Port of Long Beach/Los Angeles to SR-60 - User Fee-Backed Capacity Improvement.	$7,000.0
LA	Reeves Avenue closure and grade separation (other port area grade separations included in I-110 Connectors Program)	$61.0
LA	POLA/POLB Advanced Transportation Management, Information, and Security (ATMIS) System	$15.0
LA	Replace/ Reconstruct Gerald Desmond Bridge.	$800.5
LA	SR-47 Expressway including Commodore Heim Bridge Replacement	$557.0
LA	Expansion of I-5 from I-605 to Orange County Line	$1,150
LA	I-710 from I-10 to Huntington Dr - Construct 3 MF lanes each dir.	$300.0
LA	I-710 from Huntington Dr to I-210 - Construct 3 MF lanes each dir.	$450.0
LA	I-110 8th / 9th Street Interchange - Add auxiliary lanes and modify / reconstruct ramps (two projects)	$39.0
LA	I-405: La Tijera Blvd to Jefferson Blvd, Add Auxiliary Lane	$39.0
LA	I-5 Orange County Line to I-605, Widen for HOV and Mixed Flow lanes.	$163.0
LA	I-710 Early Action Project - City of Long Beach – Shoemaker Ave. bridge interchange/PCH interchange/Anaheim St. interchange (bridge replacement and ramp reconfigurations)	$500.0 Total of (3) I-710 Early Action Projects
LA	I-710 Early Action Project - City of South Gate – Firestone Blvd. interchange (bridge widening & ramp reconfiguration)	
LA	I-710 Early Action Project - City of Vernon – Atlantic Blvd./Bandini Blvd. (ramp reconfiguration)	
LA	I-5 Carmenita Road interchange	$250.0

Table 7
Comprehensive List of Goods Movement Projects (INITIAL EVALUATION)

County	Description	Cost ($Mill's)
LA	I-110 Connector Improvement Programs (Fries Ave. grade separation - $53 million; I-110/SR-47/Harbor Blvd. Interchange improvement program - $17 million; C St/I-110 access ramp - $30 million; John S. Gibson intersection & NB ramp - $18 million; SR-47 on and off ramp - $17 million; I-110 ramp at Miraflores & Gaffey St/SR-47 - $31 million; Broad Ave. grade separation - $18 million)	$184.0
LA	Seaside Ave & Navy Way Interchange	$40.0
LA	Reconstruct SR- 91 / I-605 Interchange	$240.0
LA	Reconstruct SR- 60 / I-605 Interchange	$1,000.0
LA	Reconstruct I-10 / I-605 Interchange	$1,000.0
LA	Reconstruct I-105 / I-605 Interchange	$500.0
LA	Develop chassis pools	
LA	Improve communications (including electronic data interchange) and planning among terminals, steamship lines and railroads to increase efficiency of on-dock rail movements.	
LA	Implement incentives to limit container dwell time	
LA	Establish port-wide terminal appointment systems for truckers	
Los Angeles / Multi-County		
LA/SB	East-West Corridor from I-710 Corridor to I-10/SR-60 Interchange	
LA/SB/ RC	Shuttle train intermodal service to Inland Empire, Inland Terminal	$60.0
LA/SB/ RC	Evaluation of Alternative Rail Technologies	$5.0
LA/SB/ RC/OC	Triple track BNSF Transcon; double track two UPRR corridors: LA to San Bernardino	$2,300.0
LA/SB/ RC/OC	Alameda Corridor-East Trade Corridor Grade Separations	$3,456.0
LA/SB/ RC/OC	Implement virtual container yards	
Orange County		
OC	SR-57 add a lane northbound from Lambert Road to Los Angeles County Line. Includes ITS components.	$157.0
OC	SR-91 Truck Storage Lane between Weir Canyon and Imperial. Include ITS components.	
OC	I-5 Improvements SR-55 to SR-57	
OC	SR-91 - Add 5th GP lane in each direction between SR-55 and SR-241	$135.0
OC	SR-91 EB/WB from Truck scales - Add storage lane at truck weigh in motion station between Weir Canyon and Imperial Hwy. Includes ITS components.	$11.0
OC	SR-91 westbound from SR-57 to I-5, connect auxiliary lane. Includes ITS components.	$72.00
OC	I-5, IC/Ramp modifications (acceleration lanes) at various locations on all routes to accommodate trucks. Include ITS components.	$130.0
OC	I-5, At Crown Valley Parkway Ramp Improvements for SB Off-Ramp. Include ITS components.	$10.5
OC	I-5, Re-construct southbound on-ramp and off-ramp at Alton Pkwy. Include ITS components.	$2.7
OC	I-5 Add aux lane from Oso to Crown Valley and widen off-ramp. Include ITS components.	
OC	I-5 Reconstruct northbound on-ramps, construct SB auxiliary lanes and widen arterial at Oso Parkway. Include ITS components.	
OC	I-5 Extend Aux lane between La Paz and Oso Parkway. Include ITS components.	

Table 7
Comprehensive List of Goods Movement Projects (INITIAL EVALUATION)

County	Description	Cost ($Mill's)
OC	I-5 From Alicia Parkway through El Toro Road extend auxiliary lane through interchange. Include ITS components.	
OC	I-5 Construct auxiliary lane from the Collector Distributor Rd to Bake Pkwy off-ramp to provide two lane off-ramp. Include ITS components.	
OC	I-5 Construct auxiliary lane between the Collector Distributor Rd and Alton Pkwy off-ramp. Include ITS components.	
OC	I-5, Construct auxiliary lane and add 2nd off-ramp lane from SB I-5/133 Branch Connector to Barranca Pkwy. Include ITS components.	
OC	I-5 Construct 2nd auxiliary lane and widen off-ramp at Jamboree Road. Include ITS components.	
OC	I-5 Widen arterial eastbound and northbound loop-on-ramp at Jamboree Road. Include ITS components.	
OC	I-5, Reconstruct Avenida Pico Interchange and widen arterial. Include ITS components.	
OC	I-5, Avenida Pico to Camino Las Ramblas add 1 general purpose lane. Include ITS components.	
OC	I-5, Mainline curve correction between Stonehill and SR-1. Include ITS components.	
OC	I-5, New SB off-ramp at Stonehill. Include ITS components.	
OC	I-5, Reconstruct the Interchange at Ortega Hwy (SR-74). Include ITS components.	
OC	I-5, Reconstruct the Interchange at Junipero Serra and widen arterial. Include ITS components.	
OC	I-5, Crown Valley/Avery Interchange Improvements /I-5 Connectors and Collector/Distributor Road. Include ITS components.	
OC	I-5, Reconstruct the Interchange at Avery Pkwy and widen arterial. Include ITS components.	
OC	I-5, Reconstruct the Interchange at La Paz Road and widen arterial. Include ITS components.	
OC	Add NB On & SB off ramps at Los Alisos (Alt #1) or SB On and Off Ramps from Avenida De La Carlota (Alt #2). Include ITS components.	
OC	I-5, Construct two-lane branch connector and extend # 6 general-purpose lane from SR-133 on to Culver Drive NB on-ramp. Include ITS components.	
OC	Sand Canyon Avenue to Jeffrey Rd Add sixth NB and SB general purpose lanes and add a second drop lane from I-5 to the SB off-ramp at Sand Canyon. Include ITS components.	
OC	I-5, Jeffrey Road and Walnut Avenue I-5 SB ramps Add eastbound shared second through lane/second right turn lane. Include ITS components.	
OC	I-5, Interchange improvement between 4th street off-ramp to north and Newport Avenue to South on the I-5, and 4th Street to the north and Edinger Avenue to the south on the SR-55. Include ITS components.	
OC	On I-5 from SR-57 to SR-91 add additional lane in each directions	
OC	I-5, SR-57/SR-22 Interchange to the SR-91: Add additional two lanes. Include ITS components.	
OC	SR-39, Widen highway under freeway from three to four lanes SR-39 / I-405 Interchange. Include ITS components.	
OC	SR-55 from SR22 to SR91 add one lane and aux lane. Include ITS components.	
OC	SR-55 19th Street to SR73 add auxiliary lanes. Include ITS components.	
OC	SR-55 Construct Aux Lane SB from Dyer to Edinger in the City of Santa Ana. Include ITS components.	
OC	SR-55 Construct Aux Lane NB from Dyer to Edinger in the City of Santa Ana. Include ITS components.	

Table 7
Comprehensive List of Goods Movement Projects (INITIAL EVALUATION)

County	Description	Cost ($Mill's)
OC	SR-55, I-5 to SR22 add aux lanes. Include ITS components.	
OC	SR-57, SR90 to County line add 1 general purpose and aux lane. Include ITS components.	
OC	SR-57, SR22 to SR91 add 1 general purpose and aux lanes. Include ITS components.	
OC	SR-57, At SR-91 add 4th general purpose lane. Include ITS components.	
OC	SR-57, Interchange improvement at Imperial Highway. Include ITS components.	
OC	SR-57, Add northbound lane from 0.3 miles south of Katella Avenue to 0.3 miles north of Lincoln Avenue. Include ITS components.	
OC	SR-57 Add Northbound lane from 0.4 miles North of SR-91 to 0.1 miles North of Lambert Road Interchange Include ITS components.	
OC	SR-91, Reconstruct interchange extend existing auxiliary lane to tie into existing on-ramp between SR-55 Connector and Tustin Avenue Interchange. Include ITS components.	
OC	SR-91, Add general purpose lane from SR-55 to Riverside Co. line. Include ITS components.	
OC	SR-91, Add a lane in each direction eastbound between SR-55/SR-91 Connector to east of Weir Canon Road and westbound between east of Weir Canyon Road and Imperial Highway	
OC	SR-91, Construct WB 91 to SB 55 connector flyover. Include ITS components.	
OC	SR-91, Auxiliary lane between Lakeview Avenue to SR-241. Include ITS components.	
OC	SR-91, Lakeview interchange construct barrier-separated onramp (2 lanes) from SB Lakeview to WB SR-91. Include ITS components.	
OC	SR-91, Lakeview interchange construct barrier-separated onramp (2 lanes) from SB Lakeview to WB SR-91. Include ITS components.	
OC	SR-91, Relocation of Weigh Stations in both directions. Include ITS components.	
OC	SR-91. SR-241 to SR-71 add auxiliary lanes. Include ITS components.	
OC	SR-91, Add auxiliary lane from SR-71 to SR-241. Include ITS components.	
OC	SR-133: Widen from Lake Forest Drive to I-405 from 4 to 6 lanes. Include ITS components.	
OC	SR-133: I-405 to I-5 add 1 general purpose lane and aux lanes. Include ITS components.	
OC	I-405, Sand Canyon Ave SB off-ramp add second drop lane from I-405 to the off-ramp. Include ITS components.	$3.0
OC	I-405, Widen on-ramp from 2-lane to 3-lane at WB Culver Dr. Include ITS components.	$2.7
OC	I-405, Modify ramp and widen intersection at ramp entrance at Euclid. Include ITS components.	$4.0
OC	I-405, Modify ramp and add 2nd NB off ramp at Talbert interchange in Fountain Valley. Include ITS components.	$3.1
OC	I-405: Add auxiliary lane from SR-133 to Irvine Center Drive. Include ITS components.	
OC	I-405: Construct Sand Cyn SB on-ramp with an auxiliary lane to the SR-133 Collector Distributor Road. Include ITS components.	
OC	I-405, Construct auxiliary lane between Jeffrey Road On-Ramp & Sand Canyon. Include ITS components.	
OC	I-405, Add Aux lane from Jeffery on-ramp to Culver Dr. off-ramp. Include ITS components.	
OC	I-405, Jeffrey Rd NB off ramp Add second auxiliary lane from I-405 to off-ramp. Include ITS components.	
OC	I-405, SR55 to SR73 add aux lanes. Include ITS components.	
OC	I-405, Construct aux lane from Talbert to Ellis/Euclid in the City of Fountain Valley. Include ITS components.	
OC	I-405, Construct aux lane from Euclid to Brookhurst in the City of Fountain Valley. Include ITS components.	

Table 7
Comprehensive List of Goods Movement Projects (INITIAL EVALUATION)

County	Description	Cost ($Mill's)
OC	I-405, Construct NB auxiliary lanes from Brookhurst to Beach in the City of Fountain Valley. Include ITS components.	
OC	I-405, Construct SB Auxiliary lanes from Magnolia to Brookhurst in the City of Fountain Valley. Include ITS components.	
OC	I-405: Widen and extend collector distributor road southerly to serve both SR-133 and Irvine Center Drive. Include ITS components.	
OC	I-405: Braid the SR-133 Connector with NB Sand Canyon Ave. Include ITS components.	
OC	I-405: SR-133 to SR-55, add 1 general purpose lane and auxiliary lanes. Include ITS components.	
OC	I-405: Reconstruct SB 405 connector to SR-133, braid with NB off-ramp from SR-133 to Barranca Parkway. Include ITS components.	
OC	I-405: Modify the Interchange to widen the Sand Canyon Rd. Include ITS components.	
OC	I-405: Construct collector distributor SB I-405 from Jeffrey Road to Sand Canyon. Include ITS components.	
OC	I-405: South Bristol Braid delete left turn access from NB Bristol to SB I-405. Provide right turn on-ramp from NB Bristol to SB I-405 via a new braid that provides direct access to NB SR-55. Include ITS components.	
OC	I-405: Add a general purpose lane and auxiliary lanes in each direction. Include ITS components	
OC	I-605, Intersection Modification & ramp entrance Katella Ave on ramp to NB I-605. Include ITS components.	$2.0
OC	I-605, Modify ramp at Katella. Include ITS components.	$2.0
OC	I-605 to County line add 1 general purpose lane. Include ITS components.	
Riverside County		
RC	I-10 from San Bernardino County Line (R0.0) to Banning City Limits (12.9) - Add eastbound truck climbing lane.	$75.0
RC	On I-10 at & E/O Apache Trail - Construct new Morongo Pkwy IC (4 lns, ramps - 2 lns), construct aux lane, widen Apache Trail 3 to 5 lns, widen Seminole Dr 2 to 5 lns (ea: oa650g)	
RC	On I-10 near Rancho Mirage from 1.5 km east to 0.9 km west of Ramon Rd IC - Construct Bob Hope Dr extension (6 lanes) with a new diamond IC plus modify Ramon Rd IC and ramps	
RC	I-10 from Calimesa @ County Line Rd (R4.0) to 500 meters e/o Sandalwood Dr I/C (R4.3) - Replace Bridge, Ramps, Construct Auxiliary Lanes, and Realign Calimesa Rd (EA 0A710K).	$60.0
RC	I-10 at Ave 50 - Construct new interchange .	$19.5
RC	I-10 McNaughton Pkwy (approx. 3.38 mi e/o Dillon Rd) - Construct interchange.	$20.0
RC	I-10 at Portola Ave btwn Dinah Shore & Varner - Construct new IC (4 lanes) and ramps incl. bridge over UPRR & Varner realignment.	$19.8
RC	I-10 at Monterey Ave - Reconfigure IC, add 1 NB lane, construct new WB entry loop ramp from Monterey & WB entry ramp from Varner, realign/relocate WB exit ramp.	$4.3
RC	At I-15/Weirick Road IC in Corona - Widen ramps 1 to 2 lanes, widen Weirick Road 2 to 4 lanes from Temescal Canyon Rd to I-15, and install signals at ramps/Weirick Rd	
RC	i-15/cajalco road, widen Cajalco Rd i/c widen 2 to 4 lns from Temescal Cyn rd to Bedford Cyn rd and widen ramps 1 to 2 lanes.	
RC	At I-15/El Cerrito Rd IC in Corona - Widen on/off ramps 1 to 2 lanes, widen 2 to 4 lanes El Cerrito Rd between ramps, install signals, realign Bedford Cyn Rd and add soundwalls	

Table 7
Comprehensive List of Goods Movement Projects (INITIAL EVALUATION)

County	Description	Cost ($Mill's)
RC	on i-15 at Ontario Ave, widen sb off & nb on ramps 2 to 3 lns, & widen Ontario 4 to 6 lns (Compton Ave to State St) & install signals	
RC	In Riverside County at i-15/Limonite Ave IC - widen ic 4 to 6 lns, ramps 1 to 2 lns, & widen Limonite Ave from Hamner to Wineville 4 to 6 lns (approx 1 mi)	
RC	At I-15 and Clinton Keith Road widen overcrossing from 2 to 4 lns and widen ramps from 1 to 2 lns	
RC	SR-86 S at Ave 50 - Construct interchange.	$9.3
RC	SR-86 S at Ave 52 btwn La Hernandez and Polk - Construct new interchange.	$19.7
RC	SR-86 at Ave 54 btwn SR-111 & Fillmore - Construct bridge/interchange w new SR-86.	$11.2
RC	SR-86 S at Airport Blvd/Ave 56 btwn Orange & Fillmore - Construct new interchange (Spread-Diamond).	$17.8
RC	SR-86S/Airport Blvd. (Ave. 56) construct new IC (three lanes OC:1 lane each direction + 1 median lane) and ramps (1 lane) from approx. Desert Cactus Dr. Ave. 57	$27.8
RC	SR-86 S at SR-195 (Avenue 66) R10.63/R11.43 - Near Mecca, construct new interchange.	$19.4
RC	SR-86 S Tyler St w/o SR-86S Tyler St e/o SR-86S - Construct new interchange.	$19.0
RC	SR-60 at Etiwanda Ave btwn San Sevaine Wy & Iberia St - Widen ramps 1 to 2 lanes. 0.1 mi..	$0.2
RC	SR-60 from 0.4 mi e/o I-15/SR-60 IC to 0.2 mi e/o Main St - Add auxiliary lanes both directions.	$5.0
RC	On I-10 at Indian Ave near Palm Springs - Widen overcrossing 2 to 6 lns from 20th Ave North of I-10 & Garnet ave South of I-10 & ramps 1 to 2 lns (tea21-#377) (ea# 45570)	
RC	On I-10 at Date Palm IC in Cathedral City - Widen overcrossing from 2 to 6 lns and ramps from 1 to 2 lns	
RC	At I-10 and Jefferson St IC, modify/widen existing IC from 2 to 6 lanes	
RC	I-10 from Monterey Ave (44.5) to Dillon Rd (58.9) - Add 1 MF lane each direction (EA 0A030K).	$71.0
RC	I-10/SR-60 - Construct new interchange.	$129.0
RC	SR-60 - Construct truck climbing lane through Badlands to I-10	$26
RC	SR-60 at Milliken Ave btwn Etiwanda Ave & Wineville Rd - Widen ramps 1 to 2 lanes. 0.1 mi..	$0.1
San Bernardino County		
SB	I-15 from Wheaton Springs-Baily Road to Yates Well Road - construct NB truck descending lane	
SB	Colton Crossing BNSF/UP rail grade separation	$280.0
SB	I-10 and I-215 from On I-10 from 0.1 km w/o I-215 (PM 23.6) to 0.9km e/o SR-38 (PM 31.4) to On I-215 from Riverside County Line (PM 0.0) to Jct I-10/I-215 (PM 4.03) - Install Fiber Optic Communications (FOC) backbone system, Changeable message signs (CMS), Ramp metering stations (RMS), modify existing communication hub, CCTV, VDS, TOS Cabinets; widen on-ramps on I-10 and I-215; add aux lanes on I-10 (various locations).	$9.5
SB	I-10 from 0.1 km e/o I-15 (PM 9.9) to 0.4 km e/o I-215 (PM R24.5) - Install RMS, CCTV ESU; widen entrance ramps from 1 to 2 lanes at: EB & WB at Cherry Ave, Citrus Ave, Cedar Ave, Riverside Ave and Mt Vernon Ave; WB at Rancho Ave; EB at 9th St.	$9.2
SB	I-10 - Add auxiliary lanes from I-15 to Riverside Co. line	
SB	I-10 from 0.8 km e/o Etiwanda Ave OC (PM 11.6) to 1.5 km w/o Riverside Ave OC (PM 19.1) - In Fontana widen exit ramps from 1 to 2 lanes at Cherry Ave, Citrus Ave, & Cedar Ave IC to accommodate proposed aux lanes at Cherry Ave IC E/B aux lane PM 11.99/12.85, W/B Aux lane PM 13.38/13.68; Citrus Ave IC E/B aux lane only PM 14.58/14.88; Cedar Ave IC E/B aux lane PM 17.36/17.83, W/B aux lane PM 18.94/19.41.	$19.0
SB	I-10 WB from Yucaipa Bl to Ford St - Add 1 MF lane westbound.	$30.0

Table 7
Comprehensive List of Goods Movement Projects (INITIAL EVALUATION)

County	Description	Cost ($Mill's)
SB	SR-60 from Ramona Ave. to I-15 - add auxiliary lanes	$71.0
SB	I-15 - Rt 60 to I-10 Widen Freeway	$100.0
SB	I-15/I-215 Devore interchange	$200.0
SB	SR-60 / Ramona interchange	$26.0
SB	SR-60 / Euclid interchange	$5.0
SB	SR-60 / Grove interchange	$43.0
SB	SR-60 / Vineyard interchange	$43.0
SB	SR-60 / Archibald interchange	$6.0
SB	I-10 / Monte Vista interchange	$25.0
SB	I-10 / Grove/4th interchange	$67.0
SB	I-10 / Cherry interchange	$43.0
SB	I-10 / Beech interchange	$40.0
SB	I-10 / Citrus interchange	$47.0
SB	I-10 / Cedar interchange	$33.0
SB	I-10 / Riverside interchange	$50.0
SB	I-10 / Pepper interchange	$33.0
SB	I-10 / Mt. Vernon interchange	$31.0
SB	I-10 / Tippecanoe interchange	$50.0
SB	I-10 / Mt. View interchange	$50.0
SB	I-10 / California interchange	$43.0
SB	I-10 / Alabama interchange	$26.0
SB	I-15 / 6th/Arrow interchange	$36.0
SB	I-15 / Joshua interchange	$1.0
SB	I-15 / Bear Valley interchange	$20.0
SB	I-15 / La Mesa-Nisqualli interchange	$72.0
SB	I-15/High Desert Corridor interchange	$74.0
SB	I-215 / University interchange	$29.0
SB	I-215 / Pep/Lind interchange	$50.0
SB	I-215 / Palm interchange	$10.0
SB	SR-210 / 5th interchange	$17.0
SB	SR-58 PM 21.8/31.0 Near Hinkley from 1.4 miles /wo Valley View Rd. to 0.Kern Co. Line to 7.5 miles E/O JCT US-395. Construct 4 lane expressway. (2-4 lanes) (Phase 2)	$93.0
SB	SR-58 PM 0.0/12.9 Kern Co. Line to 7.5 miles E/O JCT US-395. Construct 4 lane expressway.	$152.0
SB	US-395 from Adelanto to I-15 - realign on new route to carry trucks and through traffic	$670.0
SB	High Desert Corridor - Construct new roadway between Antelope Valley and Victor Valley (First phase from 1 Mi. W/O US-395 to SR-18 in Apple Valley - costs for first phase only)	$900.0
SB	I-15 at Foothill Blvd (SR-66) - Add 400m deceleration lane on NB I-15 and widen NB off-ramp from 1 to 2 lanes.	$0.7
SB	Southern California Logistics Airport Track and intermodal yard improvements	$278.5
San Bernardino / Riverside County		
SB/RV	Electronic Clearance/Pre Pass Program for Inland Empire ITS	$2.0
San Diego County		
SD	San Diego Yard Improvements (Port, Airport, Border Region)	$2,112.9

Table 7
Comprehensive List of Goods Movement Projects (INITIAL EVALUATION)

County	Description	Cost ($Mill's)
SD	San Diego Mainline Rail Improvements	$1,929.6
SD	I-5, Widen I-805 to SR56	$180.0
SD	I-5, Widen/ML La Jolla Vil. to Vandergrift	$962.0
SD	I-805, Widen/ML SR905 to SR54	$469.0
SD	I-805, Widen/ML SR54 to I-8	$555.0
SD	I-805, Widen/ML, I-8 to I-5	$469.0
SD	I-805, Widen/ML Mission Valley Viaduct	$308.0
SD	SR125, SR905 to San Miguel RD	$635.0
SD	SR125, San Miguel Rd to SR54	$140.0
SD	SR52, Widen SR125 to SR67	$446.0
SD	SR52, I-805 to SR125	$241.0
SD	I-15, Widen/HOV SR94 to SR163	$247.0
SD	SR54/125, Widen/HOV I805 to SR94	$111.0
SD	SR125, Tele Canyon to San Miguel Rd	$37.0
SD	SR125, San Miguel Rd to SR 54	$37.0
SD	SR94, Widen/HOV	$190.0
SD	TAMT/NCMT Ground Access Improv. 1	$2.4
SD	Lindbergh Field to I-5 Access	$31.6
SD	SR 905, Siempre Viva Interchange	$29.0
SD	SR905, I-805 to Mexico Border	$423.0
SD	SR905, Otay Mesa POE Truck Route	$42.0
SD	SR-11, 4F SR905 to Mexico	$234.0
SD	East Otay Mesa Border Crossing	$750.0
SD	KM MV Terminal to I-15 Access	$31.6
SD	I-15 Improvements - SR-52 to Lake Hodges	$83.0
SD	I-15, Widen/ML SR56 to Ctr City Pkwy	$422.0
SD	I-15 Widen/ML, SR163 to SR56	$342.0
SD	I-15 Widen/ML, Ctr City Pkwy to SR78	$183.0
SD	I-5, SR54 to Sea World Drive	$210.0
SD	I-5/I-805 HOV/ML Connectors	$222.0
SD	I-15 Improvement, SR52 - SR78	$19.0
SD	I-15/SR94, S/W-E/N Connectors	$185.0
SD	SR94, Widen/HOV I-5 to I-15	$99.0
SD	SR94/SR125 W/N-S/E Connectors	$136.0
SD	TAMT/NCMT Ground Access Design	$1.2
San Diego / Multi-County		
SD/RC/SB	I-15 (U.S./Mexico Border to Victorville) dedicated truck lanes (2 lanes in each direction)	
Ventura County		
VC	Port/rail intermodal access at Port of Hueneme	$18.0
VC	Santa Paula Branch Line from Santa Clarita to Port Hueneme	$350.0
VC	Port Terminal - Hueneme Rd (Port to Los Pasos), Los Pasos (Hueneme to US 101)	

Table 7
Comprehensive List of Goods Movement Projects (INITIAL EVALUATION)

County	Description	Cost ($Mill's)
VC	Port Terminal - Ventura Rd (Hueneme to Channel Island), channel Island Blvd (Ventura to Victoria), Victoria Ave (Channel Island to US Port Terminal - Ventura Rd (Hueneme to Channel Island), channel Island Blvd (Ventura to Victoria), Victoria Ave (Channel Island to US 101)	
Imperial County		
IC	SR-78/Brawley bypass	$108.0

Table 8
Roles and Responsibilities

ACTION DESCRIPTION(S)	RESPONSIBLE AGENCIES	TIME FRAME[1]	GOAL/OBJECTIVE	MARKET SEGMENT	COST	FUNDING STRATEGIES & CHALLENGES
ACTION SET 1: ACCELERATE ENVIRONMENTAL MITIGATION						
1.1. Fund and implement the SIP (including San Pedro Bay Ports CAAP, 2007 SCAQMP, and statewide GMAP)	Respective environmental agencies	I, C	Reduce air quality impacts of goods movement	All goods movement vehicles (truck, rail, intermodal equipment, ships)	$2B for the CAAP	State General Obligation Bonds (potential source), secure greater share of Federal and state funding and work with San Pedro Bay ports to negotiate funding plan with private sector
1.2. Develop guidelines for local jurisdictions to use in siting and designing goods movement related land uses and facilities	MCGMAP partners (in cooperation w/ local agencies)	I	Minimize adverse impact between goods movement & local communities to balance impacts with economic opportunities	All goods movement projects	TBD	Use the Goods Movement Environmental Justice Grant to initiate process and identify potential fund sources
1.3. Accelerate broad regional environmental mitigation strategies	County Commissions, MPO, state and federal agencies; private industry	S,M	Reduce emissions and improve public health	All goods movement vehicles (truck, rail, intermodal equipment, ships)	TBD	Moderate/high opportunity for regional fair share and private sector funding
1.4. Initiate a follow-on effort to identify more aggressive goods movement environmental initiatives to achieve regional air quality conformity and complement the State Implementation Plan	MCGMAP partners	I	Full implementation of current proposals is will not achieve conformity	All goods movement projects	TBD	Use discretionary planning funds to conduct research The challenge will be lack of understanding of new innovative solutions
1.5. Accelerate regional emission reduction measures and strategies	County Commissions, MPO, state and federal agencies	S	Reduce emissions and improve public health	All goods movement projects	TBD	Moderate/high opportunity for regional fair share and private sector funding

Table 8
Roles and Responsibilities

ACTION DESCRIPTION(S)	RESPONSIBLE AGENCIES	TIME FRAME[1]	GOAL/OBJECTIVE	MARKET SEGMENT	COST	FUNDING STRATEGIES & CHALLENGES
1.6. Accelerate project specific environmental mitigation strategies	Project sponsors/owners	S,M,L	Reduce localized/community impacts	All goods movement projects	TBD	Moderate/high opportunity for regional fair share and private sector funding
ACTION SET 2: RELIEVE CONGESTION AND IMPROVE MOBILITY						
2.1. Fund and implement the use of on-dock rail and near-dock as needed	Ports and railroads	I, C as needed	Reduce truck traffic volumes, congestion, and emissions for port communities	Regional, national intermodal markets	$631M on-dock SCIG $500M near-dock ICTF	Private sector implementation and funding. Near-dock fully funded by industry. Significant funding shortfall for on-dock improvements (61% funding gap, assuming 39% from TCIF). The challenge is limited available acreage due to many competing operations at the ports
2.2. Increase Intermodal Lift Capacity	Ports and railroads	S	Reduce congestion and emissions	Regional, national intermodal markets	TBD	High opportunity for negotiated project fee
2.3. Participate with railroads to eliminate key bottlenecks and increase capacity of mainline rail system - Mainline Rail Plan (MLRP)	County Commissions, Metrolink, Class I railroads	S, and as needed	Increase regional passenger & freight rail service and reduce vehicular traffic	Regional, national intermodal markets	$2.1B for MLRP; $280M for Colton Xing	Secure more Federal and state funding. Significant funding shortfall – 100% gap for both. TCIF-potential source for additional 20% for each. Potential private sector and railroads participation.
2.4. Increase Mainline Rail Capacity	Railroads and rail agencies	S	Reduce congestion and emissions	Regional, national intermodal markets	TBD	High opportunity for private sector funding

Table 8
Roles and Responsibilities

ACTION DESCRIPTION(S)	RESPONSIBLE AGENCIES	TIME FRAME[1]	GOAL/OBJECTIVE	MARKET SEGMENT	COST	FUNDING STRATEGIES & CHALLENGES
2.5. Develop framework to provide ongoing improvements to mainline track. (e. g. Colton grade separation, highway-rail grade separations, locomotive emission reductions, and other rail corridor related mitigations)	Railroads/rail agencies and State, regional or local agencies	S	Reduce congestion and emissions	Regional, national intermodal markets	TBD	High opportunity for private sector funding (increased contributions)
2.6. Implement the multi-county Alameda Corridor East (ACE) Trade Corridor railroad grade crossing improvement program	County commissions	I, C as funding comes available	Reduce the congestion, emissions, and the impact of regional rail movements on local communities	Local communities	$4.3B	Secure greater share of Federal and state funding. Significant funding shortfall – 86% gap. TCIF a potential source for additional 20%.
2.7. Grade Separation	County commissions	S,M,L	Reduce congestion and emissions	Local communities	TBD	High opportunity for regional fair share; low for private sector funding

Table 8
Roles and Responsibilities

ACTION DESCRIPTION(S)	RESPONSIBLE AGENCIES	TIME FRAME[1]	GOAL/OBJECTIVE	MARKET SEGMENT	COST	FUNDING STRATEGIES & CHALLENGES
2.8. Implement high-priority freeway capacity and safety operational improvement projects included in county transportation plans. (e.g., Gerald Desmond Bridge, I-710…)	County commissions and state agencies; ports	I, C as funding comes available	Improve mobility, operations and safety	Local, regional and transload markets	$1.531 B, excl. I-710 & High Desert corridor	Work with the San Pedro Bay ports to negotiate a fair-share funding plan with shippers. Significant funding shortfall (52% gap). Industry user fee and TCIF a potential source.
2.9. Initiate RSTIS to evaluate the feasibility of a dedicated freight guideway on east-west corridor bounded by I-710, SR-60, I-10, and I-15, from SR-60 to U.S.-395	MCGMAP partners	S	Reduce congestion, emissions, and impact of truck related traffic relative to other East/West corridors and for the specific factors analyzed. This corridor has the least impact on schools and the greatest revenue potential	Local, regional and transload markets	$4-5M for study	Discretionary planning fund The challenge is the community acceptance of a dedicated freight guideway and filling the funding gap to implement it – only 20% available through traditional tolling methods
2.10. Implement key highway projects	County commissions and state agencies; ports	S,M	Congestion reduction, truck trip reduction, air quality improvement	Local, regional and transload markets	TBD	Moderate/high opportunity for regional fair share and private sector funding
2.11. Continue planning of I-710 dedicated freight guideway facility Or is it the EIR and EIS	LA County agencies (Metro, Caltrans, SCAG, Gateway COG)	S	Congestion reduction, truck trip reduction, air quality improvement	Local, regional and transload markets	$5.5B	Moderate/high opportunity for regional fair share and private sector funding

Table 8
Roles and Responsibilities

ACTION DESCRIPTION(S)	RESPONSIBLE AGENCIES	TIME FRAME[1]	GOAL/OBJECTIVE	MARKET SEGMENT	COST	FUNDING STRATEGIES & CHALLENGES
2.12. Develop inland port / concentrate inland warehouse and distribution locations	County and City planning agencies	S,M	Reduce trucks; improve air quality; minimize community impacts	Local, regional and transload markets	TBD	Moderate/high opportunity for development impact fee
2.13. Improve highway system	County commissions and state agencies	S,M,L	Promote safe and efficient mobility for all users	All goods movement market segments	TBD	Low opportunity for negotiated fair share
2.14. Increase Border Trade Capacity and Efficiency	Project sponsors, County Transportation Commissions, U.S. Customs and Border Protection	S	Reduce congestion and emissions	Regional, national, and international markets	$1.5B	Moderate / high opportunity for regional fair share and private sector funding
ACTION SET 3: IMPROVE OPERATIONAL EFFICIENCY						
3.1. Implement efficiency improvements contained in the San Pedro Bay Ports Master Plans.	Ports and port tenants	I, C in step with new innovations and approaches	Minimize community impacts and accommodate trade	International container market	TBD	Private sector implementation and funding The challenge is institutional barriers…
3.2. Improve terminal productivity, truck turn times, and intermodal operations	Ports, railroads, intermodal terminal operators	S	Improve operations, increase mobility and reduce emissions	International container market	TBD	Moderate/high opportunity for private sector funding

Table 8
Roles and Responsibilities

ACTION DESCRIPTION(S)	RESPONSIBLE AGENCIES	TIME FRAME[1]	GOAL/OBJECTIVE	MARKET SEGMENT	COST	FUNDING STRATEGIES & CHALLENGES
3.3. Highway operational improvements	County commissions and state agencies	S.M	Improve operations, increase mobility and reduce emissions	All goods movement market segments	TBD	Low opportunity for regional fair share and private sector funding
3.4. Develop public/private partnerships to research and develop advances in goods movement transportation technologies.	MCGMAP partners and others	S	Conventional modes do not have the capacity to reduce future community and environmental impacts. Private sector lacks long-term solutions	All goods movement market segments	TBD	Planning funds. Partner with private sector and university-based transportation technology research centers
3.5. Implement Ontario International Airport's air cargo cross-dock facility	Airport agencies	S	Airport and Belly Cargo Shift	Air cargo	TBD	Low opportunity for regional fair share and private sector funding
3.6. Initiate goods movement supply chain logistics study on the link between industry supply chain trends and trade related transportation patterns and movements	The San Pedro Bay Ports and the MCGMAP partners	S	Data modeling of supply chain impacts on transportation patterns, particularly of first, secondary, and tertiary trips	All goods movement market segments	$2-4M	Discretionary planning funds. Partner with ports and private sector The challenge is generating reliable data
ACTION SET 4: DEVELOP EQUITABLE PUBLIC/PRIVATE FUNDING STRATEGY						
4.1. Maximize the Study Area's Fair-share of State and Federal Funds	County and state agencies	S	Increase funding capability to complete projects	Regional and national goods movement market segments	TBD	Federal dollars maybe federal participation or federal grants and loan?

Table 8
Roles and Responsibilities

ACTION DESCRIPTION(S)	RESPONSIBLE AGENCIES	TIME FRAME[1]	GOAL/OBJECTIVE	MARKET SEGMENT	COST	FUNDING STRATEGIES & CHALLENGES
4.2. Negotiate user fees with industry that can be included in a project-specific finance plan to improve goods movement and air quality. 4.3. Establish institutional arrangements to collect and disburse funds.	MCGMAP partners and the ports	I	Increase goods movement funding from private sector. Ensure health and economic well being of the region	Regional and national goods movement market segments	TBD	Work with the San Pedro Bay ports to negotiate a fair-share funding plan with importers/exporters and licensed motor carriers The challenge is agency interests competing with institutional barriers
4.4. Pursue self-help public-private funding arrangements	County and state agencies	S	Increase funding capability to complete projects	Regional and national goods movement market segments	TBD	TBD
4.5. Implement the SCNFG MOU among regional, state, and federal agencies to facilitate the actions contained in the MCGMAP	MCGMAP partners, state and Federal agencies	I	Facilitate a coordinated approach to implementing and monitoring the action plan	Local, regional, national goods movement market segments	TBD	Establish a joint working group (regional state & fed agencies) to lead coordination and implementation The challenge is multiple agencies' broad range of operational objectives
4.6. Develop Institutional Structure for Managing User Fees and Revenue	County and state agencies	S	Increase funding capability to complete projects	Regional and national goods movement market segments	TBD	TBD
4.7. Develop and coordinate a comprehensive regional legislative support program for goods movement 4.8. Maintain a database of high priority goods movement	MCGMAP partners	S	Increase the region's chances of securing Federal and state funding	Regional and national goods movement market segments	TBD	Deploy as part of overall project programming process The challenge is many competing interests

Note [1]: S = Short-term (2007-2015), M = Mid-term (2015-2025), L = Long-term (post 2025), I = Immediate, C = Continuous

Table 9
Detailed Actions

TYPE OF ACTION	ACTION SET	TIME FRAME[1]
	ACTION SET 1: ACCELERATE ENVIRONMENTAL MITIGATION	
PROJECT SPECIFIC	Promote coordinated CEQA/NEPA review of regional goods movement projects. Increase public involvement and notification to expand CEQA/NEPA process to a regional level.	S,M,L
	Develop specific mitigation plans for proposed projects.	S,M,L
	Achieve compliance w/ natural resource statutes (fed & state Endangered Species Acts and Clean Water Acts, Migratory Bird Treaty Act, etc.)	S,M,L
	Include "smart" design and good planning principles in the short-term, such as: – Landscaped buffering – Noise barriers – Exterior light shielding and positioning – Facility orientation to minimize light and noise spillover – Pedestrian crossing improvements – Paleontological and archeological surveys and monitoring – Separation of incompatible land uses – Wetlands protection	S
REGIONAL CONFORMITY	Aggressively seek reductions in diesel emissions.	S
	Consider market-based approaches to emissions reduction, such as that recommended by the Maritime Goods Movement Coalition.	S
	Initiate a follow-on effort to identify more aggressive goods movement initiatives to achieve regional air quality conformity.	S
	Undertake an initiative to generate public and/or private funds to accelerate implementation of the air quality strategies contained in the Ports' Clean Air Action Plan, the California Air Resources Board's Emission Reduction Plan, & the South Coast AQMD's Air Quality Management Plan.	S
BROADER REGIONAL STRATEGIES	Fund and implement the State Implementation Plan including the San Pedro Bay Ports Clean Air Action Plan (CAAP), the 2007 South Coast Air Quality Management (AQMP), and the California Air Resources Board (ARB) statewide Goods Movement Action Plan (GMAP).	S,M,L
	Develop guidelines for local jurisdictions to use in sitting and designing goods movement related land uses and transportation facilities.	S

Table 9
Detailed Actions

TYPE OF ACTION	ACTION SET	TIME FRAME[1]
	Strongly encourage EPA to rapidly finalize its proposed rulemaking for the Control of Emissions of Air Pollution from New Locomotive Engines and New Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder.	S
	Urge adoption of a Sulfur Emission Control Area (SECA) for the west coast.	S
	Achieve full implementation of emerging technologies that have air quality benefits, including, but not limited to:	
	– Low-sulfur diesel fuels	S
	– Shore-based electrical power (cold ironing)	S, M, L
	– Diesel particulate filter and diesel oxidation catalyst retrofits	S
	– Fuel cells	L
	– Fleet modernization/replacement	S
	– On-board engine diagnostics	S
	– Diesel-electric hybrids	M
	Investigate feasibility of advanced transportation technologies such as Maglev and linear induction motors.	L
BROADER REGIONAL STRATEGIES	Promote short term coordinated institutional policies for: – Quiet zones for rail corridors – Stricter zoning and land use regulations (buffering) – Strengthened mandatory emissions controls and engine performance standards – Mitigation banking and/or development of pooled funds for mitigation (Time frame to be determined) – Research funding (Timeframe to be determined) – Community health investment (e.g., health clinics) (Time frame to be determined)	S
	ACTION SET 2: RELIEVE CONGESTION AND IMPROVE MOBILITY	
INTERMODAL LIFT CAPACITY ENHANCEMENTS	Fund and implement the full use of on-dock rail according to the San Pedro Bay Ports Master Plans, as well as increase intermodal rail lift capacity near-dock as needed.	S,M,L
	Implement Ports Rail Systems (on-dock rail development)	S

Table 9
Detailed Actions

TYPE OF ACTION	ACTION SET	TIME FRAME[1]
	Implement BNSF's near-dock rail yard.	S
	Modernize the UPRR's ICTF.	S
	Build new BNSF intermodal yard in Victorville.	S
	Consider a comparable facility in Banning/Beaumont area along UPRR.	S,M
MAINLINE RAIL CAPACITY ENHANCEMENTS	Participate with the railroads in eliminating key bottlenecks along the mainline rail system, such as the Colton Crossing, and in the capacity expansion along the mainline system according to the Mainline Rail Plan (MLRP).	S
	Develop the appropriate institutional arrangements and negotiating framework to provide simultaneous and continuous improvement to mainline track improvements, the Colton grade separation, highway-rail grade separations, locomotive emission reductions, and other rail corridor related mitigations.	S
	Grade separate Colton Crossing.	S
	Triple track the BNSF Transcon from Redondo Junction to San Bernardino.	S
	Triple track the Cajon Pass.	S
	Double track segments of the UPRR Los Angeles and Alhambra Subdivisions.	S
	Implement Santa Paula Branch Line gap closure.	M
GRADE SEPARATIONS	Implement the Alameda Corridor East (ACE)Trade Corridor railroad grade crossing improvement program for all counties involved.	S,M,L
	Grade separate SR-118 over UPRR coast mainline near Somis.	S
	Grade separate 5th Street (SR-34/Rice Avenue) over UPRR Coast Mainline in City of Oxnard.	S
	Implement Port of San Diego Tenth Avenue/National City Marine Terminals Access program, including grade separation.	M

Table 9
Detailed Actions

TYPE OF ACTION	ACTION SET	TIME FRAME[1]
COMPREHENSIVE INNOVATIVE APPROACH (HIGHWAY)	Implement the following key highway projects:	
	– Gerald Desmond Bridge replacement	S
	– SR-47 Expressway, including Schuyler Heim Bridge replacement	S
	– I-110 Connectors Program	S
	– Navy Way/Seaside Avenue Interchange	S
	– I-710 Corridor, including two truck lanes in each direction	M
	– East-west truck corridor (I-710 to I-15)	M
	– I-15 truck lanes (from east-west corridor to Victorville)	M
	– SR-57 climbing lanes	M
	– Truck lanes through Cajon and San Gorgonio Passes	M
	– High Desert Corridor	M
	– Widen Rice Road Interchange and ramps to improve access to the Port of Hueneme to U.S.-101.	S
	Initiate a Regionally Significant Transportation Investment Study (RSTIS) focused on increasing freight moving capacity along a dedicated freight guideway (DFG) on the east-west corridor generally bounded by I-710, SR-60, I-10, and I-15, from SR-60 to U.S.-395. To include possible inland ports and staging areas, innovations in transport modes, and alternative energy uses.	S
	Continue with analysis and planning of I-710 dedicated facility.	S
	Evaluate feasibility of Long Combination Vehicles (LCVs) on truck lanes.	S,M
	Give serious consideration to the option of private ownership and operations for key facilities such as truck-only toll lanes.	S
	Develop inland port / concentrate inland warehouse and distribution locations.	S,M
GENERAL HIGHWAY IMPROVEMENTS	Proceed with planned operational and safety improvements throughout the region.	S
	Evaluate corridor-specific operational and safety improvements across jurisdictional boundaries.	M
	Combine operational and safety improvements with corridor-specific master plans.	L

Table 9
Detailed Actions

TYPE OF ACTION	ACTION SET	TIME FRAME[1]
BORDER TRADE CAPACITY ENHANCEMENTS	Implement the following key highway projects: – SR-905 Freeway, from Otay Mesa Border Crossing to I-805 (S) – SR-78 Brawley Bypass, the Calexico East Border Crossing Corridor (M) – Construct East Otay Mesa Port of Entry and highway SR-11 from Mexico Border to SR-905 (S) – Construct truck routes/bypasses at Otay Mesa and Tecate Ports of Entry (S)	 S M S S
	ACTION SET 3: IMPROVE OPERATIONAL EFFICIENCY	
PORT TERMINALS	Implement the efficiency improvements contained in the San Pedro Bay Ports Master Plans.	S
	Establish common chassis pools to improve productivity and turn times within terminals.	S
	Extend hours of operation.	S
	Implement Advanced Transportation Management, Information, and Security (ATMIS) system.	S
HIGHWAY OPERATIONS & NEW TECHNOLOGIES	Develop partnership between public and private entities to research and develop advances in goods movement transportation technologies.	S
	Expand regional ITS system – Incident management and variable message signs (VMS)	S
	Increase enforcement of trucking operations on highways ORT Congestion pricing Implement regional weigh-in-motion (WIM) stations combined with stricter enforcement of truck weight restrictions	S,M
	Initiate Regional Goods Movement Supply Chain Logistics Study (GMSCLS) focused on the linkage between industry supply chain trends and port and trade related transportation patterns and movements.	S
	Evaluate feasibility of advanced technologies, such as Maglev and linear induction motors.	S
AIRPORT & BELLY CARGO SHIFT	Implement Ontario International Airport's air cargo cross-dock facility.	S

Table 9
Detailed Actions

TYPE OF ACTION	ACTION SET	TIME FRAME[1]
	ACTION SET 4: DEVELOP EQUITABLE PUBLIC/PRIVATE FUNDING STRATEGY	
MAXIMIZE FAIR-SHARE	Focus on maximizing the region's share of the upcoming federal transportation reauthorization in 2009.	S
	Continue formula-based funding from regional and local agencies for highway capacity and general-purpose lane enhancement projects.	S
PROJECT-SPECIFIC USER FEES	Negotiate user fees with industry that can be included in a project-specific plan of finance for goods movement and air quality improvements. Develop the institutional structure to collect and disburse funds for the projects.	S
	Focus on a "short list" of high priority projects.	S
	Pursue "self-help" public-private funding arrangements to increase state and federal funds, focusing on projects to increase intermodal lift capacity, increase mainline rail and specialized (e.g., focused market-segment) truck capacity improvements, and corridor-wide grade separations.	S
INSTITUTIONAL ARRANGEMENT	Implement the GM MOU among regional, state, and federal agencies to facilitate the actions contained in the MCGMAP.	S
	Initiate a joint powers agency of key stakeholders, potentially similar to the structure developed for ACTA, to administer the fee collection and fund disbursement program. This will reassure the private sector that a government entity will not attempt to use fee revenue for non-project related uses.	S
LEGISLATIVE ACTIONS	Develop a comprehensive legislative program supportive of goods movement. Coordinate legislative efforts at a regional level to communicate and promote needs for goods movement improvements at the state and federal levels. Maintain a running list of high priority goods movement infrastructure and air quality projects and promote those projects at the regional state, and federal levels.	S
	Urge Congress to develop and pass legislation that would implement a national goods movement policy	S
	Develop a California consensus position on goods movement development, then work closely with the entire California congressional delegation, the West Coast Corridor Coalition, CALMITSAC, the Waterfront Coalition and other stakeholders to develop a unified approach to lobbying for additional federal support for goods movement related projects, port security and environmental programs.	S

Table 9
Detailed Actions

TYPE OF ACTION	ACTION SET	TIME FRAME[1]
	Establish short-term programs that will encourage private sector investment in essential infrastructure, including, but not limited to: – Investment tax credits – Loans – Expansion of tax-exempt bonding to projects of both public and private benefit.	S
	Encourage market-based approaches similar to the REACH program and the Carl Moyer Program.	S
	Extend design-build authority to ports, transportation joint powers authorities, county and city public works departments, and local and regional transportation agencies.	S

Note [1]: S = Short-term (2008-2015), M = Mid-term (2015-2025), L = Long-term (post 2025)

Table 10
Potential Funding Sources for Goods Movement Projects

SOURCES	DESCRIPTION	Eligible Project Types
Federal Sources		
High Priority Project Earmark	Discretionary program. Provides designated funding for specific projects identified in SAFETEA-LU. Approximately $15 billion for 5,173 projects was identified in SAFETEA-LU.	**Highway, Port and Rail Projects**
Projects of National and Regional Significance	Discretionary program. Provides funding for high cost projects) in excess of $500 million) of national or regional significance. Projects selected by competitive evaluation process based on ability to generate national economic benefits, reduce congestion, improve safety, leverage non-federal funding, stability of financial plan, use of new technology, and maintain/ protect the environment. Total in federal program: $1.8 billion	**Highway, Port and Rail Projects**
National Corridor Infrastructure Program	Discretionary program. Provides funding for construction of corridors of national significance to promote economic growth and international or interregional trade. Competitive selection process based on criteria including: extent to which corridor links two existing segments of the interstate system; facilitates major mobility, economic growth, development in area underserved by highway investment, significant commercial traffic; reduce commercial or other travel time through a major freight corridor. Total in federal program: $1.95 billion.	**Highway,**
Interstate Maintenance (IM) Program	Discretionary program. Provides for the on-going work necessary to preserve and improve Interstate highways. This includes funding for resurfacing, restoring, rehabilitating and reconstructing (4R) most routes on the Interstate System. For FY 06, seven projects named in California with funding levels ranging from $750,000 to $1 million.	**Highway**
Highway Bridge Program	Discretionary Program. Provides funding to enable states to improve the condition of their highway bridges through replacement, rehabilitation, and systematic preventive maintenance.	**Highway**
Transportation Improvements	Discretionary program. Provides funding for earmark projects identified in SAFETEA-LU ranging in cost from $75,000 to $30 million. Project sponsors could consider securing a Transportation Improvements earmark in the next reauthorization bill (federal fiscal year 2010-2016).	**Highway, Port and Rail Projects**
Transportation , Community, and System Preservation (TCSP) Program	Competitive program with funds earmarked for projects that integrate transportation, community, system preservation, and the environment. Limited levels of funding total and by project.	**Highway, Port and Rail Projects**
Formula Programs		

Table 10
Potential Funding Sources for Goods Movement Projects

SOURCES	DESCRIPTION	Eligible Project Types
Federal Sources		
Federal "Core" Programs: - Surface Transportation Program (STP) - National Highway System (NHS) - Highway Safety Improvements	Funds are distributed through the STIP and SHOPP. For STIP, 75 percent of funds are programmed at discretion of the MPOs in RIP and 25 percent by Caltrans in IIP. Of these, 88.53% are federal.	**Highway**
Congestion Mitigation and Air Quality (CMAQ)	For projects that improve air quality and reduce congestion. Funds are programmed by OCTA for bus/rail capital, highway, and bus/rail operations (first 3 yrs of start-up). Newly proposed FHWA guidelines in circulation as of February 2007 would eliminate start-up operations as an allowable use.	**Highway, Port and Rail Projects**
Loan and Financing Programs		
Transportation Infrastructure Finance and Innovation Act (TIFIA)	The TIFIA program provides project sponsors with secured loans, loan guarantees, and lines of credit from the federal government for surface transportation infrastructure projects of national or regional significance. Under SAFETEA-LU, eligibility extends to any highway, transit or railroad project in excess of $50 million in cost, and can include intermodal facilities, border crossing infrastructure, expansion of multi-state highway trade corridors, and other investments with regional and national benefits.	**Highway, Port and Rail Projects**
Section 129 Loan	The National Highway System Designation Act (NHS) established the Section 129 Loan Program as a mechanism to allow states to offer low interest loans to project sponsors. States can use the funds from the program for any federal-aid highway project and can offer loans to either public or private project sponsors.	**Highway, Port and Rail Projects**
Railroad Rehabilitation and Improvement Financing	This program provides up to $35 billion for direct loans and loan guarantees with up to $7.0 billion reserved for projects benefiting freight railroads other than Class I carriers.	**Rail**
Freight Programs		

Table 10
Potential Funding Sources for Goods Movement Projects

SOURCES	DESCRIPTION	Eligible Project Types
Federal Sources		
Freight Intermodal Distribution Pilot Grant Program	Provides grants to states to facilitate and support intermodal freight transportation initiatives. Pilot projects are designed to reduce congestion into/out of ports and establish/expand intermodal facilities and inland freight distribution centers. SAFETEA-LU provided $30 million over 5 years (2005-2009) for 6 designated projects: (A) Short-haul intermodal projects, Oregon, $5,000,000; (B) The Georgia Port Authority, $5,000,000; (C) The ports of Los Angeles and Long Beach, California, $5,000,000; (D) Fairbanks, Alaska, $5,000,000; (E) Charlotte Douglas International Airport Freight Intermodal Facility, North Carolina, $5,000,000; (F) South Piedmont Freight Intermodal Center, North Carolina, $5,000,000	**Highway, Port and Rail Projects**
Capital Grants for Rail Line Relocation Projects	SAFETEA-LU establishes a new capital grants program for local rail line relocation and improvement projects. A state is eligible for a grant for any construction project for the improvement of the route or structure of a rail line that either is carried out for the purpose of mitigating the adverse effects of rail traffic on safety, motor vehicle traffic flow, community quality of life, or economic development; or involves a lateral or vertical relocation of any portion of the rail line. Approximately $350 million per year (2006-2009) is available with a $20 million maximum grant for a project.	**Rail**
Department of Defense		
DHS Preparedness and Recovery Preparedness	Discretionary grant program, as determined by the Secretary of Homeland Security, which will provide $1.15 billion in grant to state and local agencies in FY 2006. Of this total, $765 million will be for use in high-threat, high density urban areas; $175 million will be for port security grants; and $150 million will be for intercity passenger rail transportation, freight rail, and transit security grants.	**Highway, Port and Rail Projects**
DOD Railroads for National Defense Program	The Department of Defense established a special program to identify and protect commercial railroad infrastructure important for defense purposes. The program is administered by the Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA). SDDCTEA's mission is to "provide the DOD with the research, engineering, and analytical expertise to improve the deployability of U.S. Armed Forces, the transportability of military equipment, the infrastructure of the defense transportation system, and the management and execution of the DOD transportation programs for national defense."	**Rail**

Table 10
Potential Funding Sources for Goods Movement Projects

SOURCES	DESCRIPTION	Eligible Project Types
Federal Sources		
STATE SOURCES		
State Transportation Improvement Program: Interregional Improvement Program (Cash)	25 percent of the federal and state funds in the State Highway Account funds are prioritized and programmed by Caltrans for projects of regional significance. These funds are programmed in the Interregional Transportation Improvement Program (IIP) component of the State Transportation Improvement Program (STIP).	**Highway, Port and Rail Projects**
STIP: Grant Anticipation Revenue Bonds (GARVEES)	Federal grant revenue anticipation bond proceeds pledged to projects. Annual debt service programmed in the STIP, with source from IIP (or RIP) funds. It is anticipated that the earliest GARVEE issuance would be during Fiscal Year 2006-2007, although it is possible that issuance could be delayed even further. Based on an April 2006 report from the State Treasurer, the state capacity to issue GARVEE bonds is approximately $2 billion.	**Highway, Port and Rail Projects**
Transportation Finance Bank (TFB) Revolving Loan Program	Program which provides flexible, short-term financing to public entities and public/private partnerships for the purpose of accelerating the delivery of transportation projects in California. Any local transportation planning agency or county transportation commission may apply for a loan. Additionally, recipients of fuel tax revenue monies are eligible for a TFB loan.	**Highway, Port and Rail Projects**
State Infrastructure Bond Program	On November 7, 2006 voters approved $19.925 billion in bonds for transportation projects. The program consists of the following: 1) $17.25 billion for mobility, transit, congestion relief; (of which $4 billion is for bus, rail, and transit improvements) 2) $1.525 billion for safety, security, disaster preparedness; and 3) $1.2 billion for air quality.	**Highway, Port and Rail Projects**
Public Utilities Commission Section 130 Program	The Section 130 Program provides federal funds to improve safety at existing at-grade highway-rail crossings. The purpose of Section 130 Program is to reduce the number, severity and potential of hazards to motorists, bicyclists, and pedestrians at highway-rail at-grade	**Highway and Rail Projects**

Table 10
Potential Funding Sources for Goods Movement Projects

SOURCES	DESCRIPTION	Eligible Project Types
Federal Sources		
	crossings The Section 130 program is a cooperative effort between the FHWA, Caltrans, California Public Utilities Commission, railroad companies and local agencies. FHWA delegated the authority to manage this program to Caltrans in cooperation with the California Public Utilities Commission.	
Public Utilities Commission Section 190 Program	The Section 190 Program provides $15 million annually in state funds for proposed grade separation of existing or proposed highway-rail crossings, at grade crossings in need of elimination, and existing grade separations in need of alteration or reconstruction.	**Highway and Rail Projects**
REGIONAL SOURCES		
State Transportation Improvement Program: Regional Improvement Program (Cash)	75 percent of the federal and state funds in the State Highway Account funds are prioritized and programmed by regional agencies (such as OCTA). These funds are programmed in the Regional Transportation Improvement Program (RTIP) component of the State Transportation Improvement Program (STIP).	**Highway, Port and Rail Projects**
LOCAL SOURCES		
Transportation Impact Fee (for Annual Debt Service)	Creation of Transportation Impact Fee, with fees pledged for payment of annual debt service	**Highway, Port and Rail Projects**
Tax Increment Financing (for Annual Debt Service)	Creation of Tax Increment Finance District, with tax increments pledged for payment of annual debt service	**Highway, Port and Rail Projects**
USER FEES		
Tolls	Tolls could provide a mechanism to generate revenue, moderate traffic demand, and/or provide incentive to use particular facilities. Tolling could be part of an overall funding strategy with toll revenues providing part of a larger revenue stream pledged for debt repayment. Facility could be designed, built, and/or operated as public, private, or public-private partnership.	**Highway Projects**

Table 10
Potential Funding Sources for Goods Movement Projects

SOURCES	DESCRIPTION	Eligible Project Types
Federal Sources		
Transportation Development Credits	Transportation Development Credits (TDCs), formerly known as toll credits, allow states which have toll road facilities that are part of the state and national highway system to utilize revenues derived from the facilities as a "credit" or "match" to any federally funded highway and/or transit related program.	**Highway Projects**
Shadow Tolls	A shadow toll occurs on a roadway typically constructed under a DBFO arrangement where the government entity will pay the private contractor on an annual basis depending upon the volume of traffic using the road. The term "shadow tolling" is used since there are no tollbooths and the users do not pay tolls.	**Highway Projects**
Pass-Through Tolling	Pass through tolling is an agreement between local communities and TxDOT where the local communities provide funding to build a state highway project and the state partially reimburses the community over time by paying a fee for each vehicle that drives on the new highway.	**Highway Projects**
Truck Toll (TOT) Lanes	Truck only toll (TOT) lanes are highway lanes that are reserved for the use of commercial vehicles, primarily trucks and buses. Commercial vehicles can pay a fee to use the lanes if so desired, or they can continue to use the regular lanes. TOT lanes can either be newly constructed facilities, or they can be created by reallocating the use of existing lanes.	**Highway Projects**
Regional Freight Fees	If part of larger goods movement network, could potentially be part of any program funded through container fees or other freight fee program.	**Rail Projects**
Pier Pass	PierPass is a not-for-profit organization created by marine terminal operators to reduce congestion and improve air quality in and around the Ports of Los Angeles and Long Beach. The off peak program provides an incentive for cargo owners to move cargo at night and on weekends, in order to reduce truck traffic and pollution during peak daytime traffic hours and to alleviate port congestion.	**Highway, Port and Rail Projects**
Container Fees	Container fees can be assessed for the use of infrastructure either directly or indirectly. Fees could be charged by users of port and freight movement corridors could be used to support transportation and air quality improvement projects.	**Highway, Port and Rail Projects**
Impact Fees	The implementation of impact fees associated with the movement of cargo or sources (i.e., trucks, locomotives, vessels, etc.) could provide funding for projects in order to accelerate emission reductions from all source categories	**Highway, Port and Rail Projects**
INNOVATIVE FINANCING MECHANISMS		
General Obligation Bonds	General obligation bonds (GO bonds) are bonds that are legally backed by the full faith and credit of the issuing government. GO bonds are considered the most secure type of revenue bond, and therefore has the lowest interest rates. The security is based on the issuing government's ability to raise property taxes to assure payment.	**Highway, Rail, or Port Projects**

Table 10
Potential Funding Sources for Goods Movement Projects

SOURCES	DESCRIPTION	Eligible Project Types
Federal Sources		
Revenue Bonds	Revenue bonds are municipal bonds distinguished from other bonds by the guarantee of repayment exclusively from revenues generated by a project. Interest rates may be slightly higher for revenue bonds since the security pledge is not as great as GO Bonds, however, they are usually considered the second-most secure type of municipal bonds.	**Highway, Rail, or Port Projects**
Certificates of Participation (COPs)	COPs are tax-exempt bonds, issued by a state-authorized, tax-exempt entity (typically called Finance Corporation) that allows government entities to finance capital projects. The proceeds of the bond sale are used to acquire capital assets. The capital assets are leased to a government entity, which makes semi-annual lease payments using a combination of local funds and federal grant funds.	**Highway, Rail, or Port Projects**
Private Activity Bonds	Private Activity Bonds are bonds that allow a portion of the proceeds to be used for non-governmental purposes.	**Highway, Rail, or Port Projects**
INNOVATION AND MANAGEMENT OF RESOURCES		
Tapered Match	The tapered match approach allows project sponsors to seek federal reimbursement of expenditures as high as 100 percent in the early phases of a project provided that by the time the project is complete, the overall federal contribution does not exceed the statutory federal-aid limit for the project.	**Highway, Rail, or Port Projects**
Flexible (or Soft) Match	The Flexible Match approach allows certain public donations of cash, materials, and services to satisfy the non-federal matching requirement.	**Highway, Rail, or Port Projects**
Advanced Construction Authority	Advance construction authority provides a project sponsor the ability to request and receive approval to construct federal-aid projects in advance of the apportionment the federal dollars	**Highway, Rail, or Port Projects**
INNOVATIVE PROJECT DELIVERY AND MANAGEMENT/PUBLIC PRIVATE PARTNERSHIP		
Design-Build Project Delivery	Design-Build is a project delivery method that combines two, traditionally separate services into a single contract. With design-build procurements, project sponsors execute a single, fixed-fee contract for both architectural/engineering services and construction.	**Highway, Rail, or Port Projects**

Table 10
Potential Funding Sources for Goods Movement Projects

SOURCES	DESCRIPTION	Eligible Project Types
Federal Sources		
Design-Build-Operate–Maintain Project Delivery	The Design-Build-Operate-Maintain (DBOM) model is an integrated partnership that adds operations and maintenance to the design and construction responsibilities of design-build procurements.	**Highway, Rail, or Port Projects**
Design-Build-Finance Project Delivery	The Design-Build-Finance-Operate (DBFO) approach transfers to the private sector the responsibilities for a project's design, construction, finance and O&M.	**Highway, Rail, or Port Projects**
Leasing of Publicly Owned Assets	This PPP approach involves the long term lease of an existing, publicly-financed toll facility to a private sector concessionaire for a prescribed period during which they have the right to collect tolls on the facility. In exchange for the lease, the private partner must operate and maintain the facility and in some cases make improvements. The private partner must also pay an upfront concession fee.	**Highway**

Source: Sharon Greene & Associates, March 2007

MULTI-COUNTY GOODS MOVEMENT ACTION PLAN VOLUME 1, APPENDIX C: COMPENDIUM OF PUBLIC COMMENTS AND PROJECT PARTNER RESPONSES

Prepared for:

Los Angeles County Metropolitan Transportation Authority (Metro)
Orange County Transportation Authority (OCTA)
Riverside County Transportation Commission (RCTC)
San Bernardino Associated Governments (SANBAG)
Ventura County Transportation Commission (VCTC)
California Department of Transportation (Caltrans) Districts 7, 8, 11 & 12
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Table of Contents

Topical Responses to Comments/Questions 1

Correspondence from Stakeholders

California Railroad Industry
City Heights Community Development Corporation
Gateway Cities Council of Governments Excerpts
Inland Empire Economic Partnership
Majestic Realty Co.
National Association of Industrial and Office Properties
South Coast Air Quality Management District
Watson Land Company

March 17, 2008 marked the conclusion of the 30 day period for stakeholder comments on the draft Multi-County Goods Movement Action Plan ("MCGMAP" or "Action Plan"). To solicit input throughout the development of the MCGMAP, a series of multi-county stakeholder advisory group meetings were held from the outset of the project. In addition, two anecdotal opinion surveys were conducted, several briefings and presentations were made to key stakeholders and twelve multi-county public workshops were held.

In general, stakeholders view this Action Plan as a good initial step toward addressing multi-county goods movement issues and consider the multi-jurisdictional partnership to be the catalyst for establishing the Southern California Consensus Group and other collective efforts that have proven to be successful in addressing good movement challenges throughout the region. Throughout the development of the Action Plan, stakeholders stressed the importance of developing plans for localized studies that go beyond the macro-analysis that was done in the MCGMAP. In addition, stakeholders expressed that they would like the project partners to maintain an open dialogue with all stakeholders; explore the use of community friendly alternative technologies to transport goods; secure new goods movement fund sources; and expand outreach and dialogue to the goods movement industry to assure there will be a balanced approach to improving mobility, mitigating community and environmental impacts and preserving economic vitality throughout the region.

This Appendix C contains copies of letters that were written about the Action Plan for which broad topical responses have been provided. The written comments, as well as the feedback obtained during the multi-county public workshops, reflect a variety of issues, perspectives and concerns expressed by stakeholders that are in some instances beyond the scope of this study effort. The attached letters also contain comments about issues that were not addressed in the MCGMAP and suggestions for subsequent study efforts. The letters and comments received will further define local priorities and the next steps needed to develop projects and requisite mitigation measures throughout the multi-county study region.

Also included in this appendix are Tables 1 and 2. Table 1 contains the source of written comments about the draft Action Plan. Table 2 contains abbreviated comments received during the multi-county public workshops. Both tables are sorted by the following topical response categories for ease in matching comments to responses:

1- Planning Processes and Community Outreach,
2- Potential Goods Movement Improvements, Strategies and Projects
3- Impacts and Mitigation
4- Rail-Related
5- Alternative Technologies for Freight
6- Funding
7- Security
8- Environmental Justice
9- Next Steps

Attached herein are Tables 1 and 2, a summary of the comments followed by general topical responses and copies of the letters that were received.

COMMENT SUMMARY & TOPICAL RESPONSES

1- Comment Summary for Planning Processes and Community Outreach Topic: there were a number of inquiries about the MCGMAP, its relationship to other regional plans and local project programming documents/processes, the role and purview of the agencies that were involved in developing the plan, and the outreach and plan approval process.

RESPONSE: The Multi-County Goods Movement Action Plan (MCGMAP or Action Plan) provides an overview of the region's goods movement challenges, the partner agencies' collective vision, and principles, recommended actions, and strategies. .It also contains lists of recommended preliminary regional and county specific goods movement infrastructure improvements that are in various planning stages and in some instances controversial. Participating County Transportation Commissions and other agencies will continue with the development of projects and strategies identified in the MCGMAP. There is no priority to the projects/strategies included on the lists contained in the Action Plan for funding or any other purpose. Inclusion on any list does not imply approval of any project/strategy until public participation has concluded and environmental and other clearances are obtained from regulatory agencies.

Discussions with regional stakeholders will continue in an effort to move forward with the actions proposed in the MCGMAP. More detailed technical analyses will be completed, as recommended by the MCGMAP, in order to identify and prioritize regional goods movement projects and environmental and community mitigation measures that stretch across county and jurisdictional boundaries. Further, the MCGMAP is not intended to supplant local planning efforts. Local agencies and jurisdictions are encouraged to use the MCGMAP as a roadmap for future planning efforts. The project partners will continue to act as regional planning entities and will work with local jurisdictions to ensure that the principles and actions of the MCGMAP are implemented at all levels.

The MCGMAP partners are the transportation and planning agencies that co-managed the development of the Action Plan. These agencies include Los Angeles County Metro (Metro), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), San Diego Association of Governments (SANDAG), Southern California Association of Governments (SCAG), Ventura County Transportation Commission (VCTC), and Caltrans Districts 7, 8, 11, and 12. The MCGMAP partners plan, fund, maintain, operate, construct and implement multi-modal transportation projects which include goods movement related projects. The project partners developed four core mandates and six implementation principles (described in the Action Plan) that build upon the principles set forth in the Statewide Goods Movement Action Plan and provided the framework for the MCGMAP.

Other organizations, such as the Ports of Los Angeles and Long Beach, have authority to plan and construct transportation and facility improvements within their respective jurisdictions, while the South Coast Air Quality Management District (SCAQMD) and other air districts develop and implement plans to improve air quality throughout the region. Also, regional, state, and federal agencies have varying regulatory authorities over the trucking and rail industries, but the MCGMAP partners have little ability to regulate the operations, business practices, or pollutant emissions of the private sector goods movement operators, and no authority to regulate shippers and ocean carriers. As a result, the MCGMAP partners have focused primarily on goods movement infrastructure including environmental mitigation while acknowledging the essential roles and responsibilities of others.

Stakeholder participation and outreach was an essential component in the development of the MCGMAP. Two survey instruments were utilized and a project website (http://www.metro.net/mcgmap) was established to inform and engage stakeholders. Meetings and workshops were convened to gather input and share findings. Representatives from community advocacy and health organizations, air quality regulatory agencies, the ports, the trucking and railroad industries and other transportation agencies at all levels of government were invited to participate in the Stakeholder Advisory Group (SAG) meetings. Additionally, smaller one-on-one meetings were held with many of these groups to confirm data and obtain individual perspectives on issues related to goods movement. SAG meetings and county workshops provided a forum for stakeholders to comment on the content of the Action Plan and to express concerns about the impact on local communities, air quality, the environment and the transportation system.

The MCGMAP is a living document that will be revised and updated when major changes occur and if resources are made available. Adoption of this Action Plan by the project partners indicates regional consensus on a program of improvements and mitigation strategies that are needed to effectively address goods movement**.** As the goods movement system in the region continues to develop more outreach and coordination must occur among the project partners and stakeholders, including reaching out to new stakeholder groups not initially included in the MCGMAP effort.

2- Comment Summary for Potential Goods Movement improvements, Strategies and Projects Topic: Stakeholders were particularly interested in the level of detailed analysis that was performed, the range of alternatives and options that were studied and the existing capacity of the infrastructure. There were also a number of comments about factors and issues that were not addressed in the MCGMAP (e.g. air quality analysis, clustering of warehouses and other logistics practices, reverse flows, inland ports, east-west freight corridor definition, and the plan's evaluation criteria). Additionally, some stakeholder inquired about specific projects contained (and not contained) in the MCGMAP and specific route improvements.

RESPONSE**:** Given the broad scope and large study area of the MCGMAP, analyses of potential strategies and investments were done at a regional level rather than a local or project-specific level. While detailed project-level analyses were not a part of this effort, they are nevertheless critical and will be conducted as part of subsequent project development efforts. Through the stakeholder outreach process additional items were identified as needing further study (e.g., secondary and tertiary truck movements, reverse flow or empty containers, clustering of warehouses and the feasibility of inland ports remote from residences and sensitive land uses). These items will be analyzed in subsequent study efforts as referenced in the Next Steps section of the Action Plan. Further, SCAG will be conducting the comprehensive Regional Goods Movement Plan and Implementation Strategy that will include environmental mitigation and analysis of alternative technologies for transporting freight, reverse flows and a needs assessment of warehousing to augment the MCGMAP effort. The SCAG study will also serve as a precursor to a Regionally Significant Transportation Improvement Study (RSTIS) that will evaluate the feasibility of implementing a dedicated east-west freight guideway system and/or regional truck lanes on and off current freeway alignments. The RSTIS project area will extend the I-710 South study to an inland destination, possibly in the High Desert Area. The Action Plan notes that many projects and strategies described are at different stages of development; therefore,

substantial additional evaluation and analyses must occur as a part of required environmental clearance procedures, as well as to fully address the concerns of the region's stakeholders.

In terms of capacity of the existing infrastructure, all indications point to a future demand in international freight flows that will exceed even the most aggressive efforts by the ports, railroads, and transportation agencies to accommodate it. As referenced in the Action Plan, container volumes through the San Pedro Bay ports are projected to nearly triple from 15.7 million TEUs (twenty-foot equivalent units) in 2006 to 42.5 million TEUs by 2030. These forecasts are constrained by anticipated port capacity at a level significantly below the TEU demand projected for the ports in federally sponsored analyses. The study area's ports, airports, rail lines and intermodal terminals have existing capacity constraints that undermine the efficiency and productivity of the system as a whole. Furthermore, the existing roadway and rail networks are at or reaching capacity. As a result, the system today is susceptible to disruptions to the movement of goods, causing delays that reduce the quality of services and increase costs to consumers, not to mention substantial delays and congestion for all highway users. This mobility challenge is further exacerbated by the fact that the roadways, and rail networks that accommodate the movement of goods are often the same as those utilized by motorists and passengers for the movement of people.

Regarding the evaluation criteria, a qualitative evaluation of goods movement projects/strategies was conducted for the Action Plan. This analysis grouped a comprehensive list of 249 projects/strategies (the complete list is included in Appendix B of the Action Plan) into 15 categories of projects ranging from increased highway and rail capacity to changes in operational and institutional practices. The 15 categories of projects were then qualitatively evaluated using 26 evaluation criteria.

In the qualitative analysis of the categories of projects/strategies, the evaluation examined each category independently. The purpose of this independent evaluation was to show that each category of project/strategy performed differently across a variety of evaluation criteria. Many stakeholders indicated, and the MCGMAP recognized, that many projects/strategies within various categories may complement or contradict each other; therefore, combinations of projects/strategies and or categories would better serve the region. In order to evaluate the complex relationships of combined projects/strategies or categories, more detailed analysis was required.

This detailed analysis examined the relationship of various projects/strategies or categories when implemented together, as a bundle of projects. Five of the 15 categories (construction of additional freeway lanes/capacity, freeway operational/safety improvements, shuttle trains / alternative technologies including additional intermodal terminals, construction of dedicated truck lanes, and the use of Long Combination Vehicles on dedicated facilities) were modeled using the SCAG Travel Demand Forecasting Model and other more detailed analytical tools. This analysis modeled 12 bundles of projects/strategies and estimated potential cost which was kept constant at a cost per mile basis, quantified truck volumes, the number of hours of delay reduced for both autos and trucks, the number of warehouse acres in proximity to each corridor, the number of schools within 1/3 mile of the bundle, and the number of residential acres within ½ mile of the bundle.

However, due to the limitations of the analytical tools available, all bundles were modeled using a container forecast volume of 42.5 million TEUs by 2030. All analyses were completed from a regional perspective. Analyses were completed with the understanding that further detailed corridor-specific analyses would be required. It is recommended that the future detailed analysis should quantify factors

not included as part of this effort, such as design, right-of-way considerations including number of displaced properties, impact on commercial properties adjacent to corridors, right of way, cost, etc. The macro level analysis of dedicated truck lane systems, advanced technology and other bundles rendered preliminary information that warrants further investigation and outreach to affected communities to be conclusive. For more information about this analysis, refer to Chapter 6 of the Action Plan.

To support the actions, vision and market segmentation approach, the partner agencies identified two project lists: regional and county specific. The projects identified vary in terms of stage of development and implementation timeline; some can be implemented in the short-term while others require additional planning and project development. The projects on both lists are considered essential; neither list is viewed as taking precedence over the other but rather as complementary efforts to address the effects of goods movement in the region. The list of "Preliminary Regional Goods Movement Projects/Strategies" focuses on region-wide projects that provide environmental mitigation or ground access (rail, highway, and intermodal) improvements to and from the international gateways and the multi-county goods movement distribution centers and corridors (existing and proposed) within the Southern California region. The list of "Preliminary County-Specific Goods Movement System Projects/Strategies" includes improvements that are located within a single county and connect to the regional and statewide goods movement system of corridors and distribution centers and fill in gaps in the goods movement network. In addition, each of the Action Plan County chapters contain additional projects and strategies of a more localized nature. Queries about project selection, additional projects and specific route improvements should be directed to the appropriate transportation planning agencies.

3- Comment Summary for Impacts and Mitigation Topic: There were a number of questions and concerns about the goods movement impacts that were analyzed (e.g. community, air quality, economic, health and other local impacts) in the MCGMAP. There was also a question about the number of jobs that have been created as a result of the goods movement industry. In terms of mitigation, there were a number of questions from stakeholders that were interested in air quality and emissions control measures including comments on how to accelerate implementation of those measures that were noted.

RESPONSE: The region is faced with multiple mobility, environmental, community impact, funding, and economic challenges**.** While the scope of work for the Action Plan was limited to identifying the economic impacts of goods movement in terms of the logistics industry, and best existing practices to mitigate goods movement impacts, the project partners established a multi-county environmental working group to obtain more guidance from professionals that work in the environmental planning field. It was determined that this group will be an excellent resource for the project partners when the follow-up work pertaining to environmental and community mitigation begins. Further, the Action Plan identified two types of mitigation measures that must occur: Project-specific and Regional Mitigation Measures. The Action Plan suggests examples of project specific mitigation measures include use of the best available technology and best practices during construction; compliance with natural resource statutes and adopting "smart" design and good planning principles (e.g. landscaped buffering, noise barriers, exterior light shielding and positioning, separating incompatible land uses, and wetlands protection). The Action Plan recommends regional mitigation measures that can include accelerating funding and implementation of air quality plans, strengthening fuel and engine standards and adopting

institutional policies that support environmental and community benefits (e.g. designate quiet zones for rail corridors, amend zoning to avoid incompatible land uses and establish mitigation banking and/or a pool funds to alleviate impacts). Regional mitigations by their nature, will require continued coordination among goods movement stakeholders to ensure success. The MCGMAP also recommends a coordinated effort among the public and private sector to simultaneously and continuously improve the movement of goods and the associated environmental and community impacts. This is especially important given the CARB 2005 statistic that cites approximately $20 Billion expended in healthcare costs related to health effects from PM and Ozone pollution from freight transport.

In addition, the Action Plan supports the air quality plans prepared by the Ports, the California Air Resources Board (CARB), and the South Coast Air Quality Management District (AQMD). However, as stated in the Action Plan Executive Summary, the MCGMAP partners cannot fully implement many of the plan's recommended strategies on their own. Therefore, to fully realize the benefits of this plan, continued collaboration and consensus building among the MCGMAP partners and other public and private sector stakeholders will be critical. To that end, one of the next steps in MCGMAP is to initiate an activity, in conjunction with the ports, CARB, and AQMD, to generate public and/or private funds to accelerate implementation of air quality improvement strategies being undertaken by these and other entities. Many of the air quality improvement plans are in place, but substantial funding is needed to enable and incentivize the acceleration of the emissions cleanup. It is expected that some of these implementation-oriented discussions will occur through the Southern California National Freight Gateway (SCNFG) Cooperation Agreement. The SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy will also provide some additional support in this direction. Furthermore, aircraft emissions are also a contributing source of emissions and will be addressed as part of ongoing emission reduction efforts.

The Action Plan does not specifically propose modifications to the dates in the current SIP (State Implementation Plan), Ports of Los Angeles and Long Beach Clean Air Action Plan (CAAP), or Air Quality Management Plan (AQMP). However, it is supportive of other actions that can be taken to accelerate the emissions cleanup, such as relocating the cleanest available train engines and truck fleets to Southern California facilities where that opportunity exists, generating additional funds for enabling and incentivizing the location of newer goods movement technology in Southern California, and using the leasing oversight of the ports to incentivize reduced emissions from marine vessels.

Reference was made in the prior responses to possible mechanisms for accelerating air quality initiatives, including expediting vehicle retrofit or replacement. In addition, the Environmental Justice Analysis and Outreach for the MCGMAP has been initiated, one products will be a guidebook of strategies that local governments and other agencies may use to avoid, minimize, and/or mitigate the impacts of goods movement. (Refer to #8, for more information.)

The MCGMAP partner agencies expect to be involved in discussions, through the SCNFG and other means on actions that can be taken to expedite the implementation of various emission reduction strategies. Concepts for accelerating emission reduction strategies will need to be brought forward and discussed with the public and private sector entities that are in a position to take action and implement the needed changes.

As stated in the Action Plan, implementation of the recommended goods movement projects rests with the individual entities, both public and private, that have funding and implementation responsibility. Most of these projects are multiple years from being implemented, and project-level environmental reviews will be conducted at the appropriate time. The Action Plan views the recommended infrastructure projects to be needed to keep up with the growing freight demand, but also recognizes that each project will need to move forward in a way that avoids, minimizes, and/or mitigates environmental impacts.

In terms of employment and other economic gains, it was found that despite its impacts, international trade provides significant benefits to the region. The logistics industry provides both direct and indirect benefits to the region's economy. Economic studies show that logistics activity is responsible for $90.7 billion, or 6.6%, of the nearly $1.4 trillion in economic activity annually in Southern California. The indirect or induced impact represents another $170 billion or 12.4%. Each logistics job supports 2.2 new jobs in the economy. This contribution to the economy is significant and is important to achieving the MCGMAP vision and maintaining the economic vitality of the region.

4-Comment Summary for Rail-Related Topic: There were a number of stakeholders interested in the railroads, railroad operations and rail capacity improvements (e.g. intermodal facilities, on dock and near dock facilities). In addition, some stakeholders inquired about specific grade separation projects and passenger rail services, train idling and electrification that was noted.

RESPONSE: The railroads have been an active participant in the SAG meetings. The MCGMAP recognizes the importance of freight rail to the region's goods movement system. Therefore, the Action Plan calls for increased intermodal and on-dock and mainline rail capacity in order to maximize the share of goods moving by rail. However, while there is a need for additional rail intermodal capacity, any such facility must undergo required environmental impact analyses before implementation. It is important to note that rail projects must demonstrate public benefits in order to qualify for public funding. Also, given the importance of rail for goods movement, it is important to continue dialogue and cooperation between the public and private railroad companies in order to implement the most efficient, cost-effective, and environmentally friendly solution possible.

Also, the MCGMAP does not endorse any specific advanced technology, but recommends additional evaluation of technology options. The MCGMAP partners recognize that any specific operational solution or technology option dealing with line-haul freight is highly complex, will be driven by the operational needs of the logistics industry, must involve cost-effective solutions, and must represent a feasible transition from current technologies. At the same time, the MCGMAP partners recognize the need to make major advances in freight-hauling capacity while at the same time improving the environment. Both the public and private sectors must be involved in exploring these options. In conjunction with rail capacity improvements, the MCGMAP also recommends strategies and projects to reduce the community and environmental impacts of goods movement. For example, the Action Plan recommends construction of grade separation projects as well as expediting fuel and engine standards. Queries about specific grade separation projects should be directed to the appropriate transportation planning agencies.

The MCGMAP seeks to build upon successful rail projects already undertaken in the region, including the Alameda Corridor and the Alameda Corridor East. Through similar coordinated efforts, the project partners believe that the goals of the MCGMAP can be achieved.

5- Comment Summary for Alternative Technologies for Freight Topic: There were a number of comments from stakeholders requesting more analysis of alternative technologies. In addition, there was interest in maglev systems and zero emission technology.

RESPONSE: Assessment of specific types of technology was not within the scope of MCGMAP. Efforts underway by the Ports of Los Angeles and Long Beach, SCAG, as well as the I-710 Environmental Impact Report/Environmental Impact Statement will focus on analysis of alternative technologies and alignments based upon further evaluation. However, as part of MCGMAP analyses, an alternative technology bundle was modeled to reflect impacts as a result of reduction in truck trips due to the utilization of an alternative technology. The MCGMAP analyzed the potential benefits of an unspecified alternative technology system extending from the Ports of Los Angeles and Long Beach to an inland port generally located at the intersection of the I-10 and I-15 freeways. An operational target of 1.35 million annual container lifts was used, which translates into 5,400 trucks per day. This is approximately the volume handled by the BNSF Hobart Yard in Commerce, which is currently the largest such facility in the study area. An estimate of 5,400 trucks per day appears reasonable, given that the Southern California Association of Governments' "Inland Port Feasibility Study" Task 1 and 2 report estimates that in 2010, 4,500 truck trips per day will occur between San Bernardino and Riverside Counties and the Ports of Los Angeles and Long Beach. However, it is possible to increase the volume handled by an inland port and associated alternative technology system if distribution centers are clustered around the inland port and the port can attract other market segments. As a result, the MCGMAP recommends further analysis of the inland port strategy and evaluation of the feasibility of implementing a dedicated freight guideway system and /or regional truck lanes in the study area. This analysis would include a comparative evaluation of the air quality impacts and related benefits for each alternative, as well as the identification of market conditions required to develop an inland port facility. Market conditions will ultimately drive the decisions for location, system connectivity, and lift capacity of an inland port.

6-Comment Summary for Funding Topic: Stakeholders were particularly interested in the region getting its fair share of funding for goods movement infrastructure improvements and mitigation measures. A number of stakeholders inquired about user fees, collection of user fees, incentives and disincentives, and the potential for seeking other funding sources including the private sector.

RESPONSE: The goods movement system is significantly underfunded. Projects and programs identified in this Action Plan show funding needs on the order of $50 billion over the next 25 years. This will require funding commitments from all levels of government as well as the private sector.

Despite accommodating most of the nation's international trade volumes, Southern California has received a disproportionately low share of federal and state funding for goods movement. Moreover, the private sector's role in funding regional and nationally significant goods movement projects to date has been limited. It is imperative that new avenues of goods movement funding for projects be pursued, including other state appropriations, federal funds, and private sector contributions consistent

with the impacts of the benefits they derive from the use of the transportation system. For example, next year the Congress is expected to act on national transportation reauthorization legislation. While it is unclear at this point what direction that legislation will take regarding meeting the nation's goods movement needs, organizations such as the Coalition for America's Gateways and Trade Corridors and the American Road Transportation Builders' Association have developed recommendations regarding goods movement issues that could be considered by the Congress. Among those recommendations are:

- A separate title dedicated to goods movement policy issues including potential funding sources
- Potential freight-related funding sources to be considered are:
    - a fee on containers entering our ports
    - an increase in federal customs fees
    - a mileage tax on truck travel
    - a ton-based freight fee on all modes (truck and rail)

On the state level, with the passage of Proposition 1B, a $19.9 billion transportation bond issue, in November 2006, $2 billion was made available for goods movement projects. (Some of the projects submitted for funding appear in the Action Plan). Working with the California Transportation Commission (CTC), the Southern California Trade Corridors Improvement Fund (TCIF) Working Group, a partnership of public sector goods movement stakeholders garnered $1.64 billion out of a total of $3 billion made available by the CTC for TCIF. Furthermore, the San Diego Border Region received $400 million of this amount for goods movement projects (For more information on TCIF, please refer to Appendix D.)

User Fees are an approach for obtaining additional funding from specific users of designated facilities or systems. In some cases user fees can be synonymous with tolls or congestion charges, while others may view user fees as the cost associated with transporting goods using a specific or preferred mode of transport. The underlying premise is that specific users pay for the privilege of using a system or facility which provides some benefits in terms of increased speeds or reduced congestion. Ongoing efforts by the private sector, Ports, state, the federal government , and other stakeholders to obtain fair-share contributions and user fees must be coordinated and developed to work in concert together. Any discussions of fair-share contributions or user fees must ensure that economic, environmental, and operational impacts are addressed in an equitable and balanced manner. If agreed upon there would be a need to establish structures to manage user fees and revenue that are acceptable to both public and private sector stakeholders.

Also on the state level, the Legislature is considering container fee legislation to be implemented in 2009, which would impose a $30 fee on each shipping container processed at the Ports of long Beach, Los Angeles and Oakland. The fee would fund congestion management and air quality projects related to the ports. It is estimated that for the Ports of Los Angeles and Long Beach, $100 million would be generated in 2008-09 and $340 million annually thereafter. The legislation would also permit the ports to bond up to $5 billion of the proceeds from the container fee.

The MCGMAP proposes a strategic approach for involving public and private sector groups. The MCGMAP also recommends methods for public and private sector entities at various levels, from initial planning to project operations. The participation of the private sector, particularly our nation's railroads, in the development of solutions to our region's goods movement problems is essential. Forging a

partnership with private corporations who own the rail rights-of-way will be put to the test with the implementation of Proposition 1 B grade separation projects. A major topic to be discussed at that time will be the sharing of the cost of those projects based on which party benefits and which party is the most impacted.

7- Comment Summary for Security Topic: There was one inquiry about homeland security and whether the new security measures have resulted in more traffic delays at the ports.

RESPONSE: MCGMAP Tech Memo 3 and Chapter 3 in the Action Plan reference the importance and significance of goods movement security, as well as programs that have been initiated to enhance the safety and security of goods movement. The MCGMAP partners do not have any direct authority over goods movement security. Instead, security is handled by a collection of federal, state, and local agencies, such as the U.S. Department of Homeland Security/Customs and Border Protection, U.S. Coast Guard, and other local, state, and federal law enforcement agencies. As a result, the MCGMAP emphasizes the importance of goods movement security but recognizes that security is beyond the scope of this plan as well as the partner agencies' roles and responsibilities. There are, however, significant losses of output and jobs as a result of increased delays at seaports, landports, and airports. These delays could be attributed in part to changing security measures, causing an impact on local, regional, and national productivity.

8- Comment Summary for Environmental Justice Topic: There was one inquiry about the multi-county environmental justice study.

RESPONSE: The MCGMAP partners recognize the local and community impacts of goods movement. As a result, the project partners have embarked upon the Goods Movement Environmental Justice Analysis and Community Outreach project. The goal of the project is to expand the region's understanding of goods movement impacts, and identify best practices and/or solutions that support community based approaches to address the disproportional impacts of goods movement that are largely borne by minority and low income communities. The project will result in a guidebook that documents the strategies for minimizing the impacts of goods movement. In addition, the guidebook will contain one case study in each county (Los Angeles, Riverside, San Bernardino and Ventura) that will examine impacts and potential mitigation strategies. This project is expected to be completed in late 2008/early 2009. Depending on the outcome of this project, it is possible that the MCGMAP partners could embark on subsequent phases of this work.

9- Comment Summary for Next Steps Topic: There were a number of stakeholders that offered comments and suggestions about the next planning steps. In addition, there were views expressed about landuse conflicts, port diversion and private sector planning horizons versus public transportation planning horizons that were noted.

RESPONSE: The project partners are particularly mindful of the various roles that the ports, railroads, regulatory agencies, business community and the logistic industry play in the goods movement system. It is with the utmost respect that the project partners, acting on behalf of the communities that are

impacted by the decisions that are made by this industry, develop short and long term transportation plans to improve mobility so that Southern California residents can continue to enjoy a superior quality of life. While it is not the intention of the partner agencies to engage in strategic planning for the goods movement industry, collective efforts such as this provide a better understanding of a very complex system and allow planners to make more informed decisions.

Further, the success of the partnership between public and private sector interests that has developed through this study rests with all of the participants. It is for that reason that all stakeholders will play an integral role in the next steps in terms of promoting partnership and advocacy, reducing environmental and community impacts, improving mobility and securing funding as described in the Action Plan. Also ongoing support to groups such as Mobility 21 and the Coalition for America's Gateways and Trade Corridors and others in their efforts to develop dedicated federal and state goods movement funding sources will be crucial.

COPIES OF CORRESPONDENCE

TABLE 1: WRITTEN COMMENTS ON ACTION PLAN SORTED BY TOPICAL RESPONSE CATEGORIES

1. PLANNING PROCESSES AND COMMUNITY OUTREACH		
Topic	**Perspectives & Concerns**	**Source – Correspondence**
MCGMAP Plan Approval and Integration into Other Plans	▪ "It appears that our comments to the SANDAG Freight Working Group and actions of the SANDAG Board of Directors in adoption of the 2030 Regional Transportation Plan update in November 2007 have NOT been incorporated into the MCGMAP." ▪ "…the MCGMAP Draft Executive Summary 2007's Implementation Principles…appear to run counter to representations that the San Diego SANDAG 2030 RTP takes precedence in transportation planning and funding. If the MCGMAP is to be used as noted, it would appear that it requires proper environmental review. By not expressly noting this at all points in the MCGMAP this document is inaccurate and misleads other jurisdictions and agencies in their planning and budgeting." ▪ [The MCGMAP does not reflect the 2007 San Diego adopted 2030 RTP showing the deletion of the GMAP designation for the area between the I-15 – I-805 intersection and the I-15 – SR-163 intersection."]	City Heights Community Development Corporation
	▪ "Approval of the Plan should not include approval of specific projects that have not undergone all environmental reviews."	South Coast Air Quality Management District
Implementation Principles	▪ "…impacts from any proposed facility (such as impacts to sales tax base from any freeway widenings) should also be an implementation principle." ▪ "Another implementation principle should also the active input and participation from the private sector and include an environmental principle stating that all projects or strategies be environmentally protective or mitigate existing environmental deficiencies be considered for as the number one Implementation Principle."	Gateway Cities Council of Governments

2. POTENTIAL GOODS MOVEMENT IMPROVEMENTS, STRATEGIES AND PROJECTS		
Alternatives and Factors Analyzed and/or Considered	▪ Does the MCGMAP discussion of a dedicated freight guideway facility] "refer to I-15 all the way South into San Diego?"	City Heights Community Development Corporation
	▪ "In general some of the conclusions [shown on the summary of qualitative evaluations] with respect to the "most" benefit overlook the inter-dependency of the goods movement industry and the benefits of other aspects of goods movement – most notably the use of alternative technologies, improved railroad systems improvements, port hours of operations, efficiencies and ITS." ▪ "[The] section [that] recommends truck lanes on I-710 and SR-60 freeways and is not acceptable to GCCOG." ▪ [The discussion of mainline rail capacity increase] "…should have also mentioned other railroad systems that are needed to be able to use additional railroad mainline capacity." ▪ "This [situation with the potential short-fall in Intermodal lift capacity which could be as much as 10.25 million TEUs annually] is significant and the plan should discuss or evaluate the situation of mode transfer to trucks if these railroad systems capacity constraints are not addressed." ▪ "[The] discussion about the situation with truck lanes acceptability but should have referenced the guiding principles with respect to this issue from the SR-91/I-605/I-405 Corridor Cities Committee." ▪ [Major items need to be adequately addressed, such as detailed technical analyses of truck lane feasibility, more input from the logistics sector, the capacity of freight movement corridors, detailed community impacts, safety for truck and rail, institutional building, other goods movement factors, improved data, inter-dependence of various logistics movements, goods movement emissions reductions, quantitative cost/benefit analyses of freight guideway facilities, alternative technologies, port growth, and environmental and community impact mitigation measures.] ▪ "Secondary/tertiary truck trips [should be] developed [and] evaluated as well as ultimate destination analyses." ▪ "Logistics sector changes [should be evaluated]."	Gateway Cities Council of Governments

2. POTENTIAL GOODS MOVEMENT IMPROVEMENTS, STRATEGIES AND PROJECTS - CONTINUED		
Alternatives and Factors Analyzed and/or Considered	▪ "…we urge that any proposed infrastructure proposals include comparative analysis of implementation feasibility [e.g., available right-of-way or adaptability to zero or near zero emissions technologies]." ▪ "…we urge that the Action Plan also present an analysis of the air quality impacts and benefits of major alternative goods movement proposals, such as truck lanes and 'Alternative Technology' rail alternatives, or a combination of the two." ▪ "Despite the promise of this multi-county planning effort, we are concerned that an insufficient range of potential transportation systems has been analyzed to enable policy makers to design an optimal freight transportation system. In addition, the alternatives that were analyzed were not analyzed for air quality impacts, limiting hey information available to policymakers. The Action Plan also needs to more fully describe mechanisms to achieve air quality goals, and must ensure that full project level review occurs before specific projects are assumed to be appropriate."	South Coast Air Quality Management District
	▪ "It should also be noted in the MCGMAP that according to page 6-30 in the same adopted SANDAG 2030 RTP 'Dedication or construction of additional lanes for HOV or other uses in the SR 15 Mid-City segment of I-15 is contingent on the completion and operation of BRT stations and system improvements pursuant to agreements between the State and City of San Diego.'"	City Heights Community Development Corporation
	[Reverse Flow – Empty Containers] ▪ "The plan does not address the impacts of reverse flow of goods (empty containers and exports)." ▪ "In the future, data should be developed for daily volumes for 40' containers as that is the most useful for planning purposes. Also, the time of day these containers are moved (or relocated) should have been analyzed."	Gateway Cities Council of Governments
Action Sets	▪ [More detail should have been developed for the four action sets.]	Gateway Cities Council of Governments
Logistics Industry Practices	▪ "Rethinking existing warehousing and defining new paradigms for storage and transloading should be discussed with the logistics users."	Gateway Cities Council of Governments

2. POTENTIAL GOODS MOVEMENT IMPROVEMENTS, STRATEGIES AND PROJECTS - CONTINUED		
Project information	▪ "The 2030 San Diego RTP clearly states that 'I-15 between I-805 and SR 163 was removed from the GMAP network in November 2007.'"	City Heights Community Development Corporation
3. IMPACTS AND MITIGATION		
Community, Environmental, Health and Other Local Impacts	▪ "The MCGMAP does not appear to consider the problems of communities that are dissected by freeways that are designed for Goods Movement." ▪ "Clearly prioritize health of sensitive receptors, e.g. 'Health over Freight" ▪ "Redirect – Reroute trucks and other mobile freight pollutants when schools are within 500 feet to the more restrictive 1/3 mile from a dedicated Freight Guideway or other designated GMAP." ▪ "A clearer strategy should be implemented to address [the problem of people closer to the pollution sources suffering greater health issues due to higher levels of pollution]".	City Heights Community Development Corporation
	▪ "In order to this plan to garner the public support needed to succeed, it must demonstrably improve current unacceptable environmental conditions, both regionally and in locations affected by specific goods movement facilities." ▪ "…aircraft emissions are described as not being a significant source of pollutants compared to other mobile sources. We disagree. Aircraft will soon be in the top ten NOx categories."	South Coast Air Quality Management District

3. IMPACTS AND MITIGATION - CONTINUED		
Accelerating Control Measures	▪ "The current SIP, CAAP, and AQMP Plans already contain unrealistic assumptions regarding the availability of new locomotive technology. The Draft Plan should not propose that the dates in the current SIP, CAAP, or AQMP be accelerated in advance of the dates promulgated by US EPA."	The California Railroad Industry
Control Measures	▪ [The action plan must address key emission control issues such as] "how to ensure implementation of advanced control technologies for [emission] sources…how to expedite retrofit or replacement of heavy-duty trucks, locomotives and marine vessels…[and] how to ensure that the goods movement facilities are designed and sited so as to avoid unacceptable local and cumulative impacts." ▪ "Such mechanisms [to implement the Action Plan's environmental goals] should seek to implement any control measures that have not been adopted as regulations or other enforceable instruments by international, federal or state agencies, ports or other governments."	South Coast Air Quality Management District
4. RAIL-RELATED		
Electrification	▪ "All previous studies of electrification in southern California raise insurmountable operational and cost-effectiveness issues that must be thoroughly considered in any public policy discussion. Electrification is cost prohibitive and would result in limited reduction of emissions."	The California Railroad Industry
Grade Separations	▪ "Construction of the Colton Crossing grade separation will provide significant public benefits." ▪ "Standard grade separation projects do not enhance velocity, throughput or capacity for railroad operations. Instead, such projects provide a distinctly public benefit by moving vehicles resulting from nearby development over or under rail lines. The National Highway Trust Fund, other federal sources, and contributions by the state and local sector are possible sources for funding these proposed improvements."	The California Railroad Industry
Intermodal Facilities	▪ "Without the development and modernization of [the ICTF and SCIG] facilities, more containers will move by truck rather than by train. The development of the SCIG and the modernization of the ICTF are necessary to ensure that intermodal lift capacity is increased to minimize modal shift and maximize the use of rail transportation with its inherent environmental benefits."	The California Railroad Industry
	▪ "Major Transportation Facilities – This section does not mention (and should have) the ICTF and other Intermodal yards in Commerce and Vernon."	Gateway Cities Council of Governments

4. RAIL-RELATED – CONTINUED		
Metrolink	▪ "Any Metrolink expansion, if even possible on freight corridors, will have to be negotiated in the future by the interested parties."	The California Railroad Industry
On, Near Dock Rail Facilities	▪ "The Railroads also support the conclusions from the Ports Rail Master Plan that even with full development of all on-dock rail facilities, additional near dock facilities will be needed in order to prevent more containers from moving by truck rather than rail."	The California Railroad Industry
	▪ "Additional near-dock rail facilities should not be assumed in the MCGMAP as there is significant local opposition to these additional facilities."	Gateway Cities Council of Governments
Railroads	▪ "Railroad system constraints (and resulting impacts)…need to be vetted with the railroads as a reality check."	Gateway Cities Council of Governments
Train Idling	▪ "The Railroads, however, do not support local rules or regulations that restrict idle duration and such local rules and regulations are clearly preempted by Federal and State law."	The California Railroad Industry
5. ALTERNATIVE TECHNOLOGIES FOR FREIGHT		
Alternative Technology	▪ "In general shuttle trains should not have been listed with alternative technology. "	Gateway Cities Council of Governments
	▪ "While the Railroads are supportive of the development of new technology [such as maglev and linear induction motors], it seems unlikely that fixed guide-way system applications (such as maglev) will be feasible given costs, operating issues, and impacts on rail yard operations."	The California Railroad Industry
	[Bundle Analysis] ▪ [The evaluation of alternative technology options should be greatly expanded to address issues such as increasing the capacity of an inland port, clustering new warehouse construction around an inland port, using the inland port as an "agile port," the proximity of the alternative technology corridor to sensitive receptors, considerations of emissions and potential emission reductions related to increased emission control or electrification, maximizing on-dock rail and minimizing rail operations near residential areas, and the elimination or drayage of containers by truck from the ports to railyards, or the electrification of all means of container transport.] ▪ [In regards to the assumptions for the alternative technology bundle and the assumption of an inland port with a capacity of 5,400 lifts per day] "One reason for [the assumption of 5,400 lifts per day capacity] is that the Action Plan envisions this inland port as being limited to containers destined for locations within the region; those destined outside of this region would not utilize the facility."	South Coast Air Quality Management District

6. FUNDING		
Funding	▪ Where the benefits lie solely with the private railroad, the Railroad supports the principle that it pay for these improvements. However, a fee on rail container movements should not be utilized to pay for projects with predominantly public benefits.	The California Railroad Industry
	▪ Encourage and explore innovative and creative funding and project delivery solutions by both public and private sector groups.	NAIOP
	▪ [The MCGMAP discusses private sector funding strategies and private sector contributions targeted to support future projects.] "It is important for Metro to place this private sector role within the context of other 'fee' driven policy discussions currently under way."	Watson Land Company
7. SECURITY – N/A		
8. ENVIRONMENTAL JUSTICE – N/A		
9. NEXT STEPS		
Planning	▪ "The Draft Plan is flawed inasmuch as it recommends that governmental planning organizations with little or no expertise in national freight operations serve as strategic planning entity determining when and how private rail lines should be expanded. It is imperative Railroads retain authority, and the flexibility that comes with that authority, to make changes to capital investment plans as warranted by changing circumstances over time. Accordingly, the Railroads agree that continued investment in system capacity is necessary, having a public agency be involved in determining the need for investment and then taxing the industry to pay for these investments would not be economically efficient."	The California Railroad Industry
	▪ "…the time frames to implement the strategies and covers a period of over 25 years to implement. This is entirely too long, particularly for environmental mitigations and if the ports continue to grow. The ports are projected to double within the next ten years and that should be the longest period to implement the strategies in the plan."	Gateway Cities Council of Governments

9. NEXT STEPS - CONTINUED		
	▪ "…should any jurisdictions pursue such guidelines [for the siting and designing goods movement related land uses and transportation facilities], we strongly encourage that this be undertaken as a joint effort between the local jurisdictions and practitioner groups, such as NAIOP and the Building Industry Association, to be most effective." ▪ "We do not believe that diversion to other ports is necessary, but rather that more efficient ways, both logistically and environmentally, should be found to move the goods."	NAIOP
	▪ "Future logistics facilities will be greatly influenced by local land use decisions, which may not reflect regional goods movement needs and priorities. These barriers need to anticipated and addressed"	Watson Land Company
	▪ Regarding the Goods Movement Strategic Plan for Los Angeles County ▪ "The GCCOG is recommending that a community-based plan working with the most affected communities is a necessity and a first step. This effort needs to include input from all public sector and private sector stakeholders." ▪ [There is no explanation of why the proposed next steps will work.] ▪ "A more specific 'next steps plan' is needed that includes community and perhaps equally important industry input."	Gateway Cities Council of Governments

TABLE 2: WORKSHOP COMMENTS ON ACTION PLAN SORTED BY COUNTY & TOPICAL RESPONSE CATEGORIES

Los Angeles County Workshops – December 3, 6, 13, 2007 and February 20, 2008

1. PLANNING PROCESS AND COMMUNITY OUTREACH		
Topic	**Questions, Perspectives and/or Concerns**	**Source of Comments**
Agency Coordination	▪ It would be beneficial to include Kern County and Central Valley in the study process.	Marilyn Beardslee, Kern Council of Governments
MCGMAP Plan Approval and Integration with Other Plans	▪ What is the relationship with SCAG?	Marilyn Beardslee
Outreach/Agency Coordination (Roles and Responsibilities)	▪ Has AQMD been involved?	Marilyn Beardslee
Agency Coordination (Roles and Responsibility)	▪ Has SCAG's Regional Transportation Plan incorporated the efforts of the Multi-County Goods Movement Action Plan?	General Comments
MCGMAP Plan Approval Process and Integration with Other Plans	▪ What approval is being requested from the Boards in March – seems premature? ▪ Does the Action Plan focus on local projects or regional projects? How does it relate to the RTP?	LaDonna DiCamillo, BNSF Railway
	▪ What effect does the Plan have? The use should be defined.	Peter Greenwald, AQMD
Outreach	▪ Gateway Cities has already adopted a mitigation plan for goods movement. Metro and other transportation agencies should work through area Councils of Governments to ensure strong local involvement in the above-mentioned grant program.	General Comments
	Outreach & Agency Coordination ▪ What input have the ports and railroad had in the development of the plan process; and will there be one-on-one meetings held with these groups?	Sharon Neely, Alameda Corridor-East

1. PLANNING PROCESS AND COMMUNITY OUTREACH - CONTINUED		
Future planning	▪ Elected officials shouldn't be making all of the decisions. Let the public decide what types of transportation modes they would support through their taxes. We should ask the public questions, such as, "Should we invest in Maglev? Should we consider an underground tunnel for goods movement?" These kinds of questions and the survey results should be included in the Action Plan.	Colleen Callahan, American Lung Association
2. POTENTIAL GOODS MOVEMENT IMPROVEMENTS, STRATEGIES AND PROJECTS		
Alternatives and Factors Analyzed and/or Considered	▪ Need to consider the agricultural business and warehouses in the Central Valley. ▪ A dedicated truck lane on Highway 58 eastbound would be a major elevation change, 350 to 4,000 feet. ▪ Consider the scenario of "What if Americans change their way of living through less consumption?" or if overseas industry/business bring manufacturing back to America. Americans may be forced into buying less because of increased prices. ▪ What would alternate be when Interstate 5 closes? Would Highway 58 be considered a safer route?	Marilyn Beardslee, Kern Council of Governments

2. POTENTIAL GOODS MOVEMENT IMPROVEMENTS,STRATEGIES AND PROJECTS - CONTINUED		
Alternatives and Factors Analyzed and/or Considered	▪ How are secondary and tertiary truck trips quantified in the Action Plan? ▪ How do we account for shifts in freight volumes due to the economy or other factors? ▪ The Action Plan focuses on goods flowing from the Ports of LA/Long Beach to other locations. What about interregional movement between cities? What percentage of truck traffic do these interregional trips comprise? ▪ Several potential freight corridors are included in the Action Plan. Does the plan suggest whether these corridors are elevated, trenched or grade-separated? ▪ Has a detailed analysis been performed of the types of jobs that goods movement creates? ▪ Better land use and vertical building need analysis. ▪ A feasibility study for Interstate 710 is underway. These study results need to be considered as part of the Action Plan. ▪ What about moving cargo by air – such as by dirigibles? This would be an effective way to bypass congested highways and roads. ▪ Gateway Cities is working with the San Gabriel Valley COG to represent 61 cities in the region. This group is opposed to the I-710/Route 60/I-15 goods movement route that is included as an option in the Action Plan. There is no reason for that alignment to be selected as a truck route. Alternative technology also should be a bigger component of the Action Plan. The report should focus on function – non-polluting, community-friendly options. More specifics are needed to quantify air quality studies. In addition, cities along the Route 91/Interstate 405/Interstate 605 alignment are not supportive of these freeways being widened to accommodate the movement of freight.	Colleen Callahan, American Lung Association
	▪ Support as much diesel out of goods movements as practical, i.e. through on-dock rail; electrify rail lines; grade separations through major arterial road crossings; cluster major distribution renters along rail lines (work with cities and counties – zoning).	Michael Milroy, The Planning Center/Sierra Club
	▪ Describe east-west corridor as “area” to be studied “not route 60” e-w corridor.	Harry Baldwin, SGVCOG Governing Board
	▪ Is there a maximum number to limit imports to Ports of LA and Long Beach?	Gary Neely, Assemblyman Bob Huff’s Office

2. POTENTIAL GOODS MOVEMENT IMPROVEMENTS, STRATEGIES AND PROJECTS - CONTINUED		
	Reverse Flow ▪ Empty containers are a big problem. Stacked, rusting, empty containers create eyesores for the community and are "clutter." Empty containers should be spread around the nation, not left behind in our area. A complete inventory of containers is needed, included whether these containers are empty or full.	Colleen Callahan, American Lung Association
	▪ Requested a percentage breakdown for inbound and outbound containers. Also commented that in terms of the empty containers, these should be restricted to traveling on non-peak traffic hours.	Gary Neely, Assemblyman Bob Huff's Office
	Warehouses ▪ Does the Action Plan address clustering of warehouses, more efficient use of roadways, trucks vs trains, or intermodal lift constraints?	Colleen Callahan
Logistics industry practices	▪ What is the break-even point for shippers to send goods directly to the Midwest or east coast, rather than shipping them to the west coast and transporting them by truck or rail from here?	Colleen Callahan
Project Information	▪ Suggested the development of a Fact Sheet that is specifically for elected officials, which identifies how many dollars ($) it would take for improvements.	Sharon Neely, Alameda Corridor-East
Project List	▪ What use will the project list provide?	Peter Greenwald, AQMD
3. IMPACTS AND MITIGATION		
Impacts (Community, Environmental, Health and Other local impacts)	▪ Public health costs are a significant impact from goods movement. These costs should be factored into the recommendations. ▪ A more detailed analysis of public health impacts should be evaluated for the Action Plan. Not enough detail is provided about this important issue. ▪ Train noise is more than a nuisance. It is a serious health issue that causes lack of sleep and other problems. This should be given more consideration in the Action Plan. ▪ This is out of the purview for the moment, but in the near future there needs to be an allocation of resources to utilize existing methodologies to enhance projects, transportation options and land uses for their public health benefits and risks.	Colleen Callahan, American Lung Association
	▪ Get message (signals) to the rest of the country so that they understand the impacts of imports to our local Southern California community.	Michael Milroy, The Planning Center/Sierra Club

3. IMPACTS AND MITIGATION – CONTINUED		
	– Concerned about impacts of truck replacement program, i.e. although rail will benefit the jobs for truck trips in moving freight will be reduced and/or eliminated.	Pablo Ayala, Truck Driver
Mitigation	▪ Seek changes to federal rules, i.e. ICC seeking to block part of the ports CAAP.	Michael Milroy, The Planning Center/Sierra Club
4. RAIL-RELATED		
Grade Separations	▪ [Need] more grade separations through the high desert corridor (from SR-14 to the I-15 where Highway 58 crosses to San Bernardino County.	Marilyn Beardslee, Kern Council of Governments
Project list	▪ What time period does the $50 Billion in projects cover?	Marilyn Beardslee
5. ALTERNATIVE TECHNOLOGIES FOR FREIGHT		
Alternative Technology	▪ Are innovative projects like Maglev included in the plan for reducing vehicle emissions?	Colleen Callahan, American Lung Association
Railroads	▪ Zero emission rail should be considered; this project completion schedule doesn't seem to allow sufficient time for a proposal to conduct zero emission rail.	Peter Greenwald, AQMD
6. FUNDING		
Funding	[Cost Distribution and Container Fees] ▪ How will project costs be distributed? Does the Action Plan recommend funding specifics, such as container fees?	Colleen Callahan
7. SECURITY		
Security	▪ Did the study address homeland security issues?	Colleen Callahan

8. ENVIRONMENTAL JUSTICE		
Environmental Justice	▪ What level of work is being done to promote environmental justice? ▪ Environmental justice organizations need to be invited to meetings that are being planned through the above-mentioned grant. The Los Angeles EJ Network and other groups should be invited.	General Comments
9. NEXT STEPS		
Next Steps	▪ What/Who will enforce the next steps?	David Liu, City of Diamond Bar, Public Works Department

Orange County Workshops – January 14 and 17, 2008

1. PLANNING PROCESS AND COMMUNITY OUTREACH		
Topic	**Questions, Perspectives and/or Concerns**	**Source of Comments**
Agency Coordination	▪ The new federal transportation act report was released two days ago. Can MCGMAP partner with this act? Agency Coordination & Alternatives and Factors Analyzed and/or Considered. ▪ Also, how about the High Speed Rail study and the Maglev study – are we coordinating with these studies? Roles and Responsibilities ▪ What is Orange County's role in goods movement? Orange County is not a major destination for the 40% of goods passing through Southern California. How much freight will be transported down I-5 and into Orange County? ▪ Is SCAG involved in this process?	General Comments, OCTA Laguna Hills Public Workshop
	▪ How does Mobility 21 fit in?	General Comments
MCGMAP Plan approval and integration into other plans	▪ What is the timeline and cost for implementing the types of improvements that are needed?	

2. POTENTIAL GOODS MOVEMENT IMPROVEMENTS, STRATEGIES AND PROJECTS		
Alternative technology	▪ How can you compare a MAGLEV system to freight?	General Comments
Alternatives and Factors Analyzed and/or Considered	▪ Supervisor Pat Bates just had an accident on the freeway, due to a large truck. Trucks are not a safe, efficient way to transport goods. Need to take into account the opportunity costs and impact on safety and lives when preparing this plan. ▪ Need to separate trucks from cars on our roadways. Also need to separate passenger rail from freight. ▪ Have we researched the impact of the pipeline for LPG, and how air cargo affects the goods movement picture?	General Comments
	▪ Look at use of or conversion of carpool lanes to truck lanes (a) during non-peak hours (b) full conversion.	Patrick Pepper
	▪ Transportation and Mobility are not part of the top 5 challenges, why? I think they should definitely be included as the 6th challenge.	Mayor Pringle (Anaheim)
	▪ How are you counting the aggregates and cars? Did you include the empty container return in the study? ▪ There are huge costs related to loss of time/efficiency by commuters and delays by freight operators. Has this cost been calculated? Do we have a giant computer to come up with a cumulative loss figure? We really need to quantity this for the public. [Reverse Flow] ▪ Your study focuses on containers, not cars, correct? How did you include the impact from cars in the study?	General Comments
Logistics industry Practices	▪ It doesn't seem to make sense to pick up goods from the docks, put them on trucks and then move them to other loading facilities. Why is this done?	General Comments
	▪ Part of the problem is that everything may move to Mexico because they are building a Natural Gas facility. Due to the cheap labor, container shops may move as well.	

3. IMPACTS AND MITIGATION		
Impacts (community, environmental, health, and other local impacts)	▪ There is too much emphasis here on emissions. Is the deck shared by the environmentalists?	Roy Reynolds, PRT Strategies
4. RAIL RELATED		
Grade Separations	▪ The Imperial Grade Crossing, I had terrible time gathering information and figuring out who's responsible for the project. I did find it costs about 70 million dollars, which is just too much for that type of construction. [Environmental Mitigation] ▪ More aggressive environmental mitigation is needed, especially grade separations. OCTA is trying to get funding. What is the status? ▪ What is easier and less costly for grade separations – raising the roadway to clear the railroad tracks, or raising the railroad tracks to clear the roadway?	General Comments

4. RAIL RELATED - CONTINUED		
Railroads	▪ To what extent is BNSF cooperating, have they taken a position yet? I live about 200 yards from the rail yard. I receive announcements from Lena Kent regarding other subjects but never the goods movement effort. ▪ Is the BNSF rail yard at capacity? ▪ BNSF is using their third rail as a "parking lot" for trains lined up trying to get into their Hobart Yard. These idling trains have forced local cities to construct huge walls to block these unsightly trains from view, but this doesn't help with the noise or pollution. This is affecting cities like Yorba Linda, Anaheim and La Palma that are in this area. Once the Imperial Highway overpass is built, BNSF will be adding a third rail to Esperanza Street down to Kellogg Drive. BNSF is doing whatever it needs to do to move more trains, regardless of the impact on neighboring communities. That is their goal - moving the freight, regardless of the consequences. ▪ In all of your strategies, are you looking at ways to include rail capacity as well? What are the funding sources? Could an extra track help, such as the Colton crossing? ▪ Will you please summarize BNSF relation to this effort? ▪ Railroads seem indifferent to residents as the trains roll by, blowing their horns in the middle of the night. Can the railroads be made to understand how grade separations benefit the public, and they should be part of this solution? . ▪ Surprised that the railroads and ports are not more involved in this process. Have we considered congestion pricing as an alternative and to improve the flow of goods from the ports?	General Comments
5. ALTERNATIVE TECHNOLOGIES FOR FREIGHT – N/A		

6. FUNDING		
Funding	▪ Promote legislation through local (congress) and state (senators) representatives to require mitigation funds when trade agreements are signed.	Patrick Pepper
	[New Sources] ▪ The MCGMAP seems to be a great study, but the bottom line is we can't build the improvements if we don't have the money. ▪ Is there any possibility of a consistent federal funding stream for goods movement? ▪ If we need $50 billion in goods movement/mitigation improvements, we need to find a way of capturing $5 billion per year for 10 years. What about private funding sources~~?~~	General Comments
	[Fair Share] ▪ Can you please clarify what "Fair Share" means? Who decides what where "Fair Share" funding goes?	General Comments
	[Fair share, New Sources] ▪ Are our legislators demanding our fair share of goods movement funding in Washington, DC? The next federal act is set for approval by late 2009, and Southern California needs a greater share for what we call "the nation's loading dock." ▪ What about the proposed new tax on gasoline? ▪ Congratulations to Wilbur Smith Associates for bringing together millions of people in seven counties – this helps us speak louder and say that "we're mad as hell and aren't going to take it any more." ▪ We need a big, fat dollar amount that we can tell the public – the cost of doing these projects vs. the cost of not doing them.	General Comments
	[Federal Role] ▪ When is the Federal Government planning on getting involved? The CARB released studies that show 12,000 cases of cancer are registered yearly, this is serious! Safety is a great challenge!	General Comments

7. SECURITY		
Security	▪ Isn't security a factor in all of this? At least in terms of additional costs and delays in through the ports?	Roy Reynolds,
Project information	▪ Where can folks access the technical documents?	General Comments
8. ENVIRONMENTAL JUSTICE – N/A		
9. NEXT STEPS		
Future Planning	▪ I share Mayor Pringle's concern that traffic and congestion aren't separately shared issues and specific problems to solve. Also, container transit and local truck traffic are issues that can be separately planned for and dealt with.	Roy Reynolds

Riverside County Workshop – December 10, 2007

1. PLANNING PROCESS AND COMMUNITY OUTREACH		
Topic	**Questions, Perspectives and/or Concerns**	**Source of Comments**
Outreach and Agency Coordination	▪ Need to coordinate with railroads.	General Comment
2. POTENTIAL GOODS MOVEMENT IMPROVEMENT, STRATEGIES AND PROJECTS		
Alternatives and Factors Analyzed and/or Considered	▪ Factors to consider for SR-86 / Mexico include federal funding, inter-commerce, and national security.	Steven Hernandez
	▪ Conception Plan is ok, but there were not any specifics given to make comments possible. However, I think there are better places for railyard/head/spars than Mira Loma in terms of mobility and environment. ▪ Mira Loma is not the best location for a warehouse.	Stephen Anderson, Resident
Inland Ports	▪ What was the criteria for Inland Ports? Why are there not more in Riverside County?	Steven Hernandez
	▪ How can we become an Inland Port along SR-86?	Tim Brown
General Project Information	▪ Proposed sound walls do not mitigate freeways or any impacts related to trains or trucks. ▪ How are projects prioritized?	Betty Anderson, Resident
Project Information	▪ What are the limits for an additional lane on the I-10, east of Monterey?	Tim Brown
Project List (Additions)	▪ Riverside County Proposed Goods Movement Projects – add third lane (additional lanes) to SR-86 NAFTA Corridor Interchange Construction.	General Comment

3. IMPACTS AND MITIGATION		
Control Measures	▪ Emission reduction targets – theoretically, air quality can worsen despite mitigation efforts.	Scott Novak, Resident
Impacts (Community, Environmental, Health and Others)	▪ How will environmental concerns and mitigations be addressed? ▪ Riverside projects are prioritized based on factors such as safety; likelihood of construction within a specified timeframe; and cost. Only a limited number of projects can implemented within a short term, i.e. must consider impacts of construction and accessibility within the city.	Thomas Boyd
	▪ Cost distribution – mitigation benefits do not benefit the local community. ▪ Current improvements are not enough. ▪ Trains are still coming the local community, however, the proposed grade separations are only planned in other communities, Riverside, etc., but not in Mira Loma. ▪ Trucks from Mexico don't meet EPA standards – how will this be controlled? ▪ The proposed cleaner strategies will not offset the impact of increased truck traffic – the only solution would be to stop building.	Rachel Lopez, Center for Community Action and Environmental Justice
	▪ Has lived in Mira Loma for many years and has been affected by the encroachment on the quality of life - land use for development doesn't benefit Mira Loma (funds are used elsewhere) – there should be a benefit for infrastructure and improved quality of life. ▪ What type of requirements are imposed on trucks coming from the Mexican borders? ▪ Local frustration with trucks – submitted complaints to the City, however, there has been no change. ▪ Issue of local residents that drive out of area for employment; while those that work locally are driving from a distance.	Colleen Smethers, Resident

4. RAIL RELATED		
Grade Separations	▪ What grade separation project will be in Mira Loma, specifically in Bell Grave?	General Comment
Train Idling	▪ Idling is a problem for electric trains – electrification.	Tim Brown
	▪ What type of guarantee does the Action Plan provide?	Colleen Smethers, Resident
	▪ The Draft Action Plan only considers goods, what about people?	Steven Hernandez
5. ALTERNATIVE TECHNOLOGIES FOR FREIGHT – N/A		
6. FUNDING		
Funding	▪ Who decides how funds are distributed**?**	Colleen Smethers,
	▪ Out of 61 grade separations, can't fund all of them. ▪ Attack a little bit at a time as funding is available. ▪ Has funding model changed?	Robert Tock, Jurupa Community Services District
7. SECURITY – N/A		
8. ENVIRONMENTAL JUSTICE – N/A		
9. NEXT STEPS – N/A		

San Bernardino County Meeting – January 9, 2008

1. PLANNING PROCESS AND COMMUNITY OUTREACH		
Topic	**Questions, Perspectives and/or Concerns**	**Source of Comments**
Outreach and Agency Coordination	▪ As mentioned at the Palmdale workshop, Kern COG considers it of prime concern that Kern county's and the San Joaquin Valley's Goods Movement Plans and activities be wrapped into this Action Plan. SR58 from the coast to Barstow (and eastward when it becomes I-40) is one of the state's major corridors. Its role when I-5 closes at the Grapevine (because of weather or fires) is heightened. We have been working closely with SCAG's Goods Movement team for years and Kern COG very much desires that this relationship would be extended from Metro as that agency takes on an implementation role. ▪ BNSF/UP are expanding the Tehachapi pass – this means the trains will increase from 35 per day to 60. Action Plan needs to involve statewide strategies, including Kern County; the current partner agencies are not sufficient.	Marilyn Beardslee, , Kern Council of Governments
2. POTENTIAL GOODS MOVEMENT IMPROVEMENTS, STRATEGIES AND PROJECTS		
General Project Information	▪ Define user fees, island port and evaluation criteria used in the Action Plan.	Marilyn Beardslee
Alternative and factors analyzed and/or considered	▪ Provide clarification on Dedicated Freight Guideway System – a high speed, high volume corridor, i.e. Maglev, Truck Lanes.	Marilyn Beardslee
Alternatives and factors analyzed and/or considered	▪ Define regional vs. intra-regional. ▪ Have there been noticeable changes since this Plan was developed, i.e. higher fuel prices. ▪ Infrastructure changes are long term – freight system, transportation system – given the projected growth, what will the capacity be? Will it accommodate projections?	Marilyn Beardslee

3. IMPACTS AND MITIGATION		
4. RAIL-RELATED – N/A		
5. ALTERNATIVE TECHNOLOGIES FOR FREIGHT – N/A		
6. FUNDING		
Funding	▪ [Need] more detail as to dollar allocation.	Kent Hindes, Cushman & Wakefield
	▪ Toll charges should be used to expand truck lanes and not wait for governmental funding. Private funding for projects such as E220, with toll charges, would allow this type of project to be built on a more timely basis. In addition, a truck toll lane Northbound on I15 from the Inland Empire to the High Desert (Victorville area) could be private funding to speed up the project. In summary, the users should pay for new freeways and widening of existing freeways for a toll truck lane, and not depend on taxpayers for funding.	Harold Wright, TPM Investments
	[Fair Share] ▪ The solution would include federal support and recognition of the impact and burden of goods on the area despite the fact that the majority of goods leave the area or imposing fees on goods through the ports.	Marilyn Beardslee, Kern Council of Governments
	[Federal Role, User Fee] ▪ Final report needs to emphasize as strongly as possible that 77% of San Pedro port related traffic goes outside the seven county region. A large proportion of funding should be federal or user fee based.	Carlton Waters, Urban Crossroads, Inc.
	[Project List] ▪ For the San Bernardino project list, how do these projects intercept with the High Desert Corridor, Colton Crossing, Southern California Logistics Airport, and Intermodal Facilities. ▪ Does the San Bernardino project list included in the $40 billion estimated cost identified in the Action Plan? [User Fees] ▪ Who would have the authority to impose user fees? A: Currently, it is the Ports or ACTA. This would still need to be defined.	Marilyn Beardslee

7. SECURITY – N/A
8. ENVIRONMENTAL JUSTICE – N/A
9. NEXT STEPS – N/A

San Diego County Workshop – February 21, 2008

1. PLANNING PROCESS AND COMMUNITY OUTREACH		
Topic	**Questions, Perspectives and/or Concerns**	**Source of Comments**
Implementation Principles	▪ Are your "Implementation Principles" the same as what is stated in the statewide goods movement plan?	General Comments
MCGMAP Plan Approval and Integration with Other Plans	▪ Which plan takes precedence? The MCGMAP or RTP?	General Comments
2. POTENTIAL GOODS MOVEMENT IMPROVEMENTS, STRATEGIES AND PROJECTS		
Alternatives and Factors Analyzed and/or Considered	▪ Are you targeting a truck strategy?	General Comments
Alternative technology	▪ Is the technology that you recommend that same as the State's plan?	General Comments
3. IMPACTS AND MITIGATION		
Impacts (Community, Environmental, Health and Others)	▪ You need to outreach to neighborhoods, such as Barrio-Logan, that are heavily impacted by truck traffic. ▪ There is a new border crossing (in San Diego County); you should be aware of this and reach out to this community. ▪ The City Heights (or "Mid-City") community off the I-15 Freeway is heavily affected. We will not allow truck traffic through this stretch of the freeway. The environmental and community impacts in the area are severe. This community wants to remain very involved with this process. ▪ Are "our" issues included in your Existing Issues document? Or just the macro issues?	General Comments

4. RAIL-RELATED – N/A		
5. ALTERNATIVE TECHNOLOGIES FOR FERIGHT – N/A		
6. FUNDING		
Funding	▪ What are the private sector funding strategies [did] you assume?	General Comments
7. SECURITY – N/A		
8. ENVIRONMENTAL JUSTICE – N/A		
9. NEXT STEPS – N/A		

naiop
National Association of
Industrial and Office Properties
The Forum for Commercial Real Estate

SoCal Chapter

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March 17, 2008

Ms. Shahrzad Amiri
Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012-2393

Re: Multi-County Goods Movement Action Plan

Dear Ms. Amiri:

The SoCal Chapter of the National Association of Industrial & Office Properties (NAIOP) is the largest commercial real estate organization in Southern California and one of the largest chapters in the United States, encompassing more than 1,200 members in Orange and Los Angeles Counties. The Chapter provides a unified voice to protect and enhance the commercial real estate industry and quality of life in Southern California. NAIOP SoCal is proactively involved in public policy and provides members with comprehensive educational programs and interactive business relationship opportunities. We appreciate the opportunity to provide our input on the draft Multi-County Goods Movement Action Plan.

Improving transportation and goods movement is NAIOP SoCal's highest priority because of the impact the issue has on NAIOP members and the overall economic vitality and quality of life in the region. As the representative of the Chapter's over 1,200 members and the 5.4 million workers who travel on the roadways to work in the office and industrial buildings in Los Angeles and Orange Counties and who provide the distribution facilities for the distribution of goods throughout the country.

NAIOP SoCal commends the Multi-County Goods Movement Action Plan ("MCGMAP") partners for guiding the preparation of this strategic plan, and is pleased to be a participant in the Stakeholders Advisory Group. We support efforts to have the Plan adopted by public agencies and to work closely with private sector organizations and individuals in its implementation.

NAIOP SoCal has reviewed the draft Plan, dated October 2007, from the perspective of our members, the majority of whom live and work in Southern California. We also have viewed the draft Plan as developers, owners and operators of industrial and office facilities. We find the Plan to be a well-prepared and constructive effort to address monumental challenges in the movement of goods facing our region in the coming decades. Our appreciation is extended to all the MCGMAP partners and Metro staff for this effort.

As a result of our review we would like to offer the following observations, comments and recommendations:

1. We agree that MCGMAP partners have defined roles and responsibilities, and cannot fully implement many of the strategies alone. We also agree with your recommendation that continued collaboration and consensus building is needed. However, we would like to encourage a high level of involvement with both private sector organizations, such as NAIOP, and elected officials at the state and federal levels, to effectively design and implement recommendations of the Action Plan. We feel this is critical, since the support from these two groups is essential in advocating that other regions that benefit from goods moving through Southern California should bear a share of the costs for various infrastructure and other improvements.

2. The Stakeholder Advisory Group has questioned whether our Los Angeles and Long Beach ports should necessarily shoulder the capacity burdens that have been projected in the MCGMAP. The question has been raised as to whether some of this port demand should be diverted to alternate locations, either along the West Coast or Mexico. We do not believe that diversion to other ports is necessary, but rather that more efficient ways, both logistically and environmentally, should be found to move the goods.

3. The MCGMAP recommends the development of guidelines for local jurisdictions to use in siting and designing goods movement related land uses and transportation facilities. We believe that sufficient guidelines already exist and are being utilized by local jurisdictions for zoning and land use planning. However, should any jurisdictions pursue such guidelines, we strongly encourage that this be undertaken as a joint effort between the local jurisdictions and practitioner groups, such as NAIOP and the Building Industry Association, to be most effective.

4. In view of the complexity of confronting the challenges of goods movement in Southern California over the next 25 years, we feel that the MCGMAP should encourage and explore innovative and creative solutions by both public and private sector groups. The MCGMAP takes a step in this direction by encouraging vehicle and equipment manufacturers to find cleaner alternatives to oil-based fuels, and by supporting the Regionally Significant Transportation Investment Study to evaluate the feasibility of a dedicated freight guideway system. We applaud this effort and encourage the MCGMAP partners to aggressively pursue these ideas.

5. NAIOP SoCal supports voluntary efforts to embrace sustainable building practices that will result in lowering greenhouse gas emissions, conserve water, non-renewable resources and produce more environmentally friendly workplaces. We feel that it is essential to work together with the MCGMAP and Stakeholder members to adequately address environmental issues associated with goods movement facilities, including warehousing and distribution buildings, offices and transportation improvements. NAIOP supports reasonable and attainable modifications to the California building codes to assist in the implementation of AB 32.

6. We agree that Southern California has been receiving a disproportionately low share of federal funding for transportation improvements, despite efforts by our elected and appointed officials, as well as private sector organizations. With the adoption of the MCGMAP, we feel that pertinent and salient data and analysis are now available to more adequately make a case for not only more federal funds, but also increased collaboration and cooperation at the

state and federal level for cost sharing of proposed improvements that provide benefits well beyond Southern California.

7. We agree that there should be continued discussions with private sector and stakeholders to seek support in addressing goods movement impacts and filling funding gaps. We believe that the discussions should focus on the use of incentives and the delivery of tangible system-wide improvements, and not a focus on user fees. It is vitally important to develop a clear and concise message on this issue and effectively communicate this to the public and policy and funding decision makers

We recognize that considerable effort has gone into the preparation of the MCGMAP and strongly urge the MCGMAP partners to aggressively pursue implementation through a concerted effort of public and private sector collaboration. NAIOP has been proactive in facilitating solutions to goods movement issues not only in Southern California, but nationally, through our national headquarters staff and proactive organizations, such as the Coalition for America's Gateway's and Trade Corridors. We look forward to the opportunity to assist in the implementation of the MCGMAP.

Thank you for the opportunity to comment on the final draft of the Multi-County Goods Movement Action Plan.

Sincerely,

James V. Camp
Legislative Action Committee Chair

Vickie Talley
Director of Legislative Action

cc: NAIOP SoCal Board of Directors
Orange County Transportation Authority Board of Directors and Executive Officer
Los Angeles County Metropolitan Transportation Authority Board of Directors and Executive Officer

MAJESTIC REALTY CO.

13191 Crossroads Parkway North, Sixth Floor • City of Industry, CA 91746-3497
Office (562) 692-9581 • FAX (562) 695-2329

DATE: March 17, 2008

TO: Multi-County Goods Movement Action Plan – Agency Partners:
Los Angeles County Metropolitan Transportation Authority
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Ventura County Transportation Commission
California Department of Transportation – Districts 7,8,11 &12
San Diego Association of Governments
Southern California Association of Governments

RE: Multi-County Goods Movement Action Plan Comments

In response to your request for comments regarding the final draft of the Multi-County Goods Movement Action Plan (MCGMAP), Majestic Realty Co. would like to begin by acknowledging the significant work that has gone into the preparation of this multi-county effort. We have appreciated the opportunity to participate as a member of the Stakeholder Advisory Group and look forward to our continued collaborations.

We believe that this focused effort speaks volumes to the importance of goods movement to our regional and national economy. In fact, it was this effort that laid the ground work for our region's timely TCIF submission. Without the work that had previously been done in bringing the various counties and agency partners together to discuss these complex issues, we do not believe that our region would have been able to submit a consensus request.

As we all know, our region's needs significantly outpace our current levels of available funding. Collaboration will be key as we continue to pursue integrated solutions. Future progress will require continued coordination across regional jurisdictions and levels of government, and with industry and community groups alike.

We encourage you to keep pressing forward for "simultaneous and continuous" system-wide solutions. Our multi-faceted supply chain is complex and this effort clearly reveals the need for comprehensive solutions.

Moving forward, we are committed to remain active stakeholders, working together to find solutions that are essential to support the future economic prosperity and enhance the quality of life throughout our region. We encourage you to continue to engage a broad base of industry partners in future efforts, so that we may continue to work toward systems-solutions that are comprehensive and sustainable.

Sincerely,

MAJESTIC REALTY CO.

Fran Inman

Fran Inman
Senior Vice President

cc: Edward P. Roski, Jr.

INLAND EMPIRE
ECONOMIC PARTNERSHIP

March 17, 2008

RE: Multi-County Goods Movement Action Plan (MCGMAP) Draft

Dear MCGMAP Member Agencies,

On behalf of the Inland Empire Economic Partnership, I would like to express our support and appreciation for the efforts of your agencies to develop a comprehensive and collective Southern California approach to our mutual issues.

The detailed technical analyses provided by the MCGMAP team has been ground breaking in the scope of details explored, and will certainly prove to the foundation of future endeavors in this area.

Beyond the technical merits of the draft plan and the effort involved, we would like to highlight the salutary benefits this process has brought to the Southern California region. By creating a mechanism to convene the disparate agencies for specific discussions related to goods movement and trade infrastructure, the MCGMAP process has doubtlessly helped to create and encourage the regional unity exemplified in the Southern California Consensus Group and its stalwart advocacy on Proposition 1B's TCIF on behalf of the impacted agencies and the residents and businesses contained within their areas of responsibility.

In this spirit, I congratulate you for the success of your efforts and for their contributions to Southern California. We look forward to the future progress of the MCGMAP collective and its individual agencies.

Sincerely,

Bill Carney
President & CEO

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·~ 951.779.6700 ~ FAX 951.779.0675

CITY HEIGHTS
Community Development Corporation

March 17, 2008

Michelle Smith, Metro Project Manager
South Counties GMAP Project Partners
One Gateway Plaza, MS 99-22-8
Los Angeles, Ca 90051 BY: Fed Ex and Email : goodmoves@metro.net

RE: Comments on Multi-County Goods Movement Action Plan

This is to provide comments on behalf of the City Heights Community Development Corporation (CHCDC) on the " Multi-County Goods Movement Action Plan" (MCGMAP) . We have been directed to submit comments to you by Sam G. Morrissey, PE of Wilbur Smith Associates.

CHCDC has participated in a number of working groups (including the SANDAG Freight Working Group) and submitted testimony and formal comments to the San Diego Association of Governments (SANDAG) regarding the Goods Movement Action Plan (GMAP) for San Diego County with special concerns regarding the SR 15 segment of I-15. We also participated and presented comments and materials to the MCGMAP Public Workshop held in San Diego on February 21, 2008. It appears that our comments to the SANDAG Freight Working Group and actions of the SANDAG Board of Directors in adoption of the 2030 Regional Transportation Plan update in November 2007 have NOT been incorporated into the MCGMAP.

The MCGMAP Executive Summary (ES) repeatedly makes reference to the problems related to truck traffic pollution in neighborhoods and communities . This is mostly discussed in regard to trucks exiting freeways and intruding into local neighborhood streets. The MCGMAP does not appear to consider the problems of communities that are dissected by freeways that are designated for Goods Movement.

The SR-15 Mid City segment of I-15 in San Diego, between SR-94 and I-8, was reviewed and constructed in the late 1980s to 1990's. The freeway was opened for service in 2000. Memoranda of Agreement (MOA) in 1985 and of Understanding (MOU) in 1993 were signed between the City of San Diego and the State of California to provide for mitigations to some of the significant effects of the construction of a freeway cutting through the densely populated Mid City San Diego communities of City Heights, Normal Heights and Kensington. A summary is attached with includes pertinent excerpts of the 1985 MOA and 1993 MOU.

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One of those mitigations in Section 9 in the SR 15 (40thStreet Corridor) Memorandum of Agreement from May 1985 states that, "The State will, to the extent feasible, sign and direct truck traffic to the 1-805 facility as an alternative to Route 15 through Mid City."

The 2007 San Diego adopted 2030 RTP clearly recognizes the significance of a high density community being dissected by a freeway. In recognition of the preexisting mitigation to divert truck traffic from I-805 the RTP section on GMAP and Appendix B, Figure 1b show the deletion of the GMAP designation for the area between the I-15 – I-805 intersection and the I-15 – SR-163 intersection. No alternative route is provided to provide for Goods Movement related traffic to reenter the I-15 freeway. A route was suggested to the SANDAG Freight Working Group and reiterated at FWG meeting in September 2007. This gap leaves an incomplete network by not providing a specific route for trucks running through the I-15. Page B-6, Table B.1 in the 2030 San Diego RTP clearly states that "I-15 between I-805 and SR 163 was removed from the GMAP network in November 2007".

It should also be noted in the MCGMAP that according to page 6-30 in the same adopted SANDAG 2030 RTP "Dedication or construction of additional lanes for HOV or other uses in the SR 15 Mid-City segment of I-15 is contingent on the completion and operation of BRT stations and system improvement pursuant to agreements between the State and City of San Diego."

The MCGMAP ES, Page 6 in the Draft Summary mentions that 1.4 million trucks worth of goods cross the Otay Mesa POE in both directions. Those trucks are mainly fed into freeways I-5, I-805 and I-15. Various combinations of these freeways connect San Diego (the border and the Port) with Los Angeles and Riverside respectively. Since the current RTP GMAP does not call out a specific route to take, trucks seeking to use the designated GMAP route up I-15 will be likely to take SR-15 Mid-City segment, because it may appear to be the shortest route. Recommending an alternative route (such as taking I-805 north – SR-163 North – I-15North or vice-versa) would appear longer but it may in fact be quicker and reduce air pollution levels in high density adjacent Mid City communities, including City Heights which has two schools located within 500 feet of the freeway.

MCGMAP ES Page 24.- Table 4: indicates the number of schools within 1/3 of a mile from identified Southern California route "bundles". According to studies, schools should not be located within 500 feet from a freeway. Special attention should be given to rerouting trucks along routes which are at least 500 feet away from schools and proper monitoring should be provided to assure that there are not adverse impacts to the sensitive receptors at these locations. In addition, the alterative routes suggested here to move freight from the Port of San Diego and the Border to Riverside should be identified as other "bundles" in the MCGMAP.

The MCGMAP states at page 2,:"Given their defined roles and responsibilities, the MCGMAP partners cannot fully implement many of the plan's recommended strategies on their own...", but according to the MCGMAP Draft Executive Summary 2007's Implementation Principles, Page 5, " **1. Guideline:** The Action Plan is the master plan for goods movement in Southern California and is intended to be used as guidance in the preparation of state, regional, and local transportation plans. The Action Plan can also be a tool for local jurisdictions to make informed land use decisions." This would appear to run counter to representations that the San Diego SANDAG 2030 RTP takes precedence in transportation planning and funding. If the MCGMAP is to be used as noted, it would appear that it requires proper environmental review. The 2030 San Diego RTP has a certified EIR completed and it excludes the GMAP designation for the Mid City SR-15 segment of I-15. By not expressly noting this at all points in the MCGMAP this document is inaccurate and misleads other jurisdictions and agencies in their planning and budgeting.

The MCGMAP can and should include the following guidelines and provisions :

1.- Clearly prioritizing health of sensitive receptors , e.g. "Health over Freight"

2.- Providing specific recommendations, e.g. "Redirect – Reroute trucks and other mobile freight pollutants when schools are within 500 feet to the more restrictive 1/3 of mile from a dedicated Freight Guideway or other designated GMAP

With these priorities explicit it will be easier for cities (regions) to create local plans that are compatible with specific restrictions already in place and produce a multi county plan with gaps such as the one that can be found in the 2007 San Diego RTP.

Please clarify if MCGMAP Page 17, the Specific Actions, last point, "implement a dedicated Freight Guideway system...I-15 to Victorville", refers to I-15 all the way South into San Diego? If that is the case it should be considered that the 2007 San Diego RTP has deleted a segment of the I-15 as part of the Goods Movement Network between the I-15 – I-805 intersection and the I-15 – SR-163 intersection and an alternative has not been identified.

This issue should be clarified.

Page 20-21, Figure 6: Map of Potential Future System identifies the San Diego segment of the I-15 as a Dedicated Freight Guideway. Again, it should be noted that the adopted 2007 San Diego RTP has deleted a segment of the I-15 as part of the Goods Movement Network (between the I-15 – I-805 intersection and the I-15 – SR-163 intersection).

Page 3 in the Draft Action Plan – San Diego, Figure 1 is inconsistent in the I-15 segment between the SR-163 intersection and the SR-94 intersection of the San Diego Region GMAP.

Table 9 in the Draft Action Plan – San Diego, which is based on Table B.1 of the San Diego Region RTP appendix B (Goods Movement Action Plan) does not take in consideration the Note on the bottom where it is stated that the I-15 between I-805 and SR 163 removed from GMAP in November 2007. This should be considered in order to draft a better and accurate Southern California GMAP.

Page 22. Stakeholders Outreach "Some stakeholders indicated that regional environmental and community impacts must be addressed and mitigated to a level beyond existing air quality attainment goals. However, the authority to increase air quality attainment goals rests with regulatory agencies such as the SCAQMD and CARB, not the MCGMAP partner agencies."

Air quality attainment goals are regional and are measured within air basins, but we know that people closer to the pollution source directly breathe many pollutants before they spread outward. Those people are exposed to high levels of pollution and suffer the health issues described in page 7. A clearer strategy should be implemented to address this problem.

Thank you for the opportunity to comment about the Multi-County GMAP.

Sincerely,

Jay Powell, CHCDC Executive Director

Enc CHCDC Comments letter San Diego RTP
CHCDC Comment letter San Diego RTP EIR

CHCDC Fact Sheet Summary Excerpts of Mitigations

SANDAG RTP documents and maps

THE CALIFORNIA RAILROAD INDUSTRY

March 17, 2008

Michelle Smith
Metropolitan Transportation Authority
1 Gateway Plaza
Los Angeles, CA 90012
Mailstop: 99-22-3

Re: Freight Railroad Comments on 2008 Draft Multi-County Goods Movement Action Plan

Dear Michelle:

On behalf of the Association of American Railroads and its Class 1 member freight railroads operating in California (BNSF Railway and Union Pacific Railroad, or the Railroads), we appreciate the opportunity to comment on the Draft Multi-County Goods Movement Action Plan (Draft Plan) strategies related to freight railroad operations. The Draft Plan addresses four (4) "action sets:"

1. Accelerate regional environmental mitigation
2. Relieve congestion and improve mobility
3. Improve operational efficiency
4. Develop equitable public/private funding strategy

The comments presented here will address the items pertaining to railroad operations in each of the action sets. Note that failure to comment on a particular item or portion of the Action Plan should not be interpreted as concurrence by AAR or the Railroads.

Action Item 1: Accelerate Regional Environmental Mitigation

Draft Plan	**Strongly encourage EPA to rapidly finalize its proposed rulemaking for the Control of Emissions of Air Pollution from New Locomotive Engines and New Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder.**
Railroad Comment 1	EPA issued final regulations on March 14, 2008. The Railroads support these technology-forcing regulations. Leaders of environmental groups lauded the US EPA on their adoption of tough new locomotive standards. Janea Scott, staff attorney for Environmental Defense Fund, remarked "EPA deserves praise for issuing a final rule that is stronger than its original proposal." Richard Kassel, director of NRDC's Clean Fuels and Vehicles project said, "EPA has delivered a strong program that will go a long way towards solving the problem of diesel train and ship pollution in the future."

Draft Plan **Generation of public and/or private funds to accelerate the implementation of the air quality strategies contained in the Ports' Clean Air Action Plan, the California Air Resources Board's Emission Reduction Plan, the California Air Resources Board's Goods Movement Action Plan & the South Coast AQMD's Air Quality Management Plan.**

Railroad Comment 2 The current SIP, CAAP and AQMP Plans already contain unrealistic assumptions regarding the availability of new locomotive technology. In some instances, these Plans propose that Tier 4 engines be introduced as early as 2012. However, When US EPA reviewed the technical information available, they concluded the new locomotive technology would not be available until 2015 at the earliest. The Railroads cannot dispatch new units to Southern California if they cannot purchase them. Even if Tier 4 locomotives were available earlier, because of the small number of brand-new locomotives produced annually the availability of these locomotives as early as 2012 would not make an appreciable difference in the region's air quality. The Draft Plan should not propose that the dates in the current SIP, CAAP or AQMP be accelerated in advance of the dates promulgated by US EPA.

Draft Plan **Investigation of the feasibility of advanced transportation technologies such as maglev and linear induction motors.**

Railroad Comment 3 While the Railroads are supportive of the development of new technology, it seems unlikely that fixed guide-way system applications (such as maglev) will be feasible given costs, operating issues, and impacts on rail yard operations. The Railroads submitted comments to SCAG on the infeasibility of using a High Speed Rail Technology (HSRT) freight system in June and October 2007, and these comments are attached for your review.

Draft Plan **Implement engine idling restrictions for rail.**

Railroad Comment 4 The Railroads support the reduction in unnecessary idling and have invested in idle reduction technologies since 2003. All new Tier 1 and Tier 2 locomotives are equipped with idle reduction devices. The Railroads are also retrofitting the intrastate locomotive fleet with devices to comply with the 2005 MOU with CARB. By June 30, 2008, all intrastate locomotives will be retrofitted with idle reduction devices that limit idling time to no more than 15 consecutive minutes unless extended idling is necessary for operational reasons. In addition, the Railroads voluntarily agreed in the 2005 MOU with CARB to exert their best efforts to limit the non-essential idling of locomotives not equipped with automatic idling reduction devices to no more than 60 consecutive minutes. The Railroads, however, do not support local rules or regulations that restrict idle duration and such local rules and regulations are clearly preempted by Federal and State law.

Draft Plan **Use low emission train engines or electrification.**

Railroad Comment 5

The Railroads have continuously invested in low emitting diesel and alternative fuel technologies for the past decade. BNSF currently operates four LNG switcher units in southern California, UP and BNSF have developed (with CARB) a diesel particulate filter application for two switcher locomotives, both BNSF and UP have invested in "green goat" hybrid battery switcher locomotives, and both BNSF and UP are currently operating low emitting "genset" switchers locomotives. Furthermore, both railroads have invested over $300 million to purchase the cleanest available locomotives to comply with the South Coast fleet average agreement. As the Railroads purchase Tier 3 and Tier 4 locomotives, the fleet will continue to become even cleaner.

All previous studies of electrification in southern California raise insurmountable operational and cost-effectiveness issues that must be thoroughly considered in any public policy discussion. Electrification is cost prohibitive and would result in limited reduction of emissions.

In addition, ingress and egress from an electrified system presents safety and operational challenges relative to inadvertent contact with electric lines and lift machines avoiding catenaries.

The Railroads submitted comments to SCAG on the feasibility of freight electrification on February 15, 2008. A copy of these comments is attached to this letter. Please review these comments for more detail.

Action Item 2: Relieve Congestion and Improve Mobility

Draft Plan

Fund and implement the use of on-dock rail according to the San Pedro Bay Ports Master Plans (Increase intermodal lift capacity).

Railroad Comment 6

Both BNSF and UP are on record supporting on-dock rail expansion at the Ports of Los Angeles and Long Beach. The Railroads also support the conclusions from the Ports Rail Master Plan that even with full development of all on-dock rail facilities, additional near dock facilities will be needed in order to prevent more containers from moving by truck rather than rail.

Draft Plan

Increase intermodal rail lift capacity at near dock facilities

- **Modernize the Union Pacific Intermodal Container Transfer Facility (ICTF).**
- **Construct BNSF's Southern California International Gateway (SCIG) near dock facility.**

Railroad Comment 7

Both BNSF and UP support the development of additional lift capacity near the Ports of Los Angeles and Long Beach. As indicated by the Draft Plan, and as clearly shown

in the Ports Master Rail Plan, even if all on-dock rail facilities are constructed in a timely manner, there still will be a need for additional lift capacity at both ICTF and SCIG. Without the development and modernization of these facilities, more containers will move by truck rather than by train. Both the BNSF and the Union Pacific projects are needed to increase intermodal rail lift capacity because container traffic moves under long term contracts to one Railroad or the other. Selection of rail carrier is often dependent as to which rail carrier serves a destination most efficiently, and each carrier does not serve all destinations. For this reason container traffic will not necessarily switch from one railroad to another but rather will move from train to truck. Both BNSF and UP have proposed to develop the cleanest intermodal facilities in the world. The Railroads agree with the Draft Plan when it states: "The biggest constraint to the movement of goods is intermodal lift capacity. Shifting freight from trucks to rail will require increased capacities and systems to allow more goods to quickly transfer from various modes (intermodal lifts); thereby minimizing the interim drayage truck movements." (chapter 6 pages 6-11) The development of the SCIG and the modernization of the ICTF are necessary to ensure that intermodal lift capacity is increased to minimize modal shift and maximize the use of rail transportation with its inherent environmental benefits.

Draft Plan
Railroad
Comment 8

Increase mainline rail capacity.
The Draft Plan recommends significant expansion of the railroad mainlines operating in the study region. The Railroads recognize that investment in rail expansion and rail efficiency is necessary to accommodate projected freight levels, but object to being taxed to fund those improvements. The Draft Plan proposes that the private railroads pay fees to a public entity to fund those investments. The Draft Plan is flawed inasmuch as it recommends that governmental planning organizations with little or no expertise in national freight rail operations serve as a strategic planning entity determining when and how private rail lines should be expanded. Network development and design is complicated and involves analysis of more than just mainline expansion in a single region. Decisions concerning investment in terminals, rail yards, locomotives, freight cars and siding capacity must be considered in light of trends across the spectrum of national freight demands, along with other investments in other areas outside of the SCAB region to prevent bottlenecks. While international intermodal freight is an important component of rail business, the Railroads have critical network needs (and capital demands) for a host of other customers around the country: wheat, corn and other agricultural products from the Midwest; coal and other minerals from mining operations around the country; industrial products; and automobiles. When and where rail capacity investment on individual rail systems is needed is a question that requires constant review and revision, is affected by changes in market demands and business cycles, and does not lend itself to the sort of long-term planning that may be more appropriate for a regional government agency

planning improvements to an existing highway system. It is imperative Railroads retain authority, and the flexibility that comes with that authority, to make changes to capital investment plans as warranted by changing circumstances over time. Accordingly, while the Railroads agree that continued investment in system capacity is necessary, having a public agency be involved in determining the need for investment and then taxing the industry to pay for these investments would not be economically efficient.

Draft Plan **Eliminate rail bottlenecks - Construction of the Colton Crossing rail-rail grade separation.**

Railroad Comment 9 Construction of the Colton Crossing grade separation will provide significant public benefits. The Railroads have submitted a Public Benefits Analysis (January 2008) of the Colton Crossing project to Caltrans and the CTC, and this study is attached for further review.

Draft Plan **Grade Separation - Implement the Alameda Corridor East (ACE) Trade Corridor railroad grade crossing improvement program for all counties involved.**

Railroad Comment 10 The Draft Plan identifies many new grade separation projects (projects which separate rail and road intersections). Standard grade separation projects do not enhance velocity, throughput or capacity for railroad operations. Instead, such projects provide a distinctly public benefit by moving vehicles resulting from nearby development over or under rail lines. The National Highway Trust Fund, other federal sources, and contributions by the state and local sector are possible sources for funding these proposed improvements.

Draft Plan **Metrolink - "Passenger train (commuter rail) volumes [are projected to] escalate to 140 by 2025 from 58 in 2000, an increase of one and half times or 150%."**

Railroad Comment 11 The Draft Plan proposes a significant increase in the number of Metrolink trains that would operate on private rail lines. Although the Draft Plan may provide for a funding mechanism to generate revenue to assist in the funding of such service, the assumption that such service level is achievable is premature. Any Metrolink expansion, if even possible on freight corridors, will have to be negotiated in the future by the interested parties.

Action Item 3: Improve Operational Efficiency

Draft Plan **Develop public/private partnerships to research and develop advances in goods movement transportation technologies.**

Railroad Comment 12 The Association of American Railroads has published a "position paper" on public/private partnerships which is attached to these comments for your review.

Action Item 4: Develop Equitable Public/Private Funding Strategy

Draft Plan	**Negotiate user fees with industry that can be included in a project-specific finance plan to improve goods movement and air quality. Fees discussed include container fees, fees to support revenue bonds, and gate fees.**
Railroad Comment 13	There are many freight projects that provide extensive public benefits—such as environmental enhancements and improved freight efficiency— that a private railroad would not otherwise fund, due to the constraints of capital budgets or the lack of a sufficient return on investment. Public funding in these instances is appropriate and does not represent a public subsidy of private beneficiaries, since a rail carrier would contribute financially commensurate with its benefit, if any. Where the benefits lie solely with the private railroad, the Railroad supports the principle that it pay for these improvements. However, a fee on rail container movements should not be utilized to pay for projects with predominantly public benefits.

Thank you for the opportunity to provide comments. If you have any questions or concerns, please call me at 415-421-4213 x 12 or Peter Okurowski at 925-339-3500.

Sincerely,

Kirk Marckwald
Principal, California Environmental Associates
On behalf of the California Railroad Industry

cc:
Hasan Ikhrata, SCAG
Mary Nichols, CARB

WATSON LAND COMPANY

March 14, 2008

Ms. Shahrzad Amiri
Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012-2393

Re: Multi-County Goods Movement Action Plan

Dear Ms. Amiri:

On behalf of Watson Land Company, I would like to offer support for public agency adoption and implementation of the "Multi-County Goods Movement Action Plan" (MCGMAP). As a Southern California based company with interests in diverse parts of the region, Watson Land Company understands the imperative of a strong and effective logistics system, which will generate unprecedented economic benefits for our area and the country. We are pleased to be a member of the MCGMAP Stakeholders Advisory Group and actively participating in the development of the Draft Plan.

We have reviewed the final version of the draft MCGMAP, dated January 31, 2007, which contains a very constructive framework for confronting the complex challenges associated with the movement of goods in the Southern California region. We believe that the MCGMAP has already stimulated a positive set of "actions" by initiating the Southern California Consensus Group, which is targeting the region's "fair share" of Proposition 1B Trade Corridor Improvement Fund (TCIF) revenues. It is our understanding that the high priority projects identified by Consensus Group and nominated for TCIF funding by the California Transportation Commission are consistent with the MCGMAP program. Both public agencies and the private sector now have a unique opportunity to build on this Consensus Group program foundation, and aggressively pursue other elements of the MCGMAP.

Let me offer a few additional comments on implementation of the MCGMAP:

1). While the Plan contains an "Implementation Principle" regarding land use compatibility, we strongly urge that more consideration be given to implementing creative and effective solutions associated with market driven land use decisions. Future logistic facilities will be greatly influenced by local land use decisions, which may not reflect regional goods movement needs and priorities. These potential barriers need to anticipated and addressed.

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2). In the section of MCGMAP identifying the "action sets," there is a proposal for development of a private sector funding strategy. Further, "Action Set 4" proposes a "private sector contribution" targeted to support future projects. It is important for Metro to place this private sector role within the context of other "fee" driven policy discussions currently under way. For example, Metro has been developing a congestion impact fee for future consideration by the Board of Directors. To date, there has been no discussion on how the potential impact fee would relate to the "user fee" envisioned in the MCGMAP. In addition, as currently drafted the proposed impact fee could be imposed on some of the same facilities indemnified in the MCGMAP as important elements of the regional logistics system. In addition, we want to emphasize that the collection of fees without a streamlined process for building the infrastructure for which it is intended would render this only a "plan" without action and results.

3) MCGMAP contains a section entitled "Next Steps" which references a proposal to include Mobility 21 and other organizations in the development of new federal funding sources to support priority goods movement projects in Southern California. While this advocacy activity is important, we urge that the role for Mobility 21 and other organization including the Southern California Leadership Council be extended into other aspects of the MCGMAP. It is important to forge a sustained and effective working framework for wide-range private sector participation, in order to translate this policy document into reality.

Thank you for the opportunity to comment on the MCGMAP.

We look forward to our continued working relationship with Metro.

Sincerely,

Pilar M. Hoyos

Pilar M. Hoyos
Vice President, Public Affairs

South Coast
Air Quality Management District
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March 17, 2008

To: MCGMAP Project Partners and Consultants

Re: SCAQMD Staff Comments on Draft
Multi-County Goods Movement Action Plan

Thank you for the opportunity to submit these comments on the Draft Multi County Goods Movement Action Plan ("Action Plan"). The staff of the South Coast Air Quality Management District has participated in the Stakeholder Advisory Group for the Plan since its inception. This planning effort holds great promise because the project partners are multijurisdictional and can take a regional perspective to create *a vision for an optimal freight transportation system for Southern California*. The infrastructure that the project partners construct is important for air quality because the public health impacts of diesel exhaust are significant and localized, making infrastructure design, capacity and emissions control critical. Moreover, controlling emissions from goods movement is essential if this region is to attain federal air quality standards, and key emission control technologies such as rail electrification are inextricably tied to infrastructure.

We commend the project partners for their thought and analysis, and, in particular, for including the following among the objectives of the plan: achievement of "simultaneous infrastructure and air quality improvement;" accelerating regional environmental mitigation through project-specific mitigation *and* broader regional "powertrain" cleanup strategies; maximizing on-dock rail; and encouraging land use decisions that separate goods movement infrastructure and sensitive receptors such as residential areas, schools, and hospitals.

Despite the promise of this multi-county planning effort, we are concerned that an insufficient range of potential transportation systems has been analyzed to enable policy makers to design an optimal freight transportation system. In addition, the alternatives that were analyzed were not analyzed for air quality impacts, limiting key information available to policymakers. The Action Plan also needs to more fully describe mechanisms to achieve air quality goals, and must ensure that full project level review occurs before specific projects are assumed to be appropriate.

We thus urge that the Action Plan be augmented, as described below. We appreciate that some of the issues described below are designated in the Action Plan for further study.

The AQMD staff would be pleased to assist in any way we can in this effort. Our goal in providing these comments is to assure that the Action Plan fulfills its potential and garners the public consensus necessary for successful implementation. These comments are consistent with AQMD staff comments submitted by letter dated August 1, 2007.

Background: Air Quality Needs. The 2007 SCAQMD *Air Quality Management Plan* (AQMP) plainly shows that expeditious implementation of advanced control technologies for goods movement sources will be needed for this region to timely attain federal annual $PM_{2.5}$ and 8-hour ozone ambient air quality standards by applicable deadlines (2015 and 2024, respectively), and to reduce local toxics risks. Even with aggressive implementation of advanced control technologies, the AQMP still contains a substantial "black box" of yet-to-be-defined NOx and VOC measures. These black box measures account for 54% of the total emission reductions needed to attain the federal ozone standard in 2024. In addition, EPA recently established a new 24-hour $PM_{2.5}$ ambient standard with a likely attainment deadline of 2019, as well as a more stringent ozone standard. Preliminary analysis indicates that implementation of the AQMP measures to achieve the annual $PM_{2.5}$ and previous 8-hour ozone standards will leave the region 49% above the new 24 hour standard in 2020 unless further emissions controls are implemented. Finally, recent health risk assessments have found high cancer risks – over 700 in a million – near Southern California railyards, due to diesel particulate matter emissions from locomotives, trucks and cargo handling equipment. The AQMD's recent Multiple Toxics Exposure Study (MATES III) similarly found regional cancer risks of 1,200 in a million, again primarily due to diesel particulates.

Key Goods Movement Emission Control Issues. In light of the above factors, the key air quality issues that the Action Plan must address are —

- how to ensure implementation of advanced control technologies for sources such as marine vessels and locomotives since federal and international standards for such sources have historically been inadequate to meet the needs of this region,

- how to expedite retrofit or replacement of heavy-duty trucks, locomotives and marine vessels since the most stringent regulatory emissions standards generally apply only to new units, and these sources have long useful lives, and

- how to ensure that the goods movement facilities are designed and sited so as to avoid unacceptable local and cumulative impacts from toxic air contaminants, chiefly diesel particulate matter.

Comments on Action Plan. We submit the following comments in the spirit of seeking an Action Plan that will successfully reduce congestion and address the issues described above.

1. **Public Support is Critical**. As is recognized in the technical memoranda, many goods movement plans and projects have been met with community concerns and

opposition due to environmental impacts. Such concerns have been grounded in forecasts of doubling and even tripling of cargo movement, and in the large and growing body of evidence that air emissions related to goods movement activities — notably particulates and diesel exhaust — are contributing to serious health impacts. These impacts include thousands of premature deaths per year from regional particulates, significant cancer risks near transportation corridors, asthma, risk of permanently reduced lung function among children growing up in high particulate areas, heart disease, and other impacts. Concerns over such impacts have delayed implementation of goods movement infrastructure projects perceived as capacity enhancing. *In order for this plan to garner the public support needed to succeed, it must demonstrably improve current unacceptable environmental conditions, both regionally and in locations affected by specific goods movement facilities.* Comments to assist in achieving these goals follow.

2. **Defining a Vision for an Optimal Freight Transportation System: Additional Infrastructure Scenarios Should be Considered and Air Quality Analysis is Needed.** A key potential benefit of the Action Plan is that it can take a multi-jurisdictional perspective and define an optimal transportation system for the region as a whole. A key question presented is what infrastructure to include, particularly whether truck lanes, shuttle trains or "more of the same" freeway and rail corridors should be used to transport containers to and from the ports.

   To help answer this question, the project consultant modeled and compared the hours of delay for vehicles and trucks considering nine scenarios ("bundles") of truck lanes, one mixed flow toll expressways scenario, and one "Alternative Technology" rail scenario. The latter scenario involved use of a shuttle train (possibly maglev) to transport containers to a new "inland port" railyard in the high desert or other parts of San Bernardino County. (We will use the Action Plan's term "Alternative Technology" in referring to this scenario, but we note that it could be implemented by traditional electrified rail, a well-established technology in many parts of the world, or, less desirably from an air quality perspective, by "Tier 4" diesel locomotives that EPA rules will mandate).

   The Alternative Technology scenario analyzed in the Action Plan is based on an inland port with limited capacity -- a maximum of 5,400 containers per day -- about the capacity of the existing BNSF Hobart yard. This is but a small portion of the containers transported through the region every day. One reason for this limitation is that the Action Plan envisions this inland port as being limited to containers destined for locations *within* the region; those destined out of this region would not utilize the facility.

   Under these circumstances, this Advanced Technology alternative showed worse performance than any of the truck lane scenarios in limiting hours of congestion delay. No comparison of air quality impacts and benefits of the scenarios was made. (Qualitative comparisons of Project Categories are made in Chapter 6, but they are

too general to be useful and are subject to misinterpretation[1]). We have the following concerns:

- **Lack of Air Quality Analysis of Alternatives.** We acknowledge the importance of the congestion analysis, but for policymakers to be able to knowledgably decide what course of action to take, *we urge that the Action Plan also present an analysis of the air quality impacts and benefits of major alternative goods movement proposals, such as truck lanes and "Alternative Technology" rail alternatives, or a combination of the two.* From an air quality perspective, trucks and rail each have pros and cons, depending on the technology utilized, proximity to warehouses, proximity to pollutant receptors, and whether grade separations are constructed. The issue of whether to utilize truck lanes, rail shuttle, or a combination of the two, thus requires more thorough analysis, including air quality impacts and benefits.

- **Only One, Relatively Limited, Alternative Technology Configuration was Analyzed.** Transporting containers to and from the ports by clean, zero or near zero emission rail, has the potential to take trucks off the highways and reduce emissions. Moreover, it may be technologically, economically, and logistically more feasible to control emissions from locomotives than from trucks because fewer locomotives can move relatively large numbers of containers and because technologies such as rail electrification have been in use for decades, while electric trucks are just now being developed for limited types of service.

  The draft Action Plan, however, only considers one, relatively limited, configuration for moving containers by clean rail. The analysis portrays that alternative as less beneficial than truck lanes in reducing hours of highway delay, but this is due to analysis that does not completely describe potential benefits. The key problem is that the analysis does *not* consider –

  - a larger capacity inland port than one roughly equal to the existing Hobart yard (representing a small portion of all TEUs)

  - the benefits of clustering the considerable amount of projected *new warehouse construction* (tripling by 2030) next to such an inland port,[2] or

  - use of such a facility as an "agile port" to create destination trains for containers *bound outside of the region* which were quickly removed

[1] For example, it is said that the greatest PM emission reduction would result from alternative technologies (probably true) and the least reduction would result from improvements not enhancing capacity (may or may not be true depending on technologies used, current vehicle speeds, and other factors).
[2] The Action Plan does suggest such clustering (p. 7-6), but there is no quantitative analysis of the benefits of this strategy.

from the docks unsorted by destination using low emission rail (thereby eliminating truck drayage to near and off-dock yards).

The lack of quantitative analysis of such options imposed substantial and probably unnecessary limitations on the ability of this alternative to reduce truck traffic and congestion, as well as emissions and community impacts adjacent to near and off-dock yards.

We emphasize that AQMD is not in this letter taking a position regarding the desirability of any particular inland port, or of the concept of inland ports. Rather, we believe this concept holds sufficient promise to warrant considerably more thorough study. We note that, at a minimum, any inland port would have to be remote from residential and other receptors to avoid toxics impacts, unless it was fully electrified.

Analysis of "Alternative Technology" systems should be conducted which considers alternatives involving greater capacity, greater implementation of on-dock rail, and clustering new transload warehouse space near inland ports. More, specifically, the factors that should be evaluated are as follows:

- ***Proximity to Receptors.*** The analysis should also determine proximity to residential and school sites (as was done for all of the truck lane options) so this basic comparison can be made between truck lanes and rail.

- ***Rail Emissions Control Technologies and Electrification***. The analysis should include consideration of the emissions expected from (1) use of locomotives meeting EPA's proposed "Tier 4" emissions standards (e.g. 90% control of PM by 2015 model year), (2) emissions rates that could be achieved by accelerating to the year 2012 introduction of line haul locomotives meeting such standards (as assumed by SCAQMD and CARB in the State Implementation Plan, and (3) electrification of the existing rail system.

  Regarding electrification, as was noted earlier, the AQMP contains a substantial black box of undefined control measures, and the current air plan does not include sufficient measures to attain the new 24-hour $PM_{2.5}$ standard by the likely federal deadline of 2019. Electrification of the current rail system, potentially including a shuttle route to an inland port, is a strategy that should be evaluated as a means of further reducing emissions to meet the federal standards, as well as to address local toxics impacts from diesel particulates. The 2007 State Implementation Plan for the Basin calls for significant reductions from locomotives, equivalent to the accelerated deployment of 100% Tier 4 locomotives by 2014. While these reductions are substantial, system-wide rail electrification could achieve even higher reductions, as much

as 22 tons per day of NOx, surpassing the overall long-term benefits of such a system over Tier 4 engines. *Given the level of emission reductions needed by 2015 and beyond, as well as climate change impacts of diesel use, our region has no choice but to seriously consider the reduction of emissions from diesel locomotives through electrification.*

Further, discussions between AQMD, SCAG and CARB leading to the development of the white paper identifying long term "black box" strategies to reduce 200 tons per day of NOx and the upcoming 24-hour $PM_{2.5}$ standards must be considered. Direction proposed in the white paper will undoubtedly include strategies that fully support zero and near zero emission systems.

We agree that where electrification is not feasible, that Tier 4 is the preferred strategy. However, we recommend that the project partners analyze zero emission technologies including anticipated costs, benefits, timelines, etc. for the electrification of the existing rail system.

We also support considering *phasing* such electrification, if needed to commence implementation. For example, a high-volume rail link that has already been built to accommodate rail electrification is the Alameda Corridor. Railyards near each end of the corridor have the highest and second highest railyard cancer risks found by CARB in the state. This link is thus an obvious candidate to begin a phased electrification of the rail system.

- ***Evaluation of Clustering Development of New Transloading and Warehousing Facilities Adjacent to Inland Ports Remote from Residential Areas.*** One key purpose of a comprehensive, multijurisdictional plan such as this should be to assist the region to develop a sensible distribution of goods movement-related facilities. Given the tremendous projected growth in international cargo imports, it is fair to assume that the recent growth in transloading and warehousing facilities will continue. The growing body of studies showing the health impacts of diesel particulates on persons living near transportation facilities counsel that the plan should consider and analyze the benefits of focusing such development in locations that will avoid concentrations of diesel emissions near residential areas. The plan should thus evaluate the feasibility and impacts of clustering development of new transloading and warehousing facilities adjacent to inland ports that are remote from residential areas.

  Such a "more comprehensive approach" is briefly alluded to in Technical Memo 6b as having substantial potential benefits, but is not

elucidated other than to state that the advanced technology corridor could be a viable alternative if land-use polices were strengthened to encourage warehouse clustering near inland staging areas. (e.g. pages 2-29, 3-20). *Given the enormous projected increase in cargo, the limitations on in-basin railyard capacity, and the community impacts of siting railyards near residential areas, it is essential that this approach be further analyzed and considered.*

- ***Maximizing On-Dock Rail to Minimize Rail Operations Near Residential Areas; Evaluation of "Agile Port."*** The current practice of draying significant numbers of containers by truck to "near-dock" and off-dock railyards where they are transferred to trains is inefficient, causes truck VMT and congestion, as well as local air quality impacts near residential areas. For example, the California Air Resources Board recently released risk assessments for several intermodal railyards that show significant cancer risks for thousands of persons, e.g. increases of approximately 700 in a million risk in some areas. For perspective, AQMD rules for stationary sources generally limit cancer risks to 25 in a million. To handle increasing cargo volume, new and expanded near-dock railyards have been proposed for locations close to residential areas that are already impacted by pollution from the ports. For example, an AQMD monitor at an elementary school just east of the proposed Southern California International Gateway railyard site has shown the highest elemental carbon levels (a surrogate for toxic diesel particulate) monitored in the region. The AQMD MATES III analysis showed this area to have some of the highest cancer risks in the region – well over the 1,200 in a million regionwide average. While some emission control programs are being implemented for railyards, *any use of diesel equipment in already impacted areas exacerbates unacceptable health risks.*

  In order to minimize congestion and air quality impacts, the Action Plan should seek to eliminate drayage of containers by truck from the ports to railyards, or alternatively, to electrify all means of container transport.

  We appreciate that the Action Plan states as a goal the reduction of reliance on trucks. However, we have not seen any indication that the Plan will seek to achieve this goal through means involving changes to rail operating practices. For example, one limitation on the Alternative Technology scenario is on-dock rail capacity. However, to our knowledge, there has not been any quantitative analysis by the ports or project partners of on-dock rail capacity that considers a key alternative: transporting *unsorted* containers out of the ports by rail to inland yards remote from residential areas. This procedure (sometimes titled an "agile port") could potentially free up dock space currently

devoted to sorting destination trains, and allow more on-dock rail. The ports stated in the *San Pedro Bay Clean Air Action Plan* that they would evaluate the potential to ship unsorted containers by rail as a means of maximizing on-dock rail (Measure RL-3).

We thus urge the Action Plan to evaluate and incorporate every means of maximizing on-dock rail in order to reduce the reliance on near and off-dock railyards nearer to residential areas, unless all means of container transport are electrified.

It is only with such a full evaluation of alternatives that this Action Plan can fulfill its promise of providing policymakers with sufficient information to define an optimal transportation system for this region.

3. **The Action Plan Needs to Include More Thorough Description of Mechanisms to Implement its Environmental Objectives; Approval of the Plan Should *Not* Include Approval of Specific Projects that Have Not Undergone all Environmental Reviews.** We commend the project partners for stating their support for agency environmental plans such as the AQMP and the San Pedro Bay Ports' Clean Air Action Plan. We also support the Action Plan's call for accelerated funding and implementation of control measures in such plans, strengthening of fuel and emissions standards, and project-specific mitigation. However, the Action Plan includes little detail regarding how these ends would be achieved. Indeed, much of the environmental mitigation portion of the plan is left to future development.

   By contrast, the scores of infrastructure projects proposed in the plan are described with relative specificity. All described as being "essential." (p. 7-17). Some of those projects are highly controversial and subject to ongoing environmental review regarding (e.g. proposed "near-dock" railyard projects adjacent to residential areas north of the ports). We thus are concerned that the Action Plan -- including specific projects but largely undetermined mitigation -- is proposed to be "approved" by the agencies involved in its development. We appreciate that the project partners have responded to our workshop comments and have stated that "approval" of the plan will not include approval of specific projects. However, given the description of all projects as "essential," we urge that the scope of approval be made explicitly clear to the Boards that will be considering the Action Plan.

   More fundamentally, however, the Action Plan needs to be augmented by specific mechanisms to implement its environmental goals. We would be pleased to work with the project partners to accomplish this. *Such mechanisms should seek to implement any control measures that have not been adopted as regulations or other enforceable instruments by international, federal or state agencies, ports or other governments.* Mechanisms to include are requirements to use clean trucks and locomotives as conditions of public funding, differential use fees for relatively high emitting equipment, coordinated advocacy by the project partners, air districts and stakeholders for more stringent federal emissions standards and for federal funding of

emission controls, conditions of port leases with marine terminal or railyard operators, etc.

4. **Evaluation of Infrastructure and Emission Control Feasibility.** Because we want the Action Plan to be successful, we urge that any proposed infrastructure proposals include comparative analysis of implementation feasibility. For example, the truck lane and alternative rail proposals raise obvious issues of availability of right-of-way space. Decisionmakers should be able to compare problems in securing sufficient space for the truck lane and rail alternatives. Another example would be the issue of truck lanes versus shuttle trains. Decisionmakers should consider which transport mode could more readily be adapted to zero or near zero emissions technologies.

5. **Other Comments: *Aircraft Emissions*.** On page 7-22, aircraft emissions are described as *not* being a significant source of pollutants compared to other mobile sources. We disagree. Aircraft will soon be in the top ten NOx categories. Other categories in the top ten are relatively well controlled with the notable exceptions of locomotives and marine vessels. Aircraft emit quantities of NOx comparable to locomotives and all sources in the "RECLAIM" program – the top 320 stationary sources of NOx, including all refineries and power plants. The fact is that all source categories must be controlled if we are to achieve attainment, and there are virtually no source categories with quantities of emissions that predominate over all others.

Thank you for the opportunity to provide these comments. We look forward to providing further input in support of an effective and successful Action Plan.

Sincerely

Peter Greenwald
Senior Policy Advisor

MULTI-COUNTY GOODS MOVEMENT ACTION PLAN
DRAFT ACTION PLAN COMMENTS
COMMENTS BY GATEWAY CITIES COUNCIL OF GOVERNMENTS
FEBRUARY, 2008

EXCERPTS

The following comments are provided on the draft action plan.

The draft plan states that the plan is "just a guide in preparation of plans." However, from reviewing the draft plan many of the ideas for a framework are nebulous and lack specific steps for moving the plan forward. A more specific "next steps plan" is needed that includes community and perhaps equally important industry input. The draft plan also states that "communities are calling for slower growth (of the ports) and mitigation of existing impacts." The second part of this statement is correct but GCCOG is commenting and performing its own evaluations to see if ultimate port growth can be accommodated by the local communities. Therefore, we would disagree with the first part of the previous statement.

The GCCOG can support the Implementation Principles listed on page 1-5. However, the input of the communities is vital and an accurate portrait of community impacts from any proposed facilities (such as impacts to sales tax base from any freeway widenings) should be an implementation principle. Another implementation principle should also the active input and participation from the private sector and include an environmental principle stating that all projects or strategies be environmentally protective or mitigate existing environmental deficiencies be considered for as the number one Implementation Principle.

Page 2-3 includes the following statement – "Respondents also demonstrated support for dedicated truck lanes between the ports and the Inland Empire." This is not the overall position of GCCOG. Dedicated truck lanes are an element of the I-710 Major Corridor Study hybrid design but this does not indicate a universal acceptance, particularly where the expansion of freeway ROW is required. On this page it is also stated that "majority of respondents felt an east-west corridor should be the focus of goods movement infrastructure improvement." While generally supporting this statement, there needs to be a lot of input from GCCOG (and SGVCOG) in order to successfully address this issue. That has not been the case to date.

Railroad systems capacity limitations are not analyzed and a plan to implement those that are identified is not included in the plan. The railroad systems improvements should be analyzed collectively to determine if <u>all</u> of the needed improvements to various aspects for rail movement can be improved (and the impacts or results if they are not).

The plan does not address the impacts of reverse flow of goods (empty containers and exports).

In the future, data should be developed for daily volumes for 40' containers as that is the most useful for planning purposes. Also, the time of day these containers are moved (or relocated) should have been analyzed.

The draft action plan still does not address the locations for future warehousing/distribution centers (or a potential inland port). Without that information, the effectiveness of any "action plan" cannot be determined.

Air quality and emission reduction strategies are much more thoroughly addressed then in previous drafts. However, without a quantitative analysis of all the proposed air pollution reduction measures combined with an analysis of additional air pollution reduction measures, it is difficult to assess the impacts of these measures on the health of the nearby communities.

The plan does not address all the impacts of constructing truck lanes along various freeways.

Alternative technologies are not adequately addressed or evaluated in the plan. However, they are included as the "solution" for many of the implementation strategies. This dichotomy should have been addressed in the plan.

Table 21 from the plan is attached and shows changes or modifications recommended by GCCOG. In general shuttle trains should not have been listed with alternative technology. Shuttle trains have been dismissed by others (ACTA and SCAG) as being ineffective. The revisions or changes shown in Table 21 show the following:

- Alternative technology has much more benefits for the various categories.
- Mainline rail capacity improvements have many more benefits (as long as combined will all other railroad systems aspects needed to be improved along the mainline).
- Port hours and modifications of delivery hours have much more significant benefits than shown previously.
- ITS technologies (based on work being done by GCCOG) have the very real potential of much more benefits than shown in the original table.

Pages 6-11 to 6-18 – **Summary of Qualitative Evaluation** – Attached are the referenced pages on which GCCOG has shown our comments in red. In general some of the conclusions with respect to the "most" benefit overlook the inter-dependency of the goods movement industry and the benefits of other aspects of goods movement – most notably the use of alternative technologies, improved railroad systems improvements, port hours of operations, efficiencies and ITS. The changes shown on the attached pages reflect the previous comments by GCCOG and the changes suggested in Table 21. The specific comments for use of the evaluation categories are shown on the attached pages.

Page 7-9 – Table 24 – Example Actions Targeted by Market Segment – This table is included with changes or comments by GCCOG that reflect our previous comments.

Page 7-19 lists the time frames to implement the strategies and covers a period of over 25 years to implement. This is entirely too long, particularly for environmental mitigations and if the ports continue to grow. The ports are projected to double within the next ten years and that should be the longest period to implement

MULTI-COUNTY GOODS MOVEMENT ACTION PLAN VOLUME 1, APPENDIX D: TRADE CORRIDORS IMPROVEMENT FUND SUMMARY FOR SOUTHERN CALIFORNIA AND SAN DIEGO BORDER REGIONS

Prepared for:

Los Angeles County Metropolitan Transportation Authority (Metro)
Orange County Transportation Authority (OCTA)
Riverside County Transportation Commission (RCTC)
San Bernardino Associated Governments (SANBAG)
Ventura County Transportation Commission (VCTC)
California Department of Transportation (Caltrans) Districts 7, 8, 11 & 12
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April 2008
A31418

Proposition 1B was approved by California voters in November 2006 and authorized the State to issue almost $20 billion in bonds that will be spent on transportation projects. One component of Proposition 1B is the Trade Corridors Improvement Program (TCIF), which allocated $2 billion of the $20 billion specifically to goods movement projects such as highway, freight rail, seaport, airport, and border access infrastructure improvements. The Southern California Consensus Group and San Diego Border Region transportation agencies separately convened to develop a list of projects to submit to the California Transportation Commission, who recommended the programming of TCIF funds. The list of projects recommended for funding by the CTC in both the Southern California and San Diego Border regions can be found on the following pages.

Southern California Consensus Group

The southern California goods movement project list recommended for TCIF funding was developed through a collaborative effort by the region's transportation agencies. The agencies involved in this process included the Alameda Corridor East Construction Authority, Alameda Corridor Transportation Authority, Los Angeles County Metropolitan Transportation Authority, Southern California Regional Rail Authority (Metrolink), Orange County Transportation Authority, Port of Hueneme, Port of Long Beach, Port of Los Angeles, Riverside County Transportation Commission, San Bernardino Associated Governments, Southern California Association of Governments, and Ventura County Transportation Commission.

The projects nominated for TCIF are rooted in prior initiatives collaboratively undertaken by the Southern California Consensus Group such as Multi-County Goods Movement Action Plan, the Alameda Corridor East Trade Corridor Plan (2001), the SCAG Regional Transportation Plan (2004 and draft 2008) as well as the State Goods Movement Action Plan and the Cal-MITSAC report.

The CTC has recommended that the Southern California region receive $1.65 billion in TCIF funds out of a total of $3 billion made available by the CTC. The projects selected for funding include grade separations, highway and arterial improvement projects, bridge replacement, and port access improvements.

San Diego Border Region

The San Diego goods movement project list recommended for TCIF funding was developed through a collaborative effort by the San Diego region's transportation agencies. The agencies involved in this process included Caltrans District 11, the Port of San Diego, and the San Diego Association of Governments.

The CTC has recommended that the San Diego Border region receive $400 million in TCIF funds out of a total of $3 billion made available by the CTC. The projects selected for funding include highway and arterial improvement projects, border crossing and port access improvements, and rail projects.

Trade Corridors Improvement Fund (TCIF)
Adopted Program of Projects (Dollars in Thousands)
Southern California and San Diego Regions

Project Category	Nominated By	Project Title	County	Total Project Cost (000)	Recommended TCIF Funding (000)
Southern California					
Grade Sep	ACE	San Gabriel Valley Grade Separation Program	LA	$700,000	$336,600
Highway	ACTA	SR 47 Expwy-Schuyler Heim Bridge Replace/Construct Expwy & Flyover	LA	$687,000	$158,000
Grade Sep	City of Santa Fe Springs	ACE: Gateway-Valley View Grade Separation	LA	$79,084	$25,570
Rail	SCRRA/Metrolink	New Siding on the Antelope Valley Line (MP44 to MP61) For Freight Trains	LA	$14,700	$7,200
Highway	Port of Los Angeles	I-110 Fwy Access Ramp Imp SR 47/I-110 NB Connector Widening	LA	$48,200	$14,700
Highway	Port of Los Angeles	C Street Access Ramps Improvements	LA	$28,300	$8,300
Grade Sep	City of Commerce	Washington Blvd Widening & Reconstruction Project	LA	$28,898	$5,800
Highway	Port of Los Angeles	South Wilmington Grade Seperation	LA	$65,500	$17,000
Port	Port of Long Beach	Gerald Desmond BridgeReplacement	LA	$851,500	$250,000
Port	Port of Long Beach	Ports Rail System - Tier I (Pier F Support Yard)	LA	$27,240	$4,650
Port	Port of Long Beach	Ports Rail System - Tier I (Track Realignment @ Ocean Blvd)	LA	$75,390	$23,960
Port	Port of Long Beach	Ports Rail System - Tier I (Pier B St. Realignment)	LA	$25,670	$4,180
Port	Port of Long Beach	Ports Rail System - Tier I (Terminal Island Wye Track Realignment)	LA	$11,950	$3,790

Trade Corridors Improvement Fund (TCIF)
Adopted Program of Projects (Dollars in Thousands)
Southern California and San Diego Regions

Port	Port of Long Beach	Ports Rail System - Tier I (Reconfigure Control Point / Computerized Train Control)	LA	$37,260	$11,850
Port	Port of Long Beach	Ports Rail System - Tier I (Reeves Ave Closure and Grade Seperation)	LA	$96,860	$31,180
Port	Port of Long Beach	Ports Rail System - Tier I (Navy Mole Storage Yard)	LA	$18,280	$5,930
Port	Port of Long Beach	Ports Rail System - Tier I (New Cerritos Rail Bridge / Triple Track S. of Thenard)	LA	$168,640	$38,330
Port	Port of Long Beach	Ports Rail System - Tier I (West Basin Road Rail Access Improvements)	LA	$173,090	$47,560
Port	Port of Long Beach	Ports Rail System - Tier I (Pier 400 Second Lead Track)	LA	$11,490	$3,670
Highway	OCTA	SR 91 connect aux lanes through IC ON WBR SR 91 btwn SR 57 & I-5	ORA	$73,400	$34,950
Grade Sep	OCTA	State College Grade Separation	ORA	$62,083	$30,731
Grade Sep	OCTA	Placentia Avenue Undercrossing	ORA	$39,369	$14,934
Grade Sep	OCTA	Orangethorpe Avenue Grade Seperation	ORA	$83,957	$41,666
Grade Sep	OCTA	Kraemer Blvd Undercrossing	ORA	$45,910	$22,642
Grade Sep	OCTA	Raymond Avenue Grade Seperation	ORA	$63,739	$12,757
Grade Sep	OCTA	Lakeview Avenue Overcorssing	ORA	$58,525	$28,685
Grade Sep	OCTA	Tustin Avenue / Ross Drive Overcorssing	ORA	$63,400	$31,387
Grade Sep	City of Riverside	Columbia Avenue Grade Seperation	RIV	$29,100	$6,000
Grade Sep	RCTC/City of Corona	Auto Center Drive Seperation	RIV	$32,000	$16,000

Trade Corridors Improvement Fund (TCIF)
Adopted Program of Projects (Dollars in Thousands)
Southern California and San Diego Regions

Grade Sep	City of Riverside	Magnolia Avenue Grade Seperation - UPRR	RIV	$51,160	$20,000
Grade Sep	City of Riverside	Iowa Avenue Grade Seperation	RIV	$32,031	$13,000
Grade Sep	City of Banning	Project No. 2006-05, Sunset Avenue Grade Separation	RIV	$36,500	$10,000
Grade Sep	City of Riverside	Streeter Avenue Grade Seperation	RIV	$36,800	$15,500
Grade Sep	CVAG	Avenue 56 Grade Separation on Yuma Subdivision of UPR Mainline	RIV	$60,000	$10,000
Grade Sep	CVAG	Avenue 66 Grade Separation on Yuma Subdivision of UPR Mainline	RIV	$33,500	$10,000
Grade Sep	County of Riverside	Grade Separation at Clay Street Railroad Grade Crossing	RIV	$37,350	$12,500
Grade Sep	City of Riverside	Riverside Avenue Grade Separation	RIV	$30,300	$8,500
Grade Sep	City of Riverside	3rd Street Grade Separation	RIV	$40,161	$17,500
Highway	County of Riverside	Grade Separation at Magnolia Avenue Railroad Grade Crossing - BNSF	RIV	$81,750	$13,700
Highway	County of Riverside	March Inland Cargo Port Airport-1215 Van Buren Blvd-Ground Access Imp	RIV	$97,550	$10,000
Highway	SANBAG	I-15 Widening and Devore Interchange Reconstruction	SBD	$238,888	$118,012
Highway	SANBAG	I-10 Corridor Logistics Access Project (IC reconst @ Cherry)	SBD	$76,886	$30,773
Highway	SANBAG	I-10 Corridor Logistics Access Project (IC reconst @ Citrus)	SBD	$54,458	$23,600
Grade Sep	SANBAG	I-10 Corridor Logistics Access Project (IC reconst @ Riverside)	SBD	$34,000	$14,096
Grade Sep	SANBAG	ACE Glen Helen Pkwy Railroad Grade Separation	SBD	$26,868	$7,172
Grade Sep	SANBAG	ACE North Milliken Ave Railroad Grade Separation at UPRR	SBD	$74,210	$6,490

Trade Corridors Improvement Fund (TCIF)
Adopted Program of Projects (Dollars in Thousands)
Southern California and San Diego Regions

Grade Sep	SANBAG	ACE South Milliken Grade Separation at UP Los Angeles	SBD	$30,083	$8,031
Grade Sep	SANBAG	ACE Valley Grade Separation at BNSF/UP San Bernardino	SBD	$28,686	$7,658
Grade Sep	SANBAG	ACE Palm Grade Separation at BNSF/UP Cajon	SBD	$35,176	$9,390
Grade Sep	SANBAG	ACE Vineyard Grade Separation at UP Alhambra	SBD	$25,075	$6,694
Grade Sep	SANBAG	ACE Lenwood Grade Separation at BNSF/UP Cajon	SBD	$25,786	$6,884
Highway	City of Oxnard	US 101 Rice Avenue Interchange	VEN	$86,993	$30,449
				Southern California Total Recommended TCIF Funding:	**$1,647,971**
San Diego Border Region					
Highway	SANDAG	State Route 905	SD	$104,700	$91,605
Highway	SANDAG	State Route 11 and Otay Mesa East Port of Entry (POE)	SD	$708,820	$75,000
Highway	SANDAG/Port of San Diego	Bay Marina Drive at I-5 At-Grade Improvements	SD	$2,380	$910
Highway	SANDAG/Port of San Diego	10th Avenue at Harbor Drive Grade Separated Improvements	SD	$67,200	$30,910
Highway	SANDAG/Port of San Diego	32nd Street at Harbor Drive Grade Separated Improvements	SD	$118,460	$50,665
Highway	SANDAG/Port of San Diego	Civic Center Drive at Harbor Drive and I-5 At Garde Improvements	SD	$3,260	$1,150
Port	SANDAG/Port of San Diego	Port of San Diego National City Marine Terminal (Wharf Extension)	SD	$34,300	$15,000
Rail	SANDAG / Metropolitan Transit System	Southline Rail Improvements/San Ysidro Yard - Yard Expansion	SD	$40,460	$25,900

Trade Corridors Improvement Fund (TCIF)
Adopted Program of Projects (Dollars in Thousands)
Southern California and San Diego Regions

Rail	SANDAG / Metropolitan Transit System	Southline Rail Improvements/San Ysidro Yard - Mainline Improvements	SD	$107,030	$98,060
Rail	SANDAG/NCTD	LOSSAN N Rail Corridor-Sorrento to Miramar Double Track-Phase 1	SD	$23,700	$10,800
				San Diego Border Region Recommended TCIF Funding	**$400,000**

Source: California Transportation Commission, http://www.catc.ca.gov/programs/tcif.htm

Multi-County Goods Movement Action Plan

Volume 2: Technical Memoranda

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
San Diego Association of Governments

Prepared by:

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In association with:

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ENGINEERS
PLANNERS
ECONOMISTS
Wilbur Smith Associates

April 30, 2008

Multi-County Goods Movement Action Plan

Project Management Plan

Metro Contract No. PS-4310-1268-01-14

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
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September 2005

TABLE OF CONTENTS

Section	Title	Page
1.	PROJECT OVERVIEW	1-1
2.	SCOPE OF WORK	2-1
3.	WORK PLAN	3-1
4.	SCHEDULE	4-1
5.	TENTATIVE MEETINGS SCHEDULE	5-1
6	TENTATIVE DELIVERABLES SCHEDULE	6-1
7.	ANTICIPATED BUDGET DRAWDOWN SCHEDULE	7-1
8.	TAC CONTACTS	8-1
9.	CONSULTANT TEAM CONTACTS	9-1
10.	CONSULTANT TEAM ROLES AND RESPONSIBILITIES	10-1
11.	DATA INFORMATION NEEDS	11-1

1. PROJECT OVERVIEW

INTRODUCTION

The Los Angeles County Metropolitan Transportation Authority is leading a team, which includes most regional transportation agencies, to develop a Multi-County Goods Movement Action Plan for Southern California. A consultant team lead by Wilbur Smith Associates was selected to assist regional planning agencies and private-sector interests in preparing this Plan. The Multi-County Goods Movement Action Plan will coordinate with other studies and plans to identify to develop a comprehensive, long-term plan of action for good movement throughout the Region.

THE MULTI-COUNTY GOODS MOVEMENT ACTION PLAN

The movement of goods into Southern California, through its ports and airports and through the Region on its vast transportation network, has grown markedly in recent years. This growth will continue in the future since Southern California serves as a principal trans-shipment area for international goods movement for the entire United States. Goods movement through the Region utilizes the existing rail and highway network that also is used by its residents for mobility. The capacity of the entire highway network, in particular, is under extreme strain to meet this combined demand. The Multi-County Goods Movement Action Plan will develop a broad strategy to meet current and future demand for goods movement while preserving capacity and mobility. The Action Plan will accomplish this by fully studying the nature of goods movement and developing strategies to increase efficiency and minimize conflicts and impacts.

Specifically, the Multi-County Goods Movement Action Plan will:

- Identify the volume and projected growth in freight demand within and through Southern California and how constraints in the freight movement system may change or be impacted
- Identify strategies for infrastructure and operational improvements to improve goods movement in the short-mid and long-range periods
- Identify locations for implementation of infrastructure or operational changes and recommend public or private actions and funding strategies
- Develop strategies to mitigate the impact of goods movement on local communities.
- Identify institutional arrangements needed for implementation and potential obstacles and methods to overcome them

Development of the Multi-County Goods Movement Action Plan began in August 2005 and is expected to take approximately 18 months. The schedule includes eight sub-tasks and will involve the participating public agencies, stakeholders and the consultant team. A project Technical Advisory Committee will guide the completion of the work, and a Stakeholder Advisory Group will meet regularly to provide public and private sector input.

A Draft Multi-County Goods Movement Action Plan will be prepared by October 2006 for review and comment. The final Plan will incorporate public and agency comments and will be delivered to the sponsors by January 2007.

2. SCOPE OF WORK

I. BACKGROUND & OVERVIEW

Los Angeles County Metropolitan Transportation Authority ("METRO"), Orange County Transportation Authority ("OCTA"), Riverside County Transportation Commission ("RCTC"), San Bernardino Associated Governments ("SANBAG"), Ventura County Transportation Commission ("VCTC"), Southern California Association of Governments ("SCAG") and California Department of Transportation ("Caltrans"), herein referred to collectively as "member agencies or participating agencies", have agreed to develop a goods movement "Action Plan" that contains strategies that will support the efficient movement of goods with out disproportionately impacting local communities, the environment or transportation network. METRO will serve as the lead agency by contracting for certain consulting services, coordinating work and monitoring the overall progress of this effort. Public agency staff and staff from appropriate quasi-public and private entities will provide input into the development of the Action Plan. The Action Plan will be a regional framework for goods movement initiatives, to be developed collaboratively by the county transportation commissions, the Southern California Association of Governments (SCAG), Caltrans, councils of governments, the ports, the private sector (railroads, trucking companies, shippers, etc.), and other agencies involved in the movement of freight (e.g. Alameda Corridor Transportation Authority). Substantial work in the goods movement arena already has been undertaken in this region with some notable successes. But these efforts have not been guided by a coordinated, overall framework. Such a framework is needed to meet rapidly growing demand for freight movement, and to ensure prudent investment of public and private resources in the region's extensive and complex goods movement system. The continued economic vitality and quality of life of the region are at stake, given the extent to which the economy depends on an efficient freight logistics system.

The creation of a goods movement Action Plan is particularly important in today's financially constrained environment to minimize duplication of effort and ensure that member agencies are not inadvertently working at cross purposes. **The Action Plan will build on and seek to coordinate with activities already initiated by both the public and private sector, and not duplicate prior or ongoing efforts. The Action Plan must also identify ways to minimize the impacts of goods movement on existing infrastructure, nearby communities and the environment**.

The participation of the private sector is integral to the development and implementation of the Action Plan. The movement of freight is essentially a private enterprise, but relies heavily on use of public infrastructure. The public sector also uses portions of the privately owned infrastructure (e.g. Metrolink shares track with the rail freight system). The intent is to engage key representatives of the freight and shipping community in the development of all aspects of the Action Plan. Their involvement is needed to help identify the existing and forecast constraints in the goods movement system, define needed physical and operational improvements, and chart a realistic course by which those improvements can be funded and implemented. This must be done while maintaining private sector confidentiality in the areas of data and business practices. **The Action Plan must also respect the needs of local communities affected by freight-related activities and seek to mitigate the impacts of goods movement on the environment. The development of the Action Plan must be a partnership, cutting across a complex array of public and private institutions**.

Management Structure

The development of the Action Plan will involve a combination of contractor tasks and tasks to be performed and managed (using in-house resources) by staff representing the following member agencies:

- Los Angeles County Metropolitan Transportation Authority - Metro
- Orange County Transportation Authority - OCTA,
- Riverside County Transportation Commission - RCTC,
- San Bernardino Associated Governments - SANBAG,
- Ventura County Transportation Commission - VCTC,
- SCAG, and
- Caltrans Districts 7, 8, 11, and 12.

The Action Plan will be developed as a guiding and coordinating document across multiple counties. Elements of the Action Plan will be implemented only through the properly authorized decisions of the individual agencies and organizations represented. This will be determined through the evaluation of individual priorities at the county level, but with recognition that regional continuity and consistency is also essential.

Communications

A project of this geographic scope and complexity of the Action Plan will require clear channels of communication. Day-to-day project communications will be channeled through the METRO Project Manager. The METRO Project Manager, in coordination with the participating agencies, will schedule meetings of the Technical Advisory Committee and the Steering Committee. Contractor interface will occur through the METRO Project Manager, with direct contacts between the Contractor and other agencies/stakeholders permitted for the purposes of gathering technical data, coordination of analytical work, and related technical activities. The Contractor will take direction from the METRO Project Manager. **The Contractor will need to keep the METRO Project Manager informed of proposed project-related contacts with other agencies**. Outreach for the Action Plan will be conducted principally by the participating agencies. However, consultant assistance will be required in certain specific areas as support for the agency outreach activities. The intent is for the Contractor to focus primarily on the technical studies, while the participating agencies will guide the technical studies and serve as the channel of communications to the stakeholders. **The Contractor effort may include meetings and interviews with public and private stakeholders for the purpose of assimilating technical data**.

Each of the county transportation commissions will be responsible for the communication of study progress to stakeholders within its own county. SCAG will be responsible for communications within its own agency and to elected officials on the Regional Council and committees. Caltrans staff will be responsible for communications within its own districts. Communication with multi-county entities will be coordinated through METRO. Coordination of project information and the release of that information will occur through the TAC and Steering Committee.

II. ACTION PLAN GOAL

The goal of the Action Plan is to develop feasible solutions/strategies for short-term (0 to 5 years), mid-term (6 to 15 years), and long-term (15+ years) planning efforts that will ultimately lead to

implementation. The Action Plan will be developed using a combination of agency staff and contractor resources and will be coordinated with other on-going goods movement initiatives.

The goal is to provide consistency in strategies and implementation activities among county transportation plans and between county-level and regional plans. It is expected that actions mutually agreed upon in the Action Plan will be incorporated into county plans and the next update of the SCAG Regional Transportation Plan. The regional view should influence local priorities, and local priorities should also influence the regional view. Any new inter-jurisdictional arrangements needed to implement strategies in the Action Plan will be developed by mutual agreement of the agencies responsible for funding and implementing inter-jurisdictional elements of the plan.

Products

The product of this effort will be a report that documents existing and future goods movement problems and issues, identifies and evaluates options for dealing with those issues, and recommends an implementation plan to guide both the public and private sectors in coordinating infrastructure and operational decisions. The final report will document issues and options for the region as a whole, but will also address the issues and options unique to individual counties. It is the desire of the participating county transportation commissions that the report contain sections specific to each county that can be easily integrated into county-level transportation plans, covering goods movement issues for each county. **Orange County's transportation plan update will likely be the first to require such a discussion, and the preparation of the Orange County section of the report may need to be accelerated.**

Technical Memoranda will be prepared for each task of the project. It is anticipated that the final report will largely be drawn from the technical memoranda. Contractors should anticipate both a draft and final of each technical memorandum, so that edited versions of each could be distributed, at the option of the member agencies. Agency staff will have 30 days to comment on each draft technical memorandum, and the Contractor will have 30 days to prepare the final. The METRO Project Manager will review all comments and provide direction to the Contractor on how to resolve conflicting comments. **Subsequent tasks may proceed without waiting for the completion of the final technical memorandum of a previous task, unless otherwise directed by the METRO Project Manager.** The products should be presentable in both color and black-and-white to facilitate duplication and distribution of this information to stakeholders. The Contractor should anticipate making 25 copies of each technical memorandum/report. Voluminous reports are not desired. Key information should be placed in the body of the report as well as in the executive summary, with support material in appendices.

Period of Performance

The period of performance to complete the Action Plan is 18 months. The Contractor proposals should contain a task schedule indicating how the work will be accomplished within the specified time frame.

III. ACTION PLAN OBJECTIVES

The Action Plan at its completion should fulfill, at a minimum, the following objectives:

1. Document the existing systems of truck and rail freight movement in Southern California, the flow of goods on that system (including both geographic and modal distribution), and the constraints that currently exist within the system.

2. Identify the projected growth in freight demand within and through Southern California, trends in the logistics industry that will affect the demand, potential private sector responses to accommodate the demand (absent public intervention/assistance), and how constraints in the freight movement system may change or be impacted.
3. Identify the optimal infrastructure and operational strategies (short-, mid-, and long-term) to improve mobility, reduce delay, improve reliability, and improve safety for the movement of goods on truck and rail.
4. Identify where these strategies (infrastructure and operational) should be implemented, which are most appropriately addressed by the private or public sector (or some combination), and how the strategies should be funded.
5. Identify strategies that can be put in place to lessen the impact of industrial development and freight movement operations on local communities and the environment (e.g. to mitigate congestion, rail crossing delay, land use incompatibility, noise, air quality impacts, etc.).
6. Identify institutional arrangements needed to advocate for, finance, and implement the public share of the regional freight strategy, and identify the public sector role in facilitating private investment in infrastructure and improved operations. Identify potential obstacles to implementation (institutional and otherwise), how those obstacles may be overcome, and potential impact on agency budgets (e.g. for maintenance and operations).

IV. ACTION PLAN STRATEGIES

- The Action Plan shall include strategies or solutions, at a minimum, to address/answer the following questions: Where and how extensive are the existing delays in the goods movement system?
- What trends in the logistics industry may affect these delays and the demand for movement of goods within and through Southern California?
- What operational and management actions (both public and private) can be taken to minimize delays on the goods movement system, and to what extent can these actions affect decisions on major infrastructure improvements?
- What specific infrastructure improvements need to be planned and funded to keep goods movement delays at an acceptable level?
- To what extent can shifts of goods movement mode between rail and truck reduce the need for infrastructure investment? If desired, how can shifts in mode be influenced?
- What are the economic benefits to the region of continued expansion of our goods movement system and how can these benefits be optimized?
- What are the potential costs and impacts of that expansion and how can they be minimized
- What specifically can be done to minimize the impact of goods movement on local communities and the environment?
- How should the region pursue the funding of infrastructure used principally to accommodate the through movement of goods?
- To what extent should full or partial truck lanes (toll or free) be included as part of the regional goods movement infrastructure strategy? What is the likely range in cost of such a facility, and to what extent should it be expected that such a facility could be funded by tolls?
- What is the feasibility of accommodating longer combination vehicles on a dedicated facility? To what extent would this provide efficiencies for the logistics industry and to what extent could users of the facility finance such a facility?
- What types of partnerships are needed to facilitate the implementation of goods movement infrastructure, both public and private? Who should take responsibility for development of those partnerships?

This list is not intended to be inclusive of all the questions to be addressed, but reflects some of the principal questions and concerns of the member agencies entering into this study. It is not the intent of this effort to establish a specific alignment for dedicated truck lanes. However, it is hoped that the information generated in this study can lead to a regional consensus on whether and how dedicated truck lanes should be developed.

V. STATEMENT OF WORK TO BE PERFORMED – ACTION PLAN TASKS

Task 1.0 - Project Management and Administration

The Contractor shall document how the team intends to manage and administer the Project, and within 30 days after the contract award, the Contractor shall submit a Draft Project Management Plan for review, which shall include the following items:

- Project Schedule
- Quality Control and Assurance Program
- Project Administration
- Progress Reports
- Project Meetings
- Agency Coordination
- Project Files

1. **Project schedule** - The Contractor shall prepare a detailed project schedule showing the critical path and appropriate milestones. This schedule shall be submitted to the METRO Project Manager within 30 days after award of Contract. Any changes to the project schedule shall be approved by the Project Manager prior to distribution to others.

2. **Quality Control and Assurance Program** -The Contractor shall prepare a comprehensive quality control and assurance program. The Contractor and Sub-contractors will be required to implement and maintain consistent quality control procedures. All work will be checked and crosschecked and all deliverables will be reviewed and approved by The Contract project manager prior to submission.

3. **Project Administration** -The Contractor shall be responsible for Project administration that includes preparing and submitting budgets and invoices in accordance with METRO requirements. A Project Administrator will be assigned to the project to ensure continuity throughout the duration of the project and to establish good communications with METRO staff.

4. **Progress Reports** -The Contractor shall prepare progress reports that will be submitted monthly and include a narrative describing the work accomplished during the reporting period, a summary of meetings held and a discussion of outstanding issues and action items. The reports will also include updated progress schedules; manpower and cost reports, which compare actual versus planned expenditures and any concerns or significant problems with recommendations for corrective actions. The progress reports will also summarize tasks to be accomplished during the next period. The METRO Project Manager will review and comment on reports via electronic communication prior to distribution to project committees. METRO will

serve as the lead agency by contracting for certain consulting services, coordinating the work and monitoring the overall progress of this effort. Public agency staff from member agencies will be represented on a Steering Committee for the Action Plan and staff from appropriate quasi-public and private entities will provide input during the meetings and throughout the effort. A Technical Advisory Committee of agency staff, led by METRO, will provide day-to-day oversight of the project. Steering Committee representatives will provide periodic progress updates to their agency executives, committees and boards.

5. **Project Meetings**-The Contractor shall provide support and assistance during project meetings. The Contractor shall assist in the scheduling and conduct of project/progress meetings to be conducted periodically with project committees. The Contractor will attend and provide technical support at TAC meetings on a monthly basis and at Steering Committee meetings on a bi-monthly basis. Additional meetings may be required with the METRO Project Manager for project management purposes, estimated at bi-monthly. The meetings will discuss progress, general and specific project issues, and will be the forum for the exchange of information, resolving issues and delivering guidance and direction. Guidance and direction of the project will be received from these meetings and METRO Project Management only. The Contractor will be responsible for preparing meeting notes for the TAC and Steering Committee meetings. The notes shall briefly summarize the discussion and shall document decisions and action items.

6. **Agency Coordination**-The METRO Project Manager and the Steering Committee will be supported and assisted by the Contractor in coordinating and communicating with other member agencies based on the guidance contained in Task 2 – Outreach Assistance. The METRO Project Manager shall be copied on electronic and hard copy correspondence with other member agencies. Where written documentation of contacts occurs, the minutes, reports, letters, memos and other data shall be provided to the METRO Project Manager for review prior to distribution.

7. **Project Files** -The Contractor will develop and maintain Project files that are indexed in accordance with the Caltrans Project Development Uniform File System. At the end of this contract, the Contractor shall provide the METRO Project Manager with a hard copy, diskette, and acceptable electronic format of all files, presentation materials conceptual plans, and all other products described (and/or implied herein), assistance and coordination for meetings, and assistance in coordinating with other projects/studies within the study area.

The Contractor may establish direct contact with governmental regulatory and resource agencies and others for the purpose of obtaining information, expertise, and assistance in developing baseline data and resource inventories. The Contractor shall identify to the METRO Project Manager the agencies being contacted in advance of the contacts. The Contractor shall maintain a record of all such contacts and shall transmit copies of those records to the Project Manager on a regular basis.
The Project Management Plan shall establish a process whereby all preliminary, review and draft reports, calculations and plans are checked for quality, completeness and readability before submittal and all job-related correspondence and memoranda are routed and received by affected persons and then bound in appropriate job files

Deliverables:

- ***Draft Project Management Plan –(due within 30 days of receipt of Notice to Proceed)***
- ***Final Project Management Plan–(due one week after receiving comments on the draft)***

- ***Support Materials for Committee Meetings (e.g., handouts, presentation materials, meeting notes, etc.)***

Task 2.0- Outreach Assistance

Outreach for the Action Plan will be conducted principally by the participating agencies, as indicated above. However, consultant assistance will be required in certain specific areas. The listing below delineates the specific outreach activities to be conducted by the member agencies and those to be conducted by the Contractor:

Member Agency Outreach Activities:

- Maintain contact lists and e-mail lists – each county transportation commission will maintain a listing of stakeholder contacts pertinent to their county and will be responsible for communication with and notification of those stakeholders.
- Provide notice of committee meetings
- Include Action Plan updates as part of public outreach for RTP and county-level long-range plans and other county-level planning activities. Public outreach for the Action Plan will be integrated with other long range planning outreach activities. No separate public outreach meetings will be held.
- Provide status reports to boards, committees, and all levels of agency management
- Provide speakers for any requested presentations to community/civic groups. It is expected that comment cards or simple survey forms will be used as a means for documenting feedback from these groups.
- Interface with the media.
- Conduct stakeholder opinion survey of goods movement issues. The purpose of the survey will be to solicit opinions from a wide range of stakeholder groups (both public and private) concerning perspectives on the type and magnitude of goods movement problems and issues facing their agency or organization. The survey will focus on non-technical issues. The Contractor will be responsible for gathering technical data, some of which may reside with stakeholders being surveyed by the member agencies. The participating agencies will be responsible for distributing the surveys. The survey will also likely be posted in the Internet. Consultant assistance will be required for tabulation and reporting of survey results.
- Prepare periodic written project status reports, post on web site, and e-mail to stakeholders, and otherwise distribute copies as necessary.
- Identify materials to be posted on the project web site, and coordinate with Contractor for posting.

Contractor Outreach Activities and Meetings:

- Provide up to five PowerPoint presentations for agency staff to use at various stages in the project. Individual member agencies may adapt these presentations to specific stakeholder groups. The METRO Project Manager will make specific requests for the presentations.
- Make up to 30 presentations over the duration of contract. The METRO Project Manager in consultation with other agency staff will determine the need for a presentation by the Contractor. Typically, only the contract project manager will need to be involved in giving the presentation.
- Tabulate and report on up to 1,000 opinion surveys distributed and collected by agency staff.
- Provide information to the METRO Project Manager for the project website. Assist METRO in developing and maintaining the project web site. The participating agencies will provide links to the project web site.

- Attend and provide technical support at TAC meetings on a monthly basis and at Steering Committee meetings on a bi-monthly basis. The Contractor may be required to prepare technical handout materials for these meetings, depending on the nature of the meeting.
- Summarize comment cards received by member agencies as input from community/civic groups who request presentations.
- Prepare meeting notes and action items from committee meetings.

Deliverables:

- ***Tabulate Opinion Surveys***
- ***Summarize Comment Cards***
- ***Prepare Meeting Notes and Action Items***
- ***Technical Memorandum -Stakeholder Opinion Survey of Goods Movement Issues (Draft and Final)***

Task 3.0 Compile and Collect Goods Movement Data and Prepare Report

Existing data on the movement of goods will be compiled from throughout the Southern California region. It is the intent that data compiled in this task will be reported on a consistent basis from county to county (where county-level reporting is appropriate), to obtain region-wide and county-level trends. The data gathering will include a physical inventory of the principal goods movement systems in the region and of travel on those systems. A major objective will be identifying the location and magnitude of existing deficiencies on the freeways and railways within the region and within the logistics network in general. This will be accomplished by identifying known capacity deficiencies and the extent of delays experienced in various parts of the network. The assessment of the extent of delays will include the ports (sea and air), intermodal terminals, freeways, and rail lines, at a minimum.

The technical analysis of the freeway system will generally be limited to the freeway mainlines, but specific problems and issues on freeway interchanges and arterials also may need to be addressed, to the extent that these affect the regional flow of goods. Historical growth trends in truck traffic and rail freight also will be documented. Future deficiencies will be addressed in Task 4. **To a large extent, Task 3 will utilize existing and ongoing studies and data such as the SCAG Inland Empire Railroad Mainline Study, simulation modeling of the rail network and intermodal yards by Metrolink and the railroads, freeway traffic data from the Regional Transportation Monitoring and Information System, and modeling of the existing highway network by SCAG.**

Traffic volume data will be documented for trucks only (by type) and for total traffic. The traffic analysis will examine both peak period and off-peak demand and capacity. Though most traffic studies focus on peak period congestion, it is important for the analysis of goods movement to make an assessment of available existing and future off-peak capacity. Much of the movement of freight takes place in off-peak hours, and the analysis must evaluate the degree to which off-peak movement is constrained in both the existing and forecast conditions. Traffic data will be generated at the segment level and by peak period and direction, but will not be generated for individual interchanges, ramps, or intersections.
The Contractor shall work with the logistics industry, retailers/wholesalers, importers, the development community, real estate professionals, and local/regional agencies to compile a regional inventory of warehouse/distribution/transload centers. Estimates of historical and forecast square footage of warehousing/industrial/distribution/transload facilities shall be prepared. The purpose of this inventory is to better understand current industrial/warehouse/distribution development trends and how those trends are changing over time. It is intended that this inventory be developed through the exploration of existing and ongoing sources of data generated through these industries and member agencies.

However, targeted interviews with representatives of the industries and member agencies may be required to develop a more complete and comprehensive picture. The inventory should distinguish between facilities for domestic vs. transloaded international freight. Estimates of truck trip generation rates and truck trip lengths should be documented, where available. No new trip generation studies or surveys are requested as part of this project. The focus is on documenting what is available from existing public and private sources. The Contractor should make an assessment of the strengths and weaknesses of the various sources of data and where member agencies would benefit in the future from targeted new data collection programs. The goal of this activity is to better understand freight movements through these facilities, how these facilities are operated and planned, and the ramifications facility decisions have on the freight system regionally and locally.

The Contractor shall make contacts with the appropriate public and private agencies that collect and maintain data dealing with traffic and rail volume data on existing deficiencies and delays. The Contractor shall prepare a memorandum for the METRO Project Manager describing the data to be collected, the likely sources of the data, and the agencies to be contacted. The Contractor should generally describe a suggested data collection process in their proposals and how they intend to document existing constraints for goods movement on the rail and highway system. This should include specific types of performance measures that will be documented.

The Contractor shall also tabulate and report on the survey data collected as part of the outreach conducted by the sponsoring member agencies. It is anticipated that up to 1000 surveys will need to be tabulated and summarized. Agency staff will also provide the Contractor with notes from any interviews and meetings with stakeholders that are pertinent to the documentation of existing goods movement problems and issues. A technical memorandum shall be prepared summarizing the interviews and surveys, together with the technical data, and identifying goods movement issues and problems within the region.

Additional types of information expected to be gathered or generated in this task include:

- Estimate the magnitude of delays in various segments of the logistics network (ports sea side, ports land side, intermodal terminals, rail lines, and roadways).
- Provide examples of the impact of delays for a cross-section of industry types.
- Identify causes of delay, to the extent possible.
- Quantify existing annual goods movement (tonnage and value) by mode, origin and destination (County-level and to/from the region) and trends over the last five years.
- Quantify existing peak and off-peak traffic volumes and congestion levels by freeway segment and direction for freeways in the study area (use Caltrans volume data and/or PeMs data).
- Quantify peak and off-peak truck percentages (by truck type) on freeways in the study area.
- Document the physical constraints on expansion of the freeway system at a segment level (e.g. general characterization of right-of-way available for expansion, type and density of adjacent land uses, etc.).
- Document key environmental constraints that could affect the feasibility of improvements (based on readily available information).

Deliverables:

- ***Technical Memorandum Documenting Existing Conditions and Constraints in the Regional Goods Movement System (Draft and Final)***
- ***Technical Memorandum Summarizing Stakeholder Perspectives on Goods Movement Issues and Problems (Draft and Final)***

Task 4.0- Assess Growth in Freight Demand, Trends in the Logistics Industry and Baseline (2030) System Performance

The purpose of Task 4 is to conduct a critical review of forecasts of growth in freight demand, to understand the inter-relationships between this growth and trends in the logistics industry, and to make an assessment of future "baseline" system performance. For purposes of the Action Plan, baseline will be considered as year 2030, assuming only programmed and funded improvements from the RTP. It may also be appropriate to examine intermediate years, to define the estimated time periods in which constraints will be reached within various parts of the Southern California freight logistics system. Two types of forecasts will be prepared, one focusing on freight demand, and the other focusing on travel demand generated by the freight.

4.1 Analyze Freight Demand

Current forecasts of freight demand for Southern California shall be assembled. These shall be compared and analyzed, along with any additional data on economic growth projections, trends and forecasts of international trade, etc. A projection of freight demand by mode and by generalized origin/destination (i.e. to/from/within Southern California) shall be developed as the basis of further work in this project. It may be appropriate to express anticipated freight growth in terms of a range, rather than a single forecast, given the uncertainties involved in making these assessments.

The initial forecasts will be based on the assumption of no constraints in the infrastructure needed to service the demand. An assessment shall also be made of the potential effect of system constraints on future freight flows within and through the region. In addition, an assessment will be made of how operational decisions by the ports (air and sea), railroads, and others within the logistics industry may impact the constraints (e.g. the effect of expanding port hours on the goods movement demand by mode and time of day). The Contractor shall propose the specific scenarios to be examined in conducting the review of future baseline conditions and shall identify the type and sources of data needed to conduct the analysis. Some of this information is expected to be available from existing analyses. The Contractor shall document both existing and new analyses into a technical memorandum summarizing this assessment of freight demand to year 2030.

The assessment of freight demands shall also consider other trends in the logistics industry. These trends may include technological changes in the industry, trends in the manufacturing and distribution of goods, changes in the management of containers, impact of security issues, etc. These trends may have to do with technology, manufacturing and distribution processes, or geographic and modal choices being made by manufacturers, shippers, and others creating the demand for freight movement. The industry creates its own efficiencies over time and adjusts to constraints, to competition, to labor availability, etc. An assessment shall be made of how these changes and trends are likely to affect the need for publicly provided infrastructure and policy direction. The Contractor shall include a summary of these trends in the technical memorandum on freight demand. This shall include an assessment of the impact of the trends on infrastructure decisions for both the public and private sectors. **The Contractor may need to hold discussions or interviews with industry leaders within or outside Southern California to make this assessment. The Contractor shall review the approach to making this assessment with the METRO Project Manager.** The technical memorandum should identify the level of certainty associated with the identified trends and options that the public sector may have to facilitate trends that are in the interest of moving goods within and through Southern California.

4.2 Prepare Travel Demand Forecasts

A baseline travel demand forecast shall be prepared for both truck and rail, as well as passenger traffic, as the basis for the evaluation of future truck and rail volumes, as well as for the identification of system deficiencies. This analysis will assess not only capacity deficiencies in the rail and freeway mainlines, but deficiencies in other parts of the logistics system as well, including constraints in intermodal freight transfer facilities. The baseline forecasts will provide projections of traffic, truck, and rail volumes, and will also estimate delays that may occur on the freeway and rail system as a result, both peak and off-peak.

Baseline forecasts from the SCAG regional model, prepared for the 2004 RTP, will be used as a basis for the truck and traffic forecasts. The latest version of the SCAG Heavy Duty Truck Model shall be used. Modeling being conducted by Metrolink and the railroads and for the Inland Empire Railroad Mainline Study should be used as the starting point for the rail forecasts. No new models or modeling runs are anticipated in the baseline analysis, unless the Contractor believes them to be needed to address any of the questions identified in this task. Modeling runs will be required in the assessment of potential improvement strategies. Task 4 shall be conducted in coordination with modeling activities of other projects and studies in the area, such as the I-710 corridor study, the I-15 corridor study, and modeling of freeway traffic in all the counties. The Contractor shall use truck traffic data gathered in Task 3, along with an understanding of the model structure, to make an assessment of the SCAG Heavy Duty Truck Model's propensity to under-forecast or over-forecast in certain areas and to take those propensities into account in using the model for future year forecasting. The Contractor may recommend and implement adjustments to the model that would improve its usefulness for the development of the Action Plan. The Contractor's proposal should comment on how best to apply and/or adapt the SCAG Heavy Duty Truck Model to the needs of the Action Plan.

4.3 Prepare System Performance Report

The Contractor shall prepare a System Performance Report that thoroughly evaluates future baseline conditions and travel demand on the rail and freeway network. This assessment will identify future constraints in the rail and highway network for year 2030. It will also attempt to estimate intermediate years at which constraints will be reached on various parts of the system, including constraints at intermodal and freight handling facilities. The assessment of intermediate years is important to allow decision-makers to better understand the level of urgency that may be associated with specific parts of the goods movement infrastructure. The assessment will address both peak and off-peak conditions.

Deliverables:

- ***Technical Memorandum on Freight Demand (include how those demands may be affected by operational decisions, trends in the logistics industry, and compatibility with passenger traffic) (Draft and Final)***
- ***System Performance Report (Draft and Final)***

Task 5.0- Evaluate Economic, Environmental and Community Impact of Freight Movement Generators and Facilities (ports, intermodal facilities, industrial clusters, etc.)

Task 5 will provide an assessment of the impact of goods movement on several important aspects of life in Southern California: the economy, the quality of life in local communities, and the environment. Though most people acknowledge the need for trucks and trains, they also acknowledge that trucks and trains have a definite impact on life in the region, much of which is viewed to be negative. This is especially true of those who live near facilities that carry or handle substantial amounts of freight. The

positive aspects of goods movement to the economy are known to be an important reason for the growth and prosperity of Southern California, but the benefits are not easy to quantify.

5.1 Conduct Economic Analysis

A review shall be conducted of the anticipated economic benefits and impacts of the growth in freight movement within and through the Southern California region. The economic assessment shall be specific to the impact on Southern California in terms of job creation, wage scales, tax revenue, and the general fiscal health of communities within the region. It is recognized that there could be many dimensions to this analysis and that there are secondary and tertiary effects that could be investigated if such an analysis were to be fully comprehensive. It is not anticipated that every effect can be fully quantified. **However, the member agencies are interested in quantifying the primary effects and in understanding what other indirect effects may exist and whether those effects can be considered positive or negative.**

The Contractor shall prepare a memo to the METRO Project Manager outlining the proposed methodology for the economic analysis. The analysis should be designed to be conducted within the general level of effort identified for this component in the RFP It will be up to the Contractor to identify the bounds and limitations placed on the analysis. However, the analysis can be generally expected to include the following:

- Identify logistics-related jobs by county, by job type and by wage scale
- Identify the relationship between jobs, wages, business activity/expansion, and tax revenue and growth in freight. The relationships should be analyzed by general commodity class and origin/destination (i.e. to/from/within the region)
- Identify the economic benefit to the region for three levels of freight growth: low, medium, and high. The growth scenarios shall be proposed by the Contractor and approved by the Steering Committee prior to the analysis.
- Identify the potential costs to the region of each of the three goods movement growth scenarios. The analysis should quantify the direct costs (e.g. infrastructure required to accommodate the growth) and at least identify the nature and general magnitude of the indirect costs (e.g. air quality and health effects). The costs of infrastructure maintenance to local jurisdictions and to the State of California also will be estimated.

The member agencies are interested in an objective review of the relationship between the economy and the growth in goods movement, and in the financial obligations that this growth may place on the region. The analysis should assist the member agencies in quantifying the extent to which goods passing through Southern California represent a net economic cost to the region. A technical memorandum shall be prepared documenting the economic analysis. The Contractor's proposals should generally indicate the scope of economic analysis that can be accommodated within the identified level of effort.

5.2 Assess Environmental and Community Impacts

The evaluation of environmental and community impacts will identify locations around the region that present existing or potential impacts of freight movement on neighborhoods and quality of life. This may include, for example, locations along rail lines and freeways or where industrial and distribution uses abut residential communities. The types of impacts typically encountered within each of these settings will be documented (e.g. noise, visual, air quality, health effects, delays at rail crossings, etc.). This will serve as the basis for identifying mitigating strategies in Task 7. The intent is to identify

strategies that will allow orderly expansion of the goods movement infrastructure while minimizing impacts on the community.

A technical memorandum shall be prepared that documents the type, general location, and magnitude of the environmental and community impacts of goods movement. **A map shall be prepared highlighting the general location and type of impacts.**

Deliverables

- ***Technical Memorandum on the Economic Benefits and Costs of Growth in Goods Movement (Draft and Final)***
- ***Technical Memorandum on the Environmental and Community Impacts of Goods Movement (Draft and Final)***

Task 6.0- Identify and Evaluate Strategies for Improving the Movement of Goods (e.g. truck and rail, operational, infrastructure and policy; short, mid, and long-term)

Based on the data and analysis conducted in previous tasks, a wide range of transportation options will be investigated to address the identified issues, challenges and problems. Improvement needs will be identified in a broad, strategic sense, with consideration of all modes of travel, changes in policies and institutional arrangements, and possible private as well as public initiatives. The assessment will also address issues associated with user fees and other financing mechanisms for major infrastructure improvements and the operations/maintenance requirements to support them.

Improvement concepts may be formulated as a range of alternative strategies, from major infrastructure improvements to less costly operational, legislative, or policy initiatives. The concepts will address short-term, mid-term, and long-term time frames. The focus will be on improving mobility, reliability, and efficiency of goods movement, but also consider benefits to and impacts on passenger movement. The identification and evaluation of improvement concepts will build on work previously completed or in progress. **The Contractor shall catalogue previously conducted and ongoing efforts to evaluate goods movement strategies, so as to take advantage of work already available. This shall include work conducted by both the public and private sector**.

6.1 Define Strategy Evaluation Approach

The identification of concepts will be conducted in two stages. The first stage will identify a broad set of options and evaluate those options at a “screening” level. This first-stage evaluation will consider potential benefits, costs, and impacts in qualitative terms. The analysis will include an assessment of the extent to which the improvements will accommodate continued expansion of the ports, intermodal facilities, and the industrial/manufacturing sector in general. Technical data generated through existing or ongoing studies will be used as the basis for this evaluation, to the extent available. The results of the screening-level evaluation shall be documented in a technical memorandum.

A subset of those concepts will be identified for more detailed evaluation, based on initial evaluation results. The options to be pursued further will be recommended by representatives of the Steering Committee, base on discussions with agency executives and/or county-level policy bodies, as appropriate. Examples of strategies to be examined include:

- On-dock rail at ports
- Additional intermodal facilities

- Shuttle trains to additional intermodal terminals
- Addition of mainline rail capacity
- Modification of port hours
- Modification of delivery hours
- Construction of additional freeway lanes
- Construction of exclusive truck lanes (toll or free)
- Use of LCVs on dedicated facilities
- Construction of mixed-flow expressways, toll or free
- Program of highway-rail grade separations
- Extensive application of ITS technology for vehicle management and routing
- Operational techniques employed by private or public sector to optimize travel time for freight

The Contractor shall establish a set of criteria for evaluating the improvement concepts for each of the two stages of evaluation. The criteria at the screening level are expected to be more qualitative in nature. The criteria are expected to be more quantitative for the more detailed level of evaluation. The criteria for the detailed level of evaluation are expected to include such measures as: anticipated extent of modal diversion; change in congestion levels on freeways (peak and off-peak); changes in congestion level/delay on rail lines; changes in travel time or trip reliability; changes in trip times for freight from specific origins to specific destinations within or outside the region; regional vehicle miles of travel (for trucks and other traffic); and regional vehicle hours of travel. It is also expected that agency outreach efforts will solicit stakeholder input and feedback on the options (e.g. through comment cards, simple surveys, feedback from presentations, etc.). The Contractor will need to include stakeholder assessments and community impacts into the criteria and will be responsible for summarizing this input as part of the strategy evaluation process. The Contractor also will need to consider appropriate environmental criteria. The Contractor shall prepare a technical memorandum describing the initial alternatives and the evaluation criteria.

6.2 Evaluate Infrastructure Improvements (Capital and Non-Capital)

The potential role of major infrastructure projects (e.g. dedicated truck lanes, express facilities, use of additional HOV and mixed flow lanes, rail improvements, grade separations, intermodal facilities, inland port facilities, etc.) will be addressed in this project. The Contractor shall evaluate the general financial feasibility of full or partial truck lanes (toll or free) as an element of the regional goods movement infrastructure strategy. It is not the intent of this effort to establish a specific alignment for dedicated truck lanes and no conceptual geometric designs will be developed for specific facilities. However, it is hoped that the information generated in this study can lead to a regional consensus on whether and how dedicated truck lanes (full or partial, toll or free) should developed further. Some specific types of questions to be addressed include:

- To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? In other words, would they be a cost-effective investment?
- What portion of dedicated truck lane costs could be offset by user financing, and what additional revenues or funding sources would be needed to support dedicated truck lanes?
- What policy changes would facilitate or enhance truck lane feasibility? (e.g. LCV's, mandatory use, etc.)
- Can dedicated truck lanes offer sufficient benefits to be a preferable alternative to other ways of accommodating increased freight traffic (such as adding mixed-flow lanes, adding rail capacity, etc.)?

- What may be the differential effects of the construction of truck lanes on different sub-regions (i.e. the specific types of benefits and impacts that may occur to different sub-regions, depending on facility location)?

It is not expected that the Contractor will be responsible for facilitating a consensus on the truck lane issue. However, sufficient analysis should be generated to substantially inform the regional deliberations and discussion on the subject. To accomplish this, it is expected that several truck lane scenarios will need to be evaluated. This could include several conceptual truck lane scenarios that vary in location, toll levels, type of permitted vehicles, and location/level of access. Contractors would be expected to evaluate the following, at a minimum:

- Construction of continuous exclusive truck lanes (toll or free)
- Construction of exclusive truck lanes for spot locations or targeted segments of freeway
- Construction of toll truckways exclusively for longer combination vehicles in rural and/or urban areas of the region (i.e. as suggested by the Reason Public Policy Institute)
- Potential relationship of exclusive lane to alternative fuel technologies

The Contractor shall recommend a set of scenarios and evaluation methodology that will assist the member agencies in determining truck lane feasibility and possible range of costs (capital and operating). Other highway improvement scenarios not involving truck lanes may also need to be tested. Overall, it is anticipated that six to eight runs of the SCAG regional model will be required as part of this contract. For non-highway strategies, an appropriate off-model technique or other model-based method should be used. Contractors should comment on potential evaluation techniques in their proposals.

At a minimum, the following freeways and state highways will be considered within the Southern California region: I-5, I-10, SR-14, I-15, SR-22, I-40, SR- 30, SR-55, SR-57, SR-60, SR-86, SR-91, SR-101, I-105, I-110, SR-138, I-210, I-215, I-405, I-605 and I-710. Prior studies along these routes will be used to assist in defining potential improvements. **Challenges that would need to be surmounted to implement major mainline infrastructure improvements shall be highlighted. The analysis shall also identify strategies for working with the railroads and Metrolink to best utilize existing rail lines, and the feasibility planning and constructing intermodal and inland port facilities to address goods movements**. The results of the detailed-level evaluation shall be documented in a technical memorandum.

Estimates of capital, operations and maintenance costs will be developed for proposed capital and operational improvements. This will include an assessment of the extent to which any of the costs may be offset by revenue generated through user fees or other use-generated sources.

Deliverables:

- ***Technical Memorandum on Initial Goods Movement Strategies, Evaluation Criteria and Evaluation Methodology (Draft and Final)***
- ***Technical Memorandum on Evaluation of Initial Goods Movement Strategies (Draft and Final)***
- ***Technical Memorandum on Evaluation of Detailed Goods Movement Strategies (Draft and Final)***
- ***Cost Estimates for Proposed Capital and Freight Management Strategies/Improvements (Draft and Final)***

Task 7.0- Identify Strategies for Mitigating the Effect of Goods Movement on Local Communities and the Environment

Task 5.0 will have identified issues associated with potential community and environmental impacts of goods movement by geographic area. In Task 7, a set of strategies will be proposed for mitigating the effects of goods movement activities in general, and mitigating the potential effects of the proposed Task 6 strategies in particular. This is not intended as a CEQA-type analysis of mitigating strategies, nor will it identify specific obligations of individual member agencies. Rather, it is intended to delineate a range of approaches for dealing with the community impacts of goods movement. It will bring together a set of "good practices" that individual jurisdictions, transportation agencies, and the private sector can use to diminish the potential negative consequences of infrastructure projects and industrial/manufacturing development.

Examples of mitigating strategies may include: land use and traffic planning principles for industrial and manufacturing development (e.g. buffering, site layout, landscaping, circulation, lighting, clustering, special requirements for truck terminals and truck stops, etc.); noise mitigation techniques; visual mitigation techniques; pavement design and maintenance for local roadways in high-truck areas; highway-rail crossing mitigation, etc. The Contractor shall summarize the status of legislative and regulatory emission control efforts (truck, train, and ship) at the Federal, State, and regional level and shall relate that status to decisions on infrastructure, operational improvements, and associated impact mitigation. The Contractor shall monitor development of the 2007 South Coast AQMP, and estimate the likely range of allowable freight-related emissions consistent with the 2007 emission budgets for PM2.5 and 8-hour ozone. An estimate shall be made of the likely baseline freight-related emissions for the South Coast Basin based on current and reasonably foreseen regulation in comparison to the likely range of allowable emissions. From that comparison, the consultant shall identify the type and scale of freight-related air quality strategies likely to be required to attain the federal PM2.5 standard by 2014 and the 8-hour ozone standard by 2010 within the SCAB.

The product will be a technical memorandum containing a shopping list of strategies from which local jurisdictions, *developers*, and industrial employers may draw on for guidance in dealing with the impacts of goods movement.

Deliverable:

- ***Technical Memorandum on the Mitigation of the Community and Environmental Impacts of Goods Movement Activities (Draft and Final)***

Task 8.0 Develop Multi-County Goods Movement Action Plan Report and Identify Institutional/Funding Arrangements needed to Implement the Plan

The Contractor shall assemble the results of Tasks 1 through 7 into a Multi-County Goods Movement Action Plan report. The report is expected to be based largely on the technical memoranda prepared in prior tasks, with substantial agency input and guidance as to the strategies that should be included in the Action Plan. Up to five workshops shall be held with the participating agencies at the beginning of Task 8, with a focus on identifying the strategies that should be included in the Action Plan. The workshops will likely include a range of stakeholders representing a cross-section of public agencies and private sector representatives. The Contractor shall recommend a format for the workshops (or recommend an alternate approach) and work with agency staff to identify participants, location, timing, and other elements. Agency staff also will be responsible for communicating the findings of Tasks 1 through 7 with agency management and other stakeholders within their county and obtaining input from them that may be relevant to the formulation of the Action Plan.

The Contractor will begin the preparation of the draft Goods Movement Action Plan report following the workshops. The report will contain sections addressing goods movement actions for the region, as well as separate sections that address actions for individual counties. The individual county sections will be structured in a way that makes it easy for county transportation commissions to communicate county-specific actions to their decision-makers. The regional issues and issues common to the counties will be addressed in the regional sections.

Summary evaluation tables shall be prepared containing the following types of information:

- Strategy description
- Strategy type (i.e. infrastructure, operational, policy, etc.)
- Strategy performance and benefits (based on the evaluation criteria)
- Strategy impacts
- Cost of implementation (capital and operating)
- Potential implementation time frame (short, medium, long)
- Implementation responsibility
- Potential funding sources.

The summary tables shall have a regional element as well as county-specific elements. Each county transportation commission will assist the Contractor in preparing their respective county-level table.

Early-action strategies will be identified and be given additional attention in the implementation steps. Both traditional and non-traditional funding sources will be identified, such as:

- Jointly funded projects with freight industry stakeholders;
- User fee mechanisms;
- Truck and auto tolling; and
- Public/private partnerships.

Changes in institutional structures needed to implement specific strategies also shall be identified, and steps that need to be taken to make those changes shall be delineated. The Contractor shall prepare both a draft and final Action Plan report. Under the direction of the MCGMAP Steering Committee, the Contractor shall prepare a draft and final version of the Technical Memorandum for the Multi-County Goods Movement Action Plan Report. Preparation of the report will be closely coordinated with the Advisory Taskforce and will be supplemented by appropriate graphics and summary charts and tables. Copies of this memorandum shall be submitted to the MCGMAP Steering Committee, for review and approval, prior to distributing the report to others.

Deliverable:

- ***Multi-County Goods Movement Action Plan Report (Draft and Final)***

3. WORK PLAN

TASK 1 – PROJECT MANAGEMENT APPROACH

Project Manager - Arno Hart, the WSA Team Project Manager, will be responsible for directing and coordinating all activities associated with the MCGMAP. Mr. Hart will manage the administrative aspects of the project and will also have hands-on assignments in various tasks.

General Project Coordination - Mr. Hart will coordinate with Task Leaders at least bi-weekly, and if needed daily, to ensure that issues are being identified and the project is proceeding as planned. These efforts will focus on the following, as a minimum:

- Coordination Efforts
- Action items
- Staffing
- Progress
- Problems/Solutions
- Upcoming Tasks
- Budget Status
- Schedule
- Client Satisfaction

The information will be provided in more detail on a monthly basis and will include, but not be limited to, a summary of activities completed in the previous reporting period and identification of activities anticipated for the next period. The project schedule will be updated monthly to reflect progress on assignments.

Quality Assurance/Quality Control Program - Quality Assurance/Quality Control (QA/QC) on a project of the magnitude of MCGMAP is central to a successful work plan. We propose a very formal approach to quality management, one based on WSA's comprehensive experience in the management of a large multi-disciplinary team.

Effective quality management is accomplished by the systematic utilization of three key elements:
1. Quality-oriented personnel;
2. Comprehensive quality assurance program to verify compliance with prescribed procedures; and
3. Well-planned project quality control procedures.

Wilbur Smith Associates is committed to excellence in each of these three elements. The personnel nominated for the WSA Team are not only technically and managerially well qualified, but they are also oriented to quality management. Each has demonstrated a commitment to quality on past projects.

Roles for QA and QC – There are specific members of the team that will be responsible for QA and QC. The responsibility of QC will lie at the Project Manager and each of the Task Leaders. QC is implemented at the project deployment level on a day-to-day basis, whereby the Project Manager and Task Leaders ensure that the correct methods are used, that the level of effort is consistent with the needs of the client as well as the allotted budget, and that tasks are on schedule. The QA lies with the Principal-In-Charge who will assure through monthly periodic updates and checks with the Project Manager that all procedures are being followed. The Principal-In-Charge will also provide feedback and recommendations for improving the quality of the products.

Project Administration – While the Project Manager will manage the day to day operations of the project as well as the overall direction, the WSA Team will have a locally based Project Administrator with Metro project experience.

Progress Reports –Invoices for all work completed will be submitted monthly. Monthly progress reports will include:
- Activities, ongoing or completed, during the reporting period;
- Activities planned for the following month;

- Problems encountered and actions to remedy them; and,

Project Meetings – This PMP outlines the timing of all anticipated meetings with the Metro Project Manager (monthly), the TAC (monthly) and the Stakeholders Advisors Committee (bi-monthly). The WSA team will produce the support material needed for the meetings, as well as taking all meeting notes, summarizing the discussions, and outlining decisions and action items.

Agency Coordination – It is our understanding that in accordance with the RFP "Metro will serve as the lead agency by contracting for certain consulting services, coordinating the work and monitoring the overall progress of this effort. Public agency staff from member agencies will be represented on a Steering Committee and staff from appropriate quasi-public and private entities will provide input during the meetings and throughout the effort. A Technical Advisory Committee of agency staff will provide day-to-day oversight of the project. Steering Committee representatives will provide periodic progress updates to their agency executives, committees and boards." It is our understanding that the METRO Project Manager and the Steering Committee will be supported and assisted by the Contractor in coordinating and communicating with other member agencies based on the guidance from the WSA Team stakeholder involvement team. All correspondence and coordination will be handled through and with the concurrence of the Metro Project Manager. Communications will be through the TAC, unless otherwise directed. The WSA Team Project Manger will submit all written materials, letters, and survey forms used to solicit information or for data collection to the Metro Project Manager for review and acceptance before its use or distribution. Copies of all outgoing and incoming correspondence will be provided to the Metro Project Manager on a continuing basis. The release of any study related information will be approved by the Metro Project Manager.

Subconsultant Management - The WSA Team Project Manager will prepare subcontracts for Subconsultant's, monitor Subconsultant staff activities and adherence to schedules, review, and recommend approval of Subconsultant invoices. Subconsultant progress reports and invoices will be incorporated into the monthly study progress report.

Key Players

This task will be led by the Project Manager, Arno Hart, with support from Jennifer Anthony as the Project Administrator.

Task 2 – Community Outreach Program

Approach

Per the RFP, a specific set of tasks will be completed by the Member Agencies and a separate set of tasks will be completed by the contractor. This is defined as follows:

Member Agencies:

- Contact and e-mail lists
- Committee meeting notices
- Action Plan updates as they pertain to public outreach
- Status reports to boards, committees and any level of agency management
- Media relations
- Conduct stakeholder opinion survey
- Written reports, including web posting
- Identify materials for web posting

Contractor:

- PowerPoint presentation files (5)
- Presentations (30)

- Tabulate/report stakeholder opinion surveys
- Web postings
- Attend provide technical support at TAC and Steering Committee meetings
- Summarize public comment cards
- Prepare meeting notes/action items from committee meetings.

Methodology

Per the delineation of tasks above, The WSA Team will approach the specific tasks as follows:

PowerPoint Presentations - The WSA Team will prepare up to five (5) PowerPoint presentations on the Multi-County Goods Movement Plan to be used by the project team in presentations over the course of the project. Each presentation will be developed in concert with the project team and will include current and accurate information on the project. The presentations will utilize the latest graphic and textual information, and will be distributed electronically to all appropriate presenters.

Presentations - The WSA Team is quite experienced and capable of completing project presentations for staff as requested to community groups or committees. The WSA Team will utilize the latest and approved PowerPoint presentations. The WSA Team maintains its own public presentation equipment, including notebook computer, projection unit and screen.

Stakeholder Opinion Survey Tabulation - The WSA Team will tabulate completed stakeholder opinion surveys as conducted and completed by agencies' staff. All surveys will be inputted on Microsoft Excel, unless otherwise directed by the project team. From this tabulation, a summary report of results will be generated, including summary statistics and appropriate matrices of results.

Website Posting - The WSA Team will be responsible for ensuring that all appropriate public information from the project is posted to Metro's project website. This may include presentation materials, stakeholder opinion surveys, fact sheets, public comment sheets, or any other Metro-approved materials.

Committee Support - The WSA Team will attend and provide technical support at TAC meetings (monthly basis) and SAG meetings (bi-monthly basis). In addition, The WSA Team will be responsible for preparing technical handout materials for these meetings as directed by the project team.

Public Comment Cards - The WSA Team will be responsible for summarizing comment cards received by member agencies as input from community/civic groups who request presentations. All data will be documented appropriately, including any substantive comment, date, contact name and information. Further, substantive comments will be categorized appropriately for the project team review and processing.

Meeting Notes/Action Items - The WSA Team will be responsible for the documentation of comments from meetings at which The WSA Team staff are in attendance. Meeting notes will be prepared and action items will be identified. Meeting notes will be distributed to all team staff in attendance.

Key Players

This task will be led by Genoveva Arellano with Arellano Associates (AA) with support from staff at her firm. She will also be supported by Urban Solutions with over 20 years experience in providing public policy support for elected officials in the region.

TASK 3 COMPILE AND COLLECT GOODS MOVEMENT DATA AND PREPARE REPORT

Approach

Our overall approach is to use as much existing data as possible to piece together a complete goods movement picture for the region. As stated in the RFP, we intend to limit the amount of any efforts to collect original or new data to an isolated few cases, where needed. The premise for this approach is straightforward – a great deal of analysis has been conducted in the area of goods movement, enough so as to provide a good base load of information on the subject.

Methodology

Process – The RFP states that there will be some allowance for the Contractor to reach out to the respective public agencies and private sector entities to collect the relevant information. However the RFP outlines a specific process for coordinating with Metro Project Manager, including a memorandum outlining whom we intend to contact, and what information we intend to collect. We will comply with the prescribed process.

Our overall process is two pronged. The first prong will be the collection of information from public sector studies and reports. The second prong will be a focus on additional information from the private sector.

Identify and Compile Available Public Sector Sources – The first step is to determine the various different data sources. Normally, this could be a lengthy and difficult process. But we do not anticipate spending a great deal of resources tracking down and compiling a listing of all of these resources. SCAG has a web-based tabulation of goods movement studies and resources In addition, many of the WSA Team members have been actively involved in recently completed and ongoing goods movement studies. The bottom line to our approach is to start with what we already know, and whatever lists that have been complied, and to build on that.

Private Sector Data Outreach – The area that needs additional focus is on the private sector. Our approach is to determine the level to which the system is performing from the private sector's standpoint. The purpose is not to try to absorb and learn everything about their business (this could be a never ending process), but to determine what factors from their perspective should be taken into consideration in outlining the MCGMAP. This task will be approached on the basis that the top tier of supply chain segments in the region are relatively well known and documented. Several members of the WSA Team have conducted a variety of freight and logistics studies in the region and are very familiar with the local economy. Therefore, we propose to approach this task on the basis of tapping into the existing body of knowledge. We will do so by conducting a one day "WSA freight team charrette" that would include members of the WSA Team. The charrette will provide a forum for the parties to put forth candidate supply chain segments, and potential candidates to target. Our typical candidates for this type of process are the truck and rail carriers, shipping lines, warehouse/logistics operators, 3rd party logistics providers, the large retail shippers, industrial shippers, real estate professionals, as well as specialty operations such as transloaders. The following is a listing of the issues we will be isolating:

- **General Policy Opinions** - Issues such as reliability, diversion, fuel and engine technologies, pricing and tolling schemes, infrastructure innovations such as mass flow truck concepts, shuttles trains, inland ports, etc.
- **Infrastructure Supply/Demand Elasticities** - To what degree there exists a level of elasticity within the supply chain to accommodate current constraints within the transportation system, as well as the ability to accommodate future constraints. In other words, to what degree can the

supply chain accommodate further deterioration of the system, given existing funding constraints, and growing community concerns about the impact on the environment and quality of life.

- **Expected Performance Measures** - Determine the types of performance measures that are important to them – reliability, delay, cost, route circuity, level of service, asset turnover, labor optimization, etc.
- **System Utilization** – Where available, we will document information further defining industry's utilization of the system, current and future, including trip generation factors (much data exists on this), international versus domestic shares, transfer and transload factors, trip lengths, etc.

It is important to note that the WSA Team will focus this outreach effort for the purposes of the Action Plan, and not to gather reams of data typically associated with a survey or modeling exercise.

Targeted Analysis of Data – We use the term "targeted analysis" to get the point across that we do not propose to make this a detailed data analysis process – we are going to selectively target the various data sources looking for specific data, metrics, factors and information to use as part of the analysis to support the Action Plan. We are going to look for specific types of data, and look in the reports and databases where the respective data types are likely to be found.

Develop a Uniform Region-wide GIS Database – To facilitate analysis in subsequent tasks, the locations of goods movement facilities and infrastructure identified in this task will be electronically plotted at the county level and the multi-county regional level in a GIS format. This will establish the linkages across county lines, between the facilities and infrastructure elements to socio-economic, land use, environmental, and other databases. To ensure that as much data as possible is accessible through GIS, the WSA Team will manage the electronic cataloguing of all data gathered by the WSA Team and establish any necessary protocols for linking data. The GIS format and analysis tools also provide the means for generating mapping and other graphics for the study. Much of the data to develop the GIS tool will be sourced directly from the various agencies that develop GIS data in the region, including the Counties, SCAG and Caltrans. In other words, we do not intend to create new layers of GIS data, but rather use what is available. However, we do anticipate creating additional layers for relevant goods movement facilities that are not in GIS format. The mapping database will be used to compile and depict key goods movement related information such as goods movement flows and trends, location of goods movement intensive land-uses, system demand and capacity constraints, environmental issues, results from analytical exercises in later tasks, etc.

Key Players

This task will be led by Sam Morrissey (WSA) out the LA office with support from other WSA transportation planners and traffic engineers. In terms of the industry outreach piece, the team of Gill Hicks, George Fetty, John DeCesare and Jon Husing are the absolute ideal.

Important Note About Deliverables for Task 2 and Task 3

The scope of work (Section 2 of this PMP) outlines a Technical Memorandum Summarizing Stakeholders Opinions as part of Task Two, and a Technical Memorandum Summarizing Stakeholder Perspectives as a part of Task Three. Since there are several overlapping aspects between the two, we will produce both Tech Memos as a consolidated product.

TASK 4 ASSESS GROWTH IN FREIGHT DEMAND, TRENDS IN THE LOGISTICS INDUSTRY AND BASELINE (2030) SYSTEMS PERFORMANCE

Approach

The overall approach is to build on what we already know. The Task 3 write-up lists a variety of sources (studies, reports, surveys, etc.) all of which have some form of growth rates and trends that are the basis for their respective efforts. The Task 3 industry outreach efforts will also produce insights and data on trends, shifts, diversions, elasticities, growth factors, etc. All of this information will form a starting point. In addition, the WSA Team will tap into its bench of freight economists and planners who collectively have produced economic and goods movement forecasts at the national level (FHWA's Freight Analysis Framework), at the state level, at the MPO and regional level, and for individual facilities such as ports, intermodal yards, air cargo centers, as well as carriers.

Methodology for Task 4.1 – Analyze Freight Demand

The WSA Team will develop a comprehensive freight growth outlook for the region by piecing together the results of previous forecasts. We will stratify the forecasts across all modes (ports, rail, truck, air cargo, passenger), across key economic indicators (employment, GRP, output, imports, exports), across key sectors, where possible (manufacturing, trade, retail, transportation), across basic geographies (county, region, state, national, to, from, within, domestic, international). This multi-dimensional approach sets the stage for a "filling the gaps" process. As we gather the forecasts and drivers, we will categorize them accordingly, filling in the missing pieces. The objective would be to complete as much of the missing pieces as possible, so as to produce a complete picture.

Ranges/Scenarios –The forecasts will be developed in terms of ranges so as to allow for greater flexibility when evaluating the impact of the various scenarios in the subsequent tasks. The WSA Team will develop a set of scenarios that represent a range of outcomes based on our interpretations of the Task 3 data review and industry outreach process. Potential scenarios could include:

- **Unconstrained** – The starting point is a scenario based on zero constraints in the system, an acquiescent community and no environmental obstacles.
- **Operational Advances** – If our research and industry outreach reveals some likelihood that operational improvements will be deployed by industry (shippers, logistics providers, carriers, intermodal operators, stevedoring companies) this could become the basis for a scenario, or set of scenarios.
- **Cost Paradigm Shifts** – The impending shift in operating costs among the modes is a great unknown, and is something we will look into, including fuel costs, impact of emissions standards, driver shortages, asset and equipment balances, etc.
- **Diversions and Modal Elasticities** – The impact of mode shifts and diversion to other ports will need to be considered.
- **Global Production/Consumption (China)** – The changing global industrial complex and growing consumer base will likely continue to have an impact on forecasts.
- **Land Use Migration –** The fact that goods movement is generated from a small share of the region's land use is well documented, the migration of which (to the east and north) impacts local trip patterns. This will need to be considered in the forecast scenarios.
- **Industry's Response to Constraints –** One of the more commonly ignored factors/trends is industry's ability (agility) at responding to constraints, either by adapting and changing operations, or taking advantage of system redundancies (which have practically been eliminated by JIT processes), or by divesting to other locations/regions. This should be considered as part of this effort.

Prior to actually moving forward with the forecasts, the WSA Team will present the various scenarios to the Metro Project Manager for review.

Supplementary Data Sources – Based on our knowledge of the level of work that has been done in the region, on a variety of fronts (ports, rail, trucks, etc), we do not foresee the need to purchase supplementary forecast data. Moreover, SCAG may be purchasing trade and goods movement data from an outside vendor as part of the SCAG Heavy Duty Truck Model update. We are assuming that these data will be made available for this MCGMAP project.

Application of the Forecasts – The forecasts produced as part of this task will be used on several fronts throughout the course of the study. First, the forecasts provide a basis for the next task which will translate the forecasts into travel demand estimates (for the various modes), and to evaluate the impact of demand on the system, as well to measure the economic, environmental and community impacts. Second, the forecasts will provide backup material for subsequent tech memos and the final reports in terms of communicating the extent of expected expansion in goods movement through 2030. Third, the forecast will be the first real success in the region at providing a comprehensive outlook for goods movement (for all modes, for all sectors, and for the entire multi-county region). In effect, the forecasts will play an important role in unifying all of the MCGMAP participants as well as stakeholders around a single outlook for the future, and ultimately in support of a single MCGMAP.

Methodology for Task 4.2 – Prepare Travel Demand Forecasts

Use of Existing Models – The focus of this task will be on developing a set of travel demand forecasts for the region, with specific focus on the landside rail and highway (freeway) systems. We will tap into an existing body of travel demand models for both highways and rail. **This task is not intended as a model development exercise.** At most, we expect that the analysis will require application of the models in evaluating the scenarios (see Task 6). The rest of this section will outline our understanding of the existing highway and rail models.

Our Understanding of the SCAG HDT Model – Based on our experience with the SCAG's regional models, the SCAG HDT Model itself is TRANPLAN with customized components as well as spreadsheets tables that feed data into the model. In general:

- Special trip generation rates are applied by category (1-digit Industrial code) to get daily trips.
- A trip distribution module is used to generate daily O-D trip tables.
- Three weight categories by Gross Vehicle Weight (GVW) per Air Resources Board (ARB):
    - Light-Heavy – 8,500 to 14,000 GVW
    - Medium-Heavy – 14,000 to 33,000 GVW
    - Heavy-Heavy – Over 33,000 GVW
- Time-of-day factors based on California Weigh-in-Motion data are used to allocate trips to the four assignment time periods used for overall traffic.
- The four assignment time periods are AM (6-9), Midday (9-15), PM (15-19) and Night (19-6).
- Trucks are converted to Passenger Car Equivalents (PCE) and merged with non-truck traffic prior to entering the assignment stream.

Efforts to Update the HDT Model – SCAG is in the process of starting a large effort to update the model. The update will attempt to improve some of the issues alluded to in the MCGMAP RFP, specifically to incorporate the new expanded modeling area, improve the External Truck Model, improve the Internal Truck Trip Generation and Distribution Models and to improve the trip assignment methodology. However, over half of the effort will be on collecting new truck trip data to improve Internal Truck Trip Generation and Distribution components. This is where the largest challenges are with using the SCAG HDT Model.

Use of the SCAG Heavy Duty Truck Model in Developing the MCGMAP – The RFP places heavy emphasis on the HDT Model as a source of data in developing the MCGMAP, and also asks for comments

on how best to apply the model. In order for the MCGMAP to be credible, it must be based on credible data and models. Here are some of the issues we feel should be addressed (through the concurrent HDT Model update and not this MCGMAP) in order for it to be used as a basis for the MCGMAP:

- **Good Handle on External Trips** – The HDT Model generally has an accurate assessment of external related trips, although there is some tendency to overestimate these trips. This is because the source of this data is typically available from vendors that produce commercial-grade data on intercity freight flows (these products are made for the carrier industry using data provided by the carriers and therefore is relatively accurate). At the very least these data should be updated using sources such as WEFA, DRI/McGraw Hill and Reebie Associates.
- **Not So Good Handle on Internal Trips** – The HDT tends to underestimate internal trips, and does so on an inconsistent basis. Hence the reason for focusing on this area for the update. We recommend that the following three areas be improved (through the correct HDT model update):
    - **Tier 1 - Update the Port Traffic Data** – The Ports of Long Beach/Los Angeles are currently conducting a Transportation Study and Data Update. The effort will not only improve the forecast of volumes, but will pay special focus on the distribution of the trips and the O/D's inland. This data should be incorporated into the HDT Model.
    - **Tier 2 – Take into Account the Intermodal Yards –** The HDT Model update should specifically identify and treat traffic generated at the intermodal yards. One source for this is the ongoing Truck/Freight Modeling Framework by MTA which is going to collect data at the 6 largest intermodal centers in the region.
    - **Tier 3 - Better Focus on Warehouse/Logistics Intensive TAZ's –** Traditional methods of focusing on employment and population land uses to estimate work based trips is insufficient for HDT models. We would want to see that TAZ's with high concentrations of warehouse logistics activities (e.g. along SR 60) have trip generator factors that take into account trip generation based on square-footage and not employment. We are not aware of any outside effort to update this element and will likely have to completed as part of the HDT Model contract.
    - **Tier 4 – General Retail and Services Traffic –** The component that is least understood are the flow of services trucks (a large component of the internal trips) and retail/restaurant/tourism/hotel oriented deliveries. We are not aware of any outside effort to update this element and will likely have to completed as part of the HDT Model contract.

Nonetheless, the HDT Model is the most comprehensive regional model and is therefore the best tool to use. However, because it is the only likely alternative, it's weaknesses are well known and scrutinized. If the HDT Model is to be used to provide some of the data and information for the MCGMAP, it is essential that the aforementioned issues be addressed first by the concurrent HDT Model update.

The Regional Rail Models – There are at least three options when it comes to the analysis of rail capacity in the region.

- **Inland Mainline Rail Capacity Study** – George Fetty (as well as Gill Hicks) played a signicant role in the development of the Inland Mainline Rail Capacity model. We will therefore use the data and results and recommendation froms this study effort as part of the rail demand analysis.
- **OCTA Commuter Rail Strategic Assessment** and the **Metrolink Commuter Rail Strategic Assessment** - Justin Fox with WSA ran these projects that produced a set of rail capacity models for the entire region. These models will be an important basis for this study. Because commuter rail services typically run on freight lines, the commuter rail capacity analysis for both these studies were, in effect, an analysis of freight rail capacity in the region. All Metrolink partners (the five counties services by Metrolink) are project partners.

- **Intermodal and Rail Yard Capacity Models** – The RFP makes reference to ongoing efforts by the railroad carriers to evaluate rail capacity at their respective yards, as well as new yards. WSA has license and uses the RTC Model, which as the same model used by the western railroads (UP and BNSF). We will therefore be able to easily incorporate and interpret the railroads' own data.

4.3 - Prepare System Performance Report

The WSA Team will prepare a Systems Performance Report once Task 4.2 is completed. There is a tendency for these types of reports to be thick, loaded with tables and data, and very difficult to read and draw conclusions from. Our approach is to produce a concise document organized to highlight the key constraints. In other words, while we will report on the constraints for each of the respective modes, we do not propose to organize the report around the modes. This approach, although it seems logical, offers an opportunity for the authors to data dump facts and figures about the respective modes. We propose to organize the report around the specific constraints and issues that need to be highlighted. The report will build a case around the issues so as to properly set the stage for the subsequent tasks. We will use the systems performance data as a means for communicating the central issues. A determination of what the key issues are will be made based on the analysis, and a table of contents and outline will be produced and presented it to Metro Project Manager for review and approval. The report will report on constraints for year 2030, as well as intermediate years (possibly 2010 and 2020). However, we will reserve selecting the actual intermediate years until we are comfortable that these periods coincide with the timing of when the key constraints occur.

Key Players

This task will be led by Arno Hart. He will be supported by a deep bench of modal experts, analysts and travel demand modelers, including George Fetty, Jon DeCesare, Gill Hicks, John Husing, Jose Farran, Gary Stevens and Chandler Duncan.

TASK 5 EVALUATE ECONOMIC, ENVIRONMENTAL AND COMMUNITY IMPACT OF FREIGHT MOVEMENT GENERATORS AND FACILITIES

Approach

The overall approach is to focus on the existing body of knowledge on this subject, as much as is possible, and to develop as much new evidence as possible. Once the economic, environmental and community impact of the goods movement sector's expansion have been documented, as well as the costs of the infrastructure needed to accommodate the sector's growth and its environmental and health side-effects, the data will show the dimension of the challenges facing the region. At that point, recommendations about the feasibility and advisability of strategies affecting the sector can be made. All of the work outlined in this task would ultimately lead to two technical memoranda with extensive technical appendices documenting and explaining in detail each step of the analysis.

Methodology for Task 51. – Conduct Economic Analysis

In discussing the goods movement industry, the key problem is the "common wisdom" that the sector provides low paying dead-end jobs and uses huge facilities that provide very few jobs per square foot of space. Further, many believe that in exchange for such limited economic rewards, the sectors saturate our transportation infrastructure and cause enormous health difficulties from diesel fumes. It is also commonly believed that the primary beneficiaries of the logistics sector are consumers outside of California who benefit from low cost imported goods while paying nothing for Southern California's overburdened infrastructure. On the other hand, statements that the goods movement sector benefits Southern California's economy are generally so vague as to offer no answer to these objections.

Here is a clear case where an objective analysis can shed light on the truth or falsehood of the "common wisdom." In the process, it can also more clearly define the exact economic benefits and costs of the sector to Southern California's economy. In doing so, the analysis must be clear, precise and defensible because the stakes are enormous.

Economic Contribution - In looking at the positive economic contribution of the logistics industry to the Southern California economy, the following are the areas which must be investigated:

- **Goods Movement Narrative.** The starting point is to clearly describe how goods move through Southern California's logistics system. This is a necessary framework for any analysis as it provides a snapshot of how the various goods movement activities interact between sectors and across Southern California's counties. There has been sufficient discussion involving the players in this process to allow a clear picture. However, it is not enough to simply talk about the fact that goods are generated at the ports, airports and manufacturing facilities and move by sea, air, train and truck. Rather, it is important to discuss and quantify nuances of the process such as (but not limited to):
  - The share of goods movement that is domestically versus port generated
  - The share of air cargo moving by dedicated air cargo carriers versus in the bellies of passenger aircraft
  - The movement of empty containers and the economics of that movement
  - The use of cross docks to assemble LTL (less than load) shipments into full containers
  - The extent goods leave the ports and are used in Southern California
  - The extent goods leaving the ports go directly to other states by truck or train and add little to the local economy
  - The extent goods leaving the ports are first subject to consolidation activities at local intermodal yards before leaving, adding somewhat more to the local economy
  - The extent to which goods leaving the area first go to inland warehouses before leaving, adding quite a bit to the local economy

- **Define And Quantify The Logistics Sector.** Unfortunately, the logistics group of economic functions exploded on to the scene after the creation of the NAICS industry codes. There is thus really no logistics "sector" but rather a collection of activities that have suddenly been forced to live closely together as they have grown very rapidly. These activities include sea, air, rail and truck transportation; wholesale trade and warehousing; and ancillary support functions ranging from blue collar stevedoring and truck towing to white collar freight forwarding and supply chain management. They have been thrown together because of the advent of "just in time inventory" control systems plus the explosion of Asian trade.

The CA Employment Development Department has good historical summary data on each of the relevant sectors showing employment by NAICS category. ES 202 data allows this to be broken out by specific companies giving payroll and employment provided it is treated confidentially and only released under EDD security rules. Within each NAICS group, EDD has strong data that show the current breakdown of the share of jobs in each occupational category by OES code. They further have good information on the average pay and entry level pay plus the educational requirements for each occupational code.

These data are available by county and allow a look at the current and changing state of the "sector" and its pieces at that level of geography. This is important because there is a fear that the employment benefits of the sector will be found in the inland counties while the most negative health and environmental difficulties will be found near the ports as well as along the freeways and rail arteries connecting them to the inland area.

Compare Logistics to Other Sectors - A key issue for our society is how to provide upward social mobility to the 46.8% of the Southern California's adult population that has not had a single college class. This problem is particularly acute in light of the demise of manufacturing as a major growth force. The data can be used to show how the logistics sector's pay scales compare to those in other sectors in each of Southern California's counties. It is also possible to see how employment and pay levels in the logistics sectors in each county are changing over time. Fortunately, the data is of sufficient detail to take into account pay levels by educational requirement. This is important as it makes it possible to see how payroll in the various logistics sectors is distributed between high paying and lower paying jobs. This is an important consideration in assessing whether these sectors can truly serve as routes to upward income mobility for the majority of their workers.

Skill Ladders and Education - In each county, a key question is whether entry level pay in the logistics group of sectors is sufficiently high to make them a good replacement for manufacturing for blue collar workers. Another is whether in each county, the sectors have the requisite job ladders that would allow marginally educated workers to attain rising standards of living through on-the-job learning. EDD's information is of sufficient detail to allow this to occur. As a result, it will allow the analysis to answer the question of exactly who will benefit from the sector, by how much and in what geographic areas.

Meanwhile, an important side effect of this research will be to create information on the types of jobs and job skills necessary for the sector to deliver the maximum economic value to the Southern California economy and its workers. This information will be invaluable in alerting adult schools, regional occupational programs, community colleges, four-year colleges and universities, extension programs and private schools to the kind of training they must be prepared to deliver.

Jobs per Square Foot. Given the very large size of modern logistics facilities, it is necessary to create data on the number of jobs being created per square foot of goods movement activities versus other functions in the economy. Data can be derived on this subject from Southern California's commercial brokerage firms. Dr. John Husing has compiled these data for the new facilities that have been built in the Inland Empire since 1994.

Demand Drivers - Given an understanding of geographic and employment structure of the logistics sector, the next important question involves its future. Here, it is necessary to understand the trends in demand that have and will drive the sector in Southern California. This means looking at the trends among logistics demand drivers and the reasons for them:

- Port container volume. These data are available from the ports with estimates by type of merchandise.
- Port break bulk cargo tonnage. These data are available from the ports with estimates by type of merchandise.
- Air cargo tonnage. These data are available from the airline industry with estimates by type of merchandise by airport.
- Domestic e-commerce. These data are sketchy except at the national level.
- Southern California manufacturing. These data are available by sector through the Department of Commerce by county.
- Southern California's population growth. Good data is available from a variety of sources including SCAG and the CA Department of Finance by county.
- Southern California's retail volume. Good data is available from the CA Board of Equalization by county.

- The falling inventory/sales ratio through the use of just-in-time inventory systems. For these data, the national averages from the Bureau of the Census would have to be applied to Southern California.

Economic Activity - Given the increase in demand for logistics services, it will possible to estimate the share of Southern California's economic activity that can be attributed to the sector. This an important consideration as it will show, beyond employment, what share of the region's activity can be attributable to the sector group. Here, the RIMS II or IMPLAN models of the economy can be used. These models allow an analysis of how a change in any given variable such as an increase in automobile imports or pharmaceutical production would impact the sectors that comprise the logistics group.

These same models are designed to further provide estimates of the "multiplier" impacts that shifts in demand variables will have as the money they directly bring into Southern California economy creates indirect and induced increases in the region's economy, job base and household income. Here, the analysis is similar to that of a gold mining town in the Old West. There, miners shipped away the gold and directly brought fresh dollars to town. This is the equivalent of the money that logistics brings to Southern California. When the miners re-spent the same dollars at the local general store on tools or the saloon on entertainment, they created an indirect and/or induced increase in the town's economy. That is what the "multipliers" show once the logistics group brings fresh dollars into Southern California.

Origination & Destination - To truly understand and create policies with regards to Southern California's logistics sector, it is important to know where merchandise first arrives or is generated and where it then goes. The arrival or creation of goods can be determined from port, airport and manufacturing data. Unfortunately, one of the least understood aspects of Southern California's logistics sector is where classes of goods flow after they arrive or are created. However, those facts are very important. For instance, it would be useful to know to what extent goods stored in the inland region are being driven across Los Angeles County so they can fly out of LAX. Or again, when LAWA attempts to interest an air cargo carrier in Ontario International Airport, it would be helpful to know the extent to which the goods being stored in the inland region's warehouses can be expected to leave by air cargo carrier. Some research on these questions has been completed for SCAG, the Alameda Corridor Transportation Authority, LAWA and the railroads. The first stage in researching this issue will be to compile all of the existing data that is available. Next, the missing pieces need to be determined. Finally, basic origination and destination work will have to be done.

Construction - Southern California's logistics group will not be able to achieve its full economic benefits for the region without a dramatic increase in the quantity and quality of the infrastructure serving the sector. This is likely to include dedicated truck lanes, double and triple tracking of rail corridors, rail grade separations, additional intermodal rail yard capability, expanded port cargo handling capacity, increased airport cargo capability and probably a dedicated short haul rail line to move international freight to inland areas. Depending upon the growth scenario assumed and the financing mechanism for it, there will be thousands of construction jobs created. This impact can be estimated using standard formulas for infra-structure projects. Further, the strong multiplier impacts of this sector can be estimated using the RIMS II or IMPLAN modeling mentioned earlier.

Economic & Tax Benefit By County Under Varying Volume Scenarios - Given the development of the information discussed above, the modeling will allow the benefits of in-creased logistics activity at various levels of activity to be determined. This would include an analysis of the number and kinds of jobs in logistics and construction at various pay scales in each county. It would include the impact on total economic activity, household income and jobs in the various counties. It would also include the

impact on tax revenues to the governmental sector at the state, regional and county level because of the jobs, income and economic activity that would accompany the sector's growth.

Economic Cost - In looking at the economic cost of allowing the logistics industry of Southern California to expand, the following are the areas which must be investigated:

- **Infrastructure Cost**. As indicated, Southern California's logistics group will not be able to achieve its full economic benefits for the region without a significant investment in the infrastructure serving the sector, as well as the cost of maintaining it. Again, this is likely to include:
  - Dedicated truck lanes
  - Double and triple tracking of rail corridors
  - Rail grade separations
  - Additional intermodal rail yard capability
  - Expanded port cargo handling capacity
  - Increased airport cargo capability
  - A dedicated short haul rail line
  - Increasing the efficiency of the existing and expand systems (e.g. Pier Pass).

The cost of these projects and activities will be significant and can be estimated by defining the infrastructure and using industry estimates of the cost of building it. The same is true with maintenance activities.

- **Infrastructure Finance -** Undoubtedly, the cost figures will be more than either Southern California's governmental sector or the state will be able to bear. As a result, the analysis must explore the extent to which this burden can be shared. For instance:
  - The trucking industry might be given an upside profit interest in helping finance a dedicated truck corridor by allowing them to triple-trailer and drive at higher speeds while using it.
  - An estimate also needs to be made of the extent to which container fees could be used to help pay for the expansion of the rail system.
  - A look is needed at the U.S. government's responsibility to fund some of these improvements as part of a federal foreign trade and logistics infrastructure strategy.

In making these estimates, an important consideration will be the elasticity" of demand for various logistics functions in Southern California. Put another way, if the cost of a logistics services in the region goes up, an estimate needs to be made of the extent that will drive demand to other regions. Fortunately, SCAG has commissioned such a study and it is nearing completion. That work will need to be integrated into the infrastructure finance discussion.

Best Practices. One of the issues that has arisen with the logistics industry is the degree to which it is made up of entities that really do not know one another well, do not appreciate each others issues and do not work as a coordinated sector. This is evident, for instance, at the ports. To name a few issues:

- Some retail shippers find it convenient to allow their containers to clog scarce dock space as a form of free storage.
- Trucks can only turn round one load per day due to the inefficiency of connecting them to the containers they are contracted to haul.
- Major truckers will not serve the ports as it is not profitable, leaving the jobs to entrepreneur drivers with the oldest and most polluting equipment.

A full documentation of these issues would be included in the analysis. It may point to the need for a neutral party to be the catalyst for solving these types of intersectoral issues. An example would be a public private agency charged with bringing the numerous parties together to jointly serve the industry's and the public's interest.

Diesel - Ultimately, the jugular vein of the logistics sector will be its ability to handle the health effects of diesel emissions. The environmental movement in California is sufficiently strong to prevent the goods movement sector from expanding if the diesel and health issues are not addressed along with the building of the infrastructure for it. Attention needs to be paid to the research on the cost of the health aspects of the growth of the industry and the methods and cost of addressing them. Ultimately, this will be the cost of speeding up the implementation strategies of clean fuel technologies. Associated with this will be the benefits of reducing congestion and vehicle idling through investment in the infrastructure needed to accommodate and get ahead of the industry's growth.

Methodology for Task 5.2 – Assess Environmental and Community Impacts

Using the GIS data sets developed in Task 3.0, and the menu of potential environmental and community impacts to be assessed determined by the TAC (also in Task 3.0), the WSA Team will perform a general impact assessment of the proposed goods movement growth strategies.

The analysis will generally estimate the effects of goods movement expansion based on the environmental impacts that have been identified associated with previous transportation projects in the region, show the locations and types of impacts that would be likely to occur. Examples of completed projects that would provide guidance on expected impacts (and public concerns) are the Alameda Corridor, Alameda Corridor East, and I-405 widening. The development of rail yards for MTA and Metrolink also yield considerable information on the impacts of such facilities. Preliminary impact analyses for the I-710 Major Corridor Study and the SR 60 Truck Feasibility Study also provide sound data for identifying anticipated impacts. We know from these projects and studies, and from the public outreach efforts that have accompanied them, that the major impacts and public concerns for transportation projects are property acquisition/displacement, noise impacts, traffic impacts, and air quality concerns.

To help clearly convey impacts, the analysis would highlight the anticipated incremental change from existing conditions for a handful of specific target areas identified by the TAC. Analysis of a few representative areas is a reasonable way to provide information to the public and decision makers about what would be expected if strategies were implemented. By profiling the impacts of a target area, which represents conditions that can be found in many other locations throughout the region, one can readily begin to visualize how the effects would apply in another city. For instance, for a freeway improvement in a selected representative community, the existing condition would be a set of land uses and community facilities bordering the freeway that are subject to air and noise impacts associated with current traffic volumes and mixture of car and truck traffic. For a proposed strategy and associated improvements (i.e., the set of physical and operational changes needed to implement the strategy), the analysis might show that right of way expansion would result in the loss of X acres of various types of land use, remove or have an impact on Y number of community facilities, and that the new conditions bordering the freeway would be composed on Z land uses and community facilities. For the Z condition, we would identify the new environmental context to which inhabitants would be exposed—areas or facilities newly subject to noise or to higher levels of air pollution. Changes in traffic on arterials can be noted, either quantitatively or qualitatively. Information would typically be presented on annotated maps (showing the areas of change) and in tabular summaries. A key intent of this approach is to provide a realistic identification of impacts that are based on real-world projects, rather there fostering speculation or perhaps unwarranted exaggeration.

Since detailed plans for improvements will not be prepared, it is important that impacts will be stated in a generalized way, tending toward worst-case scenarios. It would be disingenuous to under-report potential impacts, even inadvertently, since environmental impacts are to be concurrently considered by the region in defining and adopting good movement strategies. It is equally important that impacts not be overstated. To accomplish a realistic, balanced view, rule of thumb impact thresholds that would be accepted in the public arena will be established in consultation with the TAC. For instance, a detailed noise impact analysis would need to take into account changes in car/truck percentages in traffic volumes, topography, shielding offered by existing buildings, actual counts of sensitive receptors, and a host of other specific data. Since such information will not be available, it would be reasonable to establish a zone adjoining a freeway within which is can be assumed that noise impacts would be likely to occur and to use that zone as the basis for estimating noise impact, based on the overlaying of that zone onto land use maps. The result would be a reporting of the number of adjoining acres of noise-sensitive land uses (e.g., residential, schools, public facilities, parks and open space) that would be affected. Where GIS data sources indicate specific noise-sensitive facilities, these will be called out.

One of the most sensitive environmental impacts in the public mind is property acquisition and accompanying displacements. Often the first question asked at a pubic information meeting is whether the person's property is to be acquired. How this information is assessed and conveyed requires very thoughtful communication. Even when impacts are described as 'potential', 'conceptual', 'draft', or 'subject to change', if a line appears on a map that seems to affect a property, the owner often assumes that an acquisition is definite (and that they will not be adequately compensated). Given that detailed plans will not be developed, an accurate count of likely–to-be-affected properties cannot be developed. Using the zone approach works well from a technical perspective as an effective way for accumulating data, but input from the TAC are needed in how to describe acquisitions to the public.

In addition to setting a zone width for noise impacts, establishing the zone of (assumed) impact for air quality and health effects will be one of the critical issues to be determined by the TAC. Unlike noise impacts, for which there are well-established protocols for calculating impacts for highway and rail projects and decades worth of data that can be used to define a reasonable zone, such circumstances do not exist for air quality and related health effects. A time-critical activity will be for the TAC to establish the width of this zone. It is recommended that a subgroup of the TAC work with the South Coast Air Quality Management District to define the zone and to specify the air quality impacts, specific pollutants and health risks that are assumed to occur within the zone.

Impacts can be tabulated and summarized in a variety of means. It is recommended that tabular information be assembled on a city boundary basis, but be summarized and reported on a corridor, county and regional basis. Information by city would be provided as an electronic appendix (i.e, on disk only) to the technical report. For the target, representative areas described above, impacts would also be discussed on a qualitative basis, supported by mapping and other graphics.

It will also be time critical for the TAC to determine the level of mapping of impacts that are to be presented in the Action Plan. With the hundreds of miles of freeway and rail network in the region, it is impractical to present detailed mapping along each goods movement route in a printed format- the result would be many hundreds of maps. The results of GIS mapping will be saved in electronic formats that can be viewed using readily available software, such as Adobe Acrobat Reader. For the Action Plan, it is assumed that regional and county maps will be prepared that illustrate the general locations of environmental impacts for each of the proposed strategies. The goal of such mapping will be to assist readers to graphically identify the general areas of similarity and differences among strategies. For instance, for it be readily discerned that Strategy A has impacts on Freeway X and in rail corridor Z, while Strategy C has minimal impacts of

Freeway X, but impacts on rail corridors W and Z. The locations of new facilities would be shown on regional and county maps.

Key Players

This task will be led by two individuals. Task 5.1 will be led by John Husing, PhD who is one of the most widely recognized economists in the field of freight and logistics in the region. He will be supported by WSA's economists including Arno Hart, Paula Dowell and Eric McClellan. Task 5.2 will be conducted entirely by Jones and Stokes (specifically the Myra Frank arm of the company based in Los Angeles). The task leader is Steven Brooks who has led numerous environmental studies for goods movement projects in the region He will be supported entirely by a local team of Jones and Stokes planners and scientists including Dan Henderson, Jack Ottaway and Susan Steed Wilson.

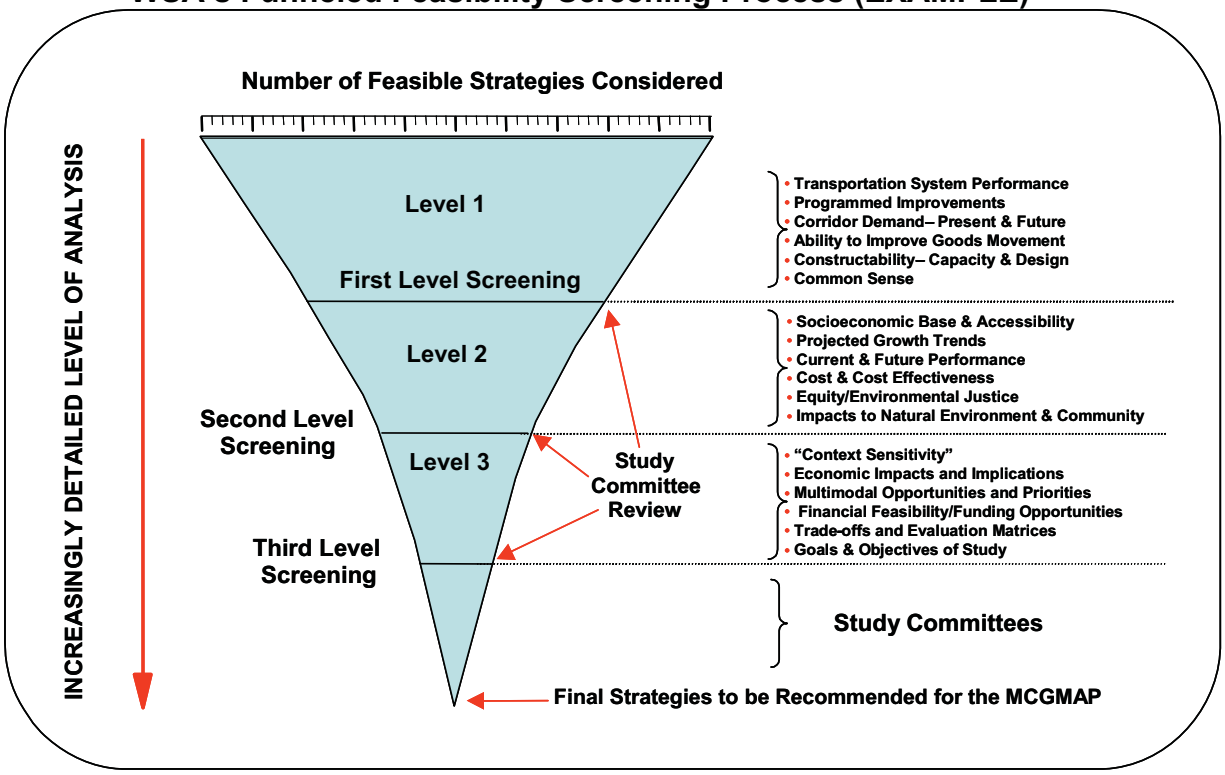
TASK 6 IDENTIFY AND EVALUATE STRATEGIES FOR IMPROVING THE MOVEMENT OF GOODS

Approach

This is exactly the type of task that WSA excels at. We have perfected a process for screening alternatives for numerous major projects over the years. Our approach is to start with the full range of possible alternatives, regardless of their perceived merit. The study process through the previous tasks will no doubt produce a great deal of strategies, including infrastructure projects, as well operational, legislative and policy based. Many will come from stakeholders, both private and public, who would likely have studied, or be in the process of being studied, and would request inclusion in this MCGMAP process. Some strategies will be identified by the Steering Committee in coordination with participating and contributing Agencies. This is where a streamlined process for evaluating and screening is critical, offering a fair and transparent means for working through the solutions, until the ones that bear greatest merit and/or opportunity are identified and supported.

To make the assessment process more manageable it is suggested that a three-step "screening process" be followed. As depicted in the following graphic funnel, the idea is to evaluate alternative scenarios using a consistent and uniform set of criteria, eliminating some on this basis and focus on those remaining using more detailed criteria.

WSA's Funneled Feasibility Screening Process (EXAMPLE)



The WSA Team will also review recently produced goods movement actions plans to identify specific strategies that should be considered for evaluation as part of this task, specifically:

- Southern California Regional Strategy for Goods Movement (February 2005);
- Goods Movement Action Plan for the State of California (March 2005).

Methodology for Task 6.1 – Define Study Evaluation Approach

This task is the critical first step toward defining the overall framework for the alternatives analysis. In other words, what will be evaluated, and by what measures will they be determined as feasible. While it is premature for this proposal to define the actual Action Plan, this WSA Team proposal puts forward a process we have perfected. WSA has developed a decision tree screening process for other projects which will be modified and applied to this task.

The key to this task is for the WSA Team to work with the Metro Project Manager, the TAC and the Steering Committee to define the variables that will go into the screening process. The variables are what provide the definitional framework for what the strategies are and the measures used to determine feasibility.

For this initial screening process, we do not expect to conduct a great deal of analysis for each of the strategies to be screened. We will use data and results from previous and ongoing studies as the means for screening the alternatives. For this reason, it is likely that we will recommend a standard set of criteria that generally reflect the following objectives: improving the mobility, reliability and efficiency of goods movement in the region.

Once the initial screening process is completed we will conduct a more detailed level of analysis on a subset of alternatives that the Metro Project Manager, the TAC and the Steering Committee deem more worthy of further analysis. It is likely that many of the alternatives that are part of the subset (for further analysis) made it through the initial screening process. The following exhibit shows a matrix we have used for previous projects. We will create a similar matrix for this task, outlining all of the criteria and performance measures that will be applied.

EXAMPLE OF AN EVALUATION CRITERIA MATRIX

ANALYSIS OF STRATEGIES							
ANALYSIS LEVEL	Transportation System Performance	Travel Efficiency	Economic Development	Cost & Cost Effectiveness	Natural Environment Impacts	Engineering Issues	Public Acceptability
1 STRATEGIC OPTIONS	Existing Traffic	Distance	Opportunities	Const. Types Unit Costs	Issues Identification	Constructability	Local Plans & Policies
2 SUB-OPTIONS	Local Accessibility	Traffic Beneficiaries	Local Corridor Benefits	Refined Cost Estimates	Environmental Differences	Location Issues	Regional Plans & Policies
3 BEST OPTIONS	Traffic Forecasts	Road User Benefit/Cost	REMI Models	Life Cycle Costs	Environmental Plan	Engineering Refinements	Responsiveness to Stakeholders
PRODUCTS: Relative Comparisons	Travel Forecast Trucking	Travel Efficiency Feasibility	Economic Development Justification	Construction & Maintenance Costs	Relative Impact Comparisons	Alignments and Plans	Compatibility

The typical criteria at this level of analysis will include but not be limited to the examples shown in the RFP:

- Anticipated extent of modal diversion;
- Change in congestion levels on freeways (peak and off-peak);
- Changes in congestion level/delay on rail lines;
- Changes in travel time or trip reliability;
- Changes in trip times for freight from specific origins to specific destinations within or outside the region;
- Regional vehicle miles of travel (for trucks and other traffic); and regional vehicle hours of travel.

These are similar to the performance measures that will be used as part of Task 3 in evaluating the existing studies and reports. Moreover, we will rely on the environmental and community planners on the WSA Team to outline a set of environmental and community impact measures. We will also rely on the economists and funding experts to provide the respective economic and funding criteria.

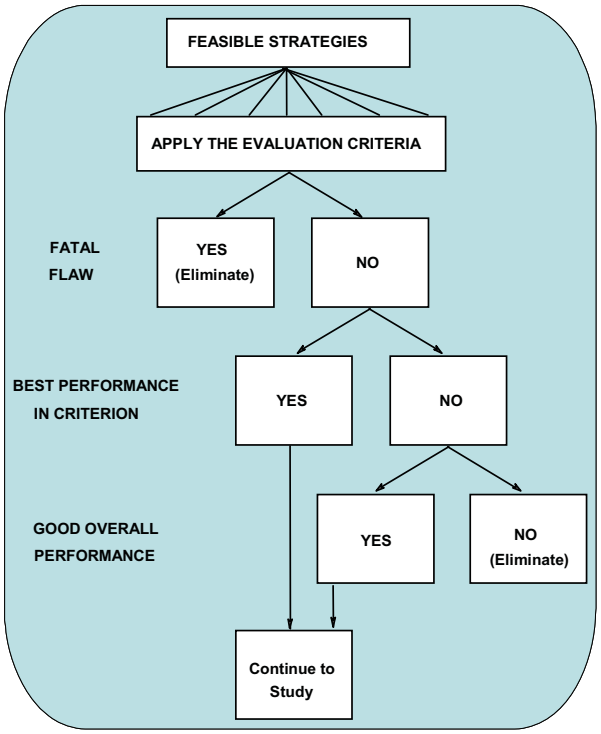
It is anticipated that the range of alternatives in this subset will include, but not be limited to the following:

- Dedicated truck lanes;
- Double and triple tracking of rail corridors;
- Rail grade separations;
- Additional Intermodal rail yard capability;
- Expanded port cargo handling capacity;
- Increased airport cargo capability;
- A dedicated short haul rail line; and,
- Increasing the efficiency of the existing and expand systems (e.g. Pier Pass).

Methodology for Task 6.2 – Evaluate Infrastructure Improvements

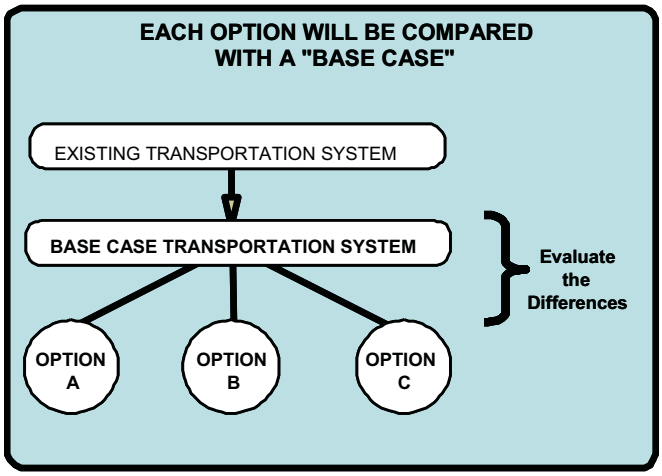
Once the screening process is complete we will move on to evaluating the range of infrastructure improvements. Aside from the technical aspects of analyzing the infrastructure options, it is critical that the process continue on a streamlined path. Although the bulk of the screening effort will be complete at this point, it is important to maintain a transparent streamlined decision process. The following exhibit shows a typical decision tree process we have used for previous projects. We will apply a similar decision tree to this based on feedback from the Metro Project Manager.

EXAMPLE OF FEASIBILITY DECISION TREE PROCESS



In addition to the decision tree process, we will also be comparing each of the alternative infrastructure strategies with the base case established in Tasks 3 and 4. The following exhibit illustrates how the evaluation with the base case will proceed. Before proceeding with the evaluation of each of the options, will present them to the Metro Project Manager, along with the base case assumptions.

PROCESS OF COMPARING IMPROVEMENT WITH THE BASE CASE



Dedicated Truck Lanes - The RFP pays special attention to the concept of dedicated truck lanes (full or partial, toll or free). We think that this has merit given the climate for innovations in tackling goods movement in the region. Moreover, there are several agencies and private sector entities that have expressed support for this avenue. At the same time, this is an innovation in which there exists very little

proof of ongoing success. While WSA is involved in several dedicated truck lane projects in the nation, and in general see enough evidence to support the concept for detailed evaluation, particularly in an urban setting, there are a limited number of applications of the concept deployed elsewhere in the country.

Our analysis will build on previous work on this subject including the SR 60 Truck Lane Feasibility Study (which found that truck tolls in an urban setting will likely not work, and that dedicated truck lanes do not remove sufficient levels of trucks from the general purpose lanes to effectively reduce congestion), the I-710 Major Corridor Study, the National I-10 Freight Corridor Study (which found that dedicated truck lanes are most feasible along urban corridors), as well as the Reason Foundation's recent report on *Building for the Future: Easing California's Transportation Crisis with Tolls and Public-Private Partnerships* (which evaluated a dedicated LCV corridor from the San Pedro Bay ports to Nevada).

Other Non-Truck Solutions – Again, while the RFP pays special attention to the concept of dedicated truck lanes, we will also focus on non-truck solutions such as mainline rail expansions, shuttle train services, inland ports, as well as non-capital solutions such as open gate policies and incentives during off-peak hours for intermodal yards, ports and warehousing areas. We will use existing tools and models to evaluate these alternatives.

Key Players

This task will be led by Arno Hart (WSA) out the LA office with support from other WSA transportation planners and traffic engineers. Because of his experience managing similar projects and perfecting WSA's screening approach, his is the ideal task leader. He will be supported by a deep bench of modal experts, analysts and travel demand modelers, including George Fetty, Jon DeCesare, Gill Hicks, John Husing, and Jose Farran, Gary Stevens. He will get specific cost estimate support from Sam Morrissey (WSA) a Senior Transportation Engineer. The lead GIS specialist will be Vincent Methaney.

TASK 7 IDENTIFY STRATEGIES FOR MITIGATING THE EFFECT OF GOODS MOVEMENT

Approach

The overall approach is to build on the work that has been completed to date on similar projects. In addition, unlike the efforts in Task 5.2, this task will present a range of approaches for mitigating the impacts of goods movement. The focus will be on identifying the best practices that can be adopted by the various agencies and jurisdictions to, at the very least, minimize the downside impacts.

Methodology

The WSA Team will identify a menu of potential mitigation measures for the environmental impact identified in Task 5.2 and the potential strategies identified in Task 6.0. These impacts will be generalized, as is typical for a project planned and evaluated under NEPA, rather than specific, as is required for a project evaluated under CEQA. Since this planning study will not approve any specific project, there is no legal requirement for the identification of or commitment to specific mitigation measures.

The types of measures will be matched to the types and magnitudes of impacts identified. Measures will include both planning level actions (e.g., land use and zoning) as well as project development measures (e.g. site layout and design features), and construction related measures (e.g., noise and visual mitigation techniques). Whenever possible, the menu of measures will capture and reflect mitigation measures already in use in the region. This approach matches that used in assessing potential impacts under Task 5.2, in that the effectiveness of mitigation from real-world situations is known. For instance, the actual

reduction in noise levels that occurs for noise walls can be measured and has been captured by Caltrans in many locations. The trade-off analyses that has occurred during the design process for projects also provide guidance to the WSA Team on the effectiveness of mitigation measures. The discussion of the measures will indicate those areas where it is clear that impacts can be reduce to less than significant levels, as well as those areas were there are potentially remainder effects after mitigation. Regulatory requirements, which must be met for any type of transportation or development project (such as compliance with air and water quality standards), will be identified as a separate category.

In addition to the monitoring of the development of the 2007 South Coast AQMP mentioned in the RFP and the related air quality emissions, The WSA Team will do a literature search for similar planning across the country, and use all such sources as a basis for developing air quality mitigation strategies.

As mentioned under Task 5.2, the relationship between air quality and health risk needs to be addressed by the TAC in defining a zone of assumed impacts. Similarly, the TAC should devote attention early on the potential air quality mitigation strategies as they relate to health risk. A primary way of mitigating health risk due to exposure to air pollutants it thought to be to provide a buffer between transportation facilities and residential areas. However, the impacts of creating such buffers are likely to be high both in terms of community impact (from displacements) and in financial terms. Accordingly, such a mitigation measure may not be feasible. It is recommended that the TAC begin consideration of this issue early in the study process.

Key Players

This task will be led by Steven Brooks with Jones & Stokes who has led numerous environmental studies for goods movement projects in the region He will be supported entirely by a local team of Jones and Stokes planners and scientists including Dan Henderson, Jack Ottaway and Susan Steed Wilson.

TASK 8 DEVELOP MULTI-COUNTY GOODS MOVEMENT ACTION PLAN REPORT

Approach

A Two-Step Process - We will use a two step process for this task. The first step is to include feedback from the participating agencies in to the development of the Action Plan. We will not commence work on the Action Plan until we have received feedback from all the member agencies. The second step is to synthesize the feedback from the participating agencies as well as information, data and recommendations in the reports produced through the course of the project, and produce an Action Plan.

Feedback from the Participating Agencies and Stakeholders – The proposed method for getting feedback participating agencies is a series of up to 5 workshops. Our stakeholder involvement team will work directly with the Metro Project Manager to outline a format for the workshops. Regardless of the ultimate format, it is critical that the format provide an environment conducive to free exchange and guidance. The level of support for the MCGMAP is highly dependent on the level and nature of feedback and guidance we receive.

Likely Components of Action Plan – The RFP outlines specific examples of various components to be considered for the plan, including:

- Strategy description;
- Strategy type (i.e. infrastructure, operational, policy, etc.);
- Strategy performance and benefits (based on the evaluation criteria);
- Strategy impacts;

- Cost of implementation (capital and operating);
- Potential implementation time frame (short, medium, long);
- Implementation responsibility; and,
- Potential funding sources.

We propose to use this approach, organizing the actions into summary tables.

Individual County Action Plans – Based on our experience, it is not unusual to include reports and action plans for individual jurisdictions as part of a multi-jurisdictional project. This approach allows the individual participants an opportunity to highlight the actions to be tackled in their individual areas. This approach also allows the member agencies to sell their individual actions as part of a larger strategy. Moreover, the individual county goods movement action plans will likely also feed into their respective overall transportation plans.

Accelerate the OCTA Action Plan – The OCTA is in the process of updating its long range transportation plan and is therefore in need of a goods movement plan before the MCGMAP is completed. The WSA Team is currently working with OCTA to develop the freight element for the OCTA long range plan. The overall approach is to collect all relevant existing reports and information pertaining to goods movement in the County and to outline a Goods Movement Strategy for the County based on the existing body of information. Our approach does not include any original or detailed analysis and forecasting. The following are the existing sources that provide a framework for developing the OCTA Goods Movement Plan.

- Orange County Goods Movement Study, 1998;
- OCTA Demonstration Projects, January 2003;
- Statewide Goods Movement Action Plan Projects List;
- 2005 Statewide Legislative Platform;
- OCTA Goods Movement Projects List (MAP), November 2006;
- 2003 Truck Volumes Map, and;
- 2005 Goods Movement Update to the Regional Planning and Highway Committee.

The OCTA goods movement element will outline the existing planned goods movement projects, identify the key goods movement issues that are not addressed by the planned projects, and pinpoint the priorities that the OCTA must focus on for the furtherance of goods movement in the County.

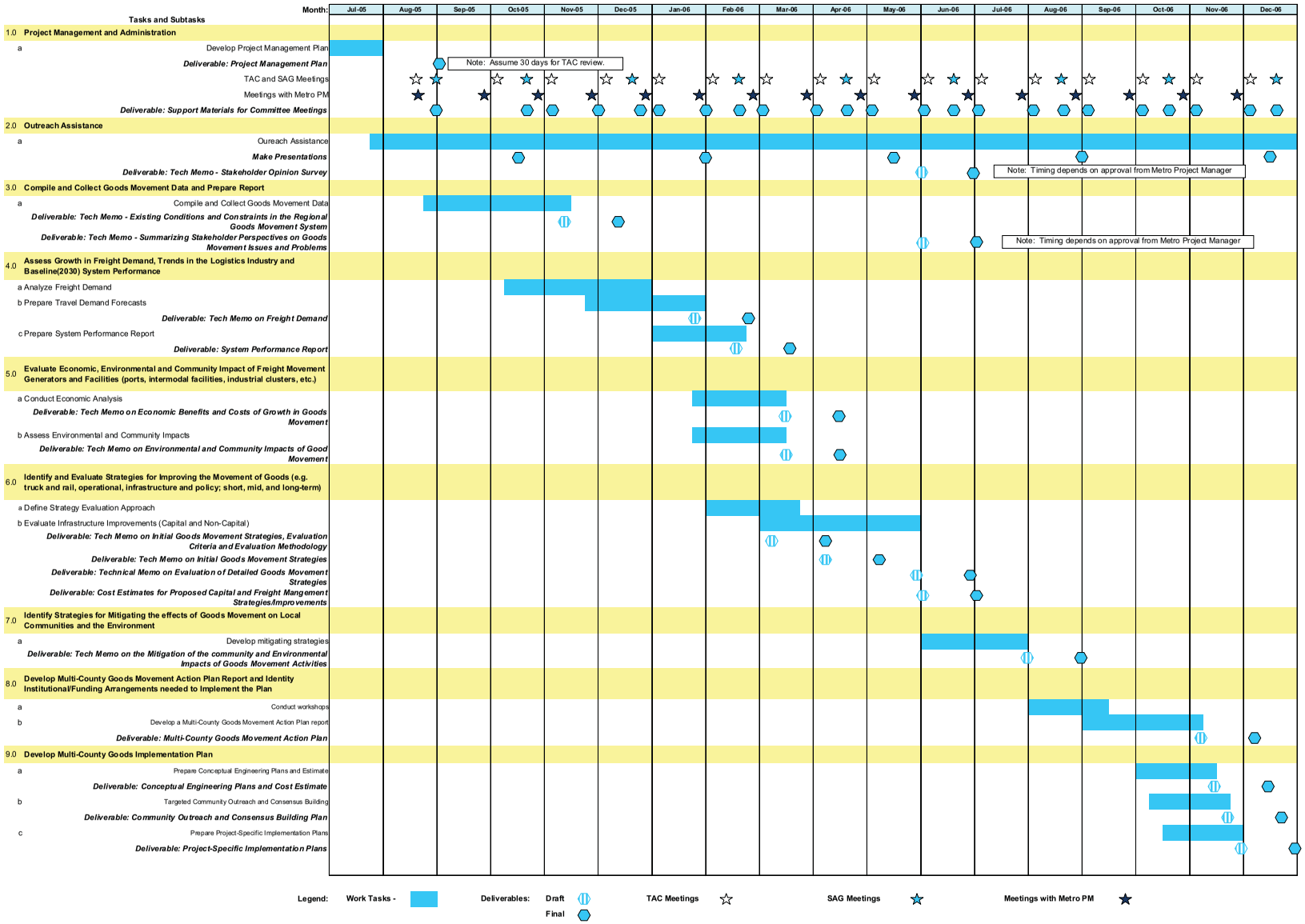
Methodology

There are no specific technical analytical steps to this and therefore a detailed methodology is not needed.

Key Players

This task will be led by Gill Hicks. He will get direct support from Arno Hart as well as the other modal experts - George Fetty, Jon DeCesare and John Husing. Sharon Greene will lead the effort to identify funding options. Genoveva Arellano will take the lead in organizing and facilitating the workshops with support from staff at her firm.

4.0 Project Schedule



5. TENTATIVE MEETINGS SCHEDULE

MEETING	DATE	OVERALL AGENDA/PURPOSE
Technical Advisory Committee Meetings		
Meeting No. 1	August 29, 2005	Discuss Project Management Plan (T1)
Meeting No. 2	October 3, 2005	Data Collection Update Outreach Discussions
Meeting No. 3	November 14, 2005	Data Collection Report Presentation (T3)
Meeting No. 4	December 5, 2005	Freight Demand Update
Meeting No. 5	January 9, 2006	Freight Demand Report Presentation (T4)
Meeting No. 6	February 6, 2006	Systems Performance Update Outreach Discussions
Meeting No. 7	March 6, 2006	Systems Performance Report Presentation (T4) Economics Update Environmental/Community Update
Meeting No. 8	April 3, 2006	Economics Report Presentation (T5) Environ/Community Report Presentation (T5) Strategy Evaluation Approach Briefing
Meeting No. 9	May 1, 2006	Initial Goods Movement Strategies Review
Meeting No. 10	June 5, 2006	Detailed GM Strategies Review GM Capital Costs Review Outreach Discussions
Meeting No. 11	July 10, 2006	Stakeholder Opinion Survey Report Present. (T2&3) Detailed GM Strategies Report Presentation (T6) GM Capital Costs Report Presentation (T6) GM Mitigation Strategies Review
Meeting No. 12	August 7, 2006	GM Mitigation Strat. Report Presentation (T7) Discuss Workshops/Approach
Meeting No. 13	September 11, 2006	Workshops Update Review of MCGMAP Outreach Discussions
Meeting No. 14	October 2, 2006	Workshops Findings Presentation (T8) MCGMAP Update
Meeting No. 15	November 6, 2006	MCGMAP Report Presentation (T8) Concept Plans/Cost Update* Comm/Consensus Building Plan Update* Implementation Plans Update*
Meeting No. 16	December 4, 2006	Concept Plans/Cost Report Presentation* (T9) Comm/Consensus Report Presentation* (T9) Implementation Plans Report Presentation* (T9) Outreach Discussions

*Tentative Task 9 – based on contract approval.

Stakeholder Advisory Group Meetings		
Meeting No. 1	October 26, 2005	TBD
Meeting No. 2	December 21, 2005	Data Collection Report Presentation
Meeting No. 3	February 22, 2006	Freight Demand Report Presentation
Meeting No. 4	April 26, 2006	Economics Report Presentation Environ/Community Report Presentation
Meeting No. 5	June 28, 2006	Initial Goods Movement Strategies Review
Meeting No. 6	August 30, 2006	Detailed GM Strategies Report Presentation GM Capital Costs Report Presentation
Meeting No. 7	October 25,2006	GM Mitigation Strat. Report Presentation Workshops Findings Presentation
Meeting No. 8	December 20, 2006	MCGMAP Report Presentation Concept Plans/Cost Report Presentation* Comm/Consensus Report Presentation* Implementation Plans Report Presentation*
Meeting No. 9		

6. TENTATIVE DELIVERABLES SCHEDULE

Task	Deliverables	Timing
1	Project Management Plan	Sept '05
2	TM – Summary of Stakeholder Opinions Survey	July '06
3	TM – Existing Conditions and Constraints	Nov '05
	TM – Summary of Stakeholder Perspectives	July '06
4	TM – Freight Demand Analysis	Feb '06
	TM – Systems Performance Report	Mar '06
5	TM – Economic Benefits and Costs	Apr '06
	TM – Environmental and Community Impacts	Apr '06
6	TM – Initial GM Strategies, Evaluation Criteria and Method	Apr '06
	TM – Evaluation of Initial GM Strategies	May '06
	TM – Evaluation of Detailed GM Strategies	Jun '06
	TM – Cost Estimates for Capital and GM Management Strategies	Jul '06
7	TM – Mitigation of Community & Environmental Issues	Aug '06
8	MCGMAP Report	Dec '06

7. ANTICIPATED BUDGET DRAWDOWN SCHEDULE

MONTH-BY-MONTH

Anticipated Monthly Progress, By Task

Task	Month 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
2	0%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
3	0%	31%	31%	31%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
4	0%	0%	9%	17%	17%	17%	17%	17%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%	9%	36%	36%	18%	0%	0%	0%	0%	0%	0%	0%	0%
6	0%	0%	0%	0%	0%	0%	0%	20%	20%	20%	20%	20%	0%	0%	0%	0%	0%	0%
7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	0%	0%	0%
8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	24%	24%	24%	24%	6%

Anticipated Monthly Budget Impact, By Task ($ 000's)

Task	Month 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
1	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**107**
2	-	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	**137**
3	-	21	21	21	5	-	-	-	-	-	-	-	-	-	-	-	-	-	**68**
4	-	-	11	21	21	21	21	21	5	-	-	-	-	-	-	-	-	-	**122**
5	-	-	-	-	-	-	15	59	59	29	-	-	-	-	-	-	-	-	**161**
6	-	-	-	-	-	-	-	27	27	27	27	27	-	-	-	-	-	-	**137**
7	-	-	-	-	-	-	-	-	-	-	-	39	39	-	-	-	-	-	**78**
8	-	-	-	-	-	-	-	-	-	-	-	-	-	39	39	39	39	10	**166**
Total	**6**	**35**	**46**	**56**	**40**	**35**	**50**	**121**	**105**	**71**	**41**	**80**	**53**	**53**	**53**	**53**	**53**	**24**	**975**

ANTICIPATED BUDGET DRAWDOWN - CUMULATIVE

Anticipated Cumulative Progress, By Task

Task	Month 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	6%	11%	17%	22%	28%	33%	39%	44%	50%	56%	61%	67%	72%	78%	83%	89%	94%	100%
2	0%	6%	12%	18%	24%	29%	35%	41%	47%	53%	59%	65%	71%	76%	82%	88%	94%	100%
3	0%	31%	62%	92%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
4	0%	0%	9%	26%	43%	61%	78%	96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
5	0%	0%	0%	0%	0%	0%	9%	45%	82%	100%	100%	100%	100%	100%	100%	100%	100%	100%
6	0%	0%	0%	0%	0%	0%	0%	20%	40%	60%	80%	100%	100%	100%	100%	100%	100%	100%
7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	100%	100%	100%	100%	100%	100%
8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	24%	47%	71%	94%	100%

Anticipated Cumulative Budget Impact, By Task ($ 000's)

Task	Month 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	6	12	18	24	30	36	42	48	54	60	66	71	77	83	89	95	101	107
2	-	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	137
3	-	21	42	63	68	68	68	68	68	68	68	68	68	68	68	68	68	68
4	-	-	11	32	53	74	95	117	122	122	122	122	122	122	122	122	122	122
5	-	-	-	-	-	-	15	73	132	161	161	161	161	161	161	161	161	161
6	-	-	-	-	-	-	-	27	55	82	109	137	137	137	137	137	137	137
7	-	-	-	-	-	-	-	-	-	-	-	39	78	78	78	78	78	78
8	-	-	-	-	-	-	-	-	-	-	-	-	-	39	78	117	156	166
Total	6	41	87	143	183	218	268	389	484	665	608	688	739	782	845	898	851	876

8. TECHNICAL ADVISORY COMMITTEE CONTACTS

Name/Position	Address/ Phone/Fax	E-mail Address	Agency
Michelle Smith	One Gateway Plaza Mail Stop: 99-22-8 Los Angeles, CA 90012 Phone: (213) 922-3057	smithmi@metro.net	Metro
Dilara Rodriguez	(213) 897-8785 120 S. Spring St. Los Angeles, CA 90012 Phone: (213) 897-8785	dilara_rodriguez@dot.ca.gov	Caltrans District-7 Representative
Diane Morales	464 W. 4th St. San Bernardino, CA 92402 Phone: (909) 383-4625	diane_morales@dot.ca.gov	Caltrans District-8 Representative
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Richard Marcus	550 S. Main St. Po Box 14184 Orange, CA 92863 Phone: (714) 560-5832	rmarcus@octa.net	OCTA Representative
Stephanie Wiggins	Po Box 12008 Riverside, CA 92502 Attn: Stephanie Wiggins Phone: (951) 787-7908	swiggins@rctc.org	RCTC Representative
Steve Smith	1170 W. 3rd. St. 2nd Floor San Bernardino, CA 92410 Phone: (909) 889-8611 ext. 134	ssmith@sanbag.ca.gov	SANBAG Representative
Nancy Pfeffer	818 W. Seventh St. 12th Floor Main Office Los Angeles, Ca 90017 Phone: (213) 236-1869 Fax: (213)236-1825	pfeffer@scag.ca.gov	SCAG Representative
Kerry Forsythe	950 County Square Dr., Suite 207 Ventura, CA 93003 Phone: (805) 642-1591 ext. 105	kforsythe@goventura.org	VCTC Representative

9. WSA CONSULTANT TEAM - KEY STAFF			
Name/Position	**Address/ Phone/Fax**	**E-mail Address**	**Team Role**
Arno Hart Regional Vice-President, Wilbur Smith Associates	900 Wilshire Blvd., Suite 930 Los Angeles, CA 90017 Phone: (213) 627-3855 Fax: (213) 627-3859 Cell: (213) 804-4001	ahart@wilbursmith.com	Overall Role: **Project Manager** **Task Leader: Tasks 1 and 6**
Sam Morrissey, P.E. Transportation Engineer Wilbur Smith Associates	900 Wilshire Blvd., Suite 930 Los Angeles, CA 90017 Phone: (213) 627-3855 Fax: (213) 627-3859 Cell: (619) 917-7478	smorrissey@wilbursmith.com	Overall Role: Transportation Engineer **Task Leader: Task 4** Support: Tasks 4,6,7 & 8
Gill V. Hicks President, Gill V. Hicks and Associates, Inc.	1121 Embury Street Pacific Palisades, CA 90272 Phone: (310) 573-4377 Fax: (310) 573-4388 Cell: (310) 403-6274	gill@gillhicks.com	Overall Role: Deputy Project Manager and Ports and Maritime Chief **Task Leader – Task 8** Support: Task 4, 6 & 7
John E. Husing, PhD Economist, Economics & Politics, Inc.	961 Creek View Lane, Redlands, CA 92373 Ph: 909-307-9444 Fax: 909-748-0620	john@johnhusing.com	Overall Role: Chief Economist **Task Leader: Task 5.1**
George R. Fetty President, George R. Fetty & Associates	277 Pomona Avenue Long Beach, CA 90803 (562) 434-6428 (562) 243-7257 (cell) Fax: (562) 439-3509	GRFetty@aol.com	Overall Role: Rail Systems Chief Support: Task 4, 6, 7 & 8
Genoveva L. Arellano Principal, Arellano Associates *(DBE- MTA certified)*	4091 Riverside Drive, Suite #117 Chino, CA 91710 (909) 627-2974 Phone (909) 628-5804 Fax	GArellano@ArellanoAssociates.com	Overall Role: Public Stakeholder Outreach **Task Leader: Task 2**
Jon DeCesare Principal, WCL Consulting	One World Trade Center Suite 800 Long Beach, CA 90831 Office: (562) 435-2600 Cell: (310) 963-6172	jondecesare@wclconsulting.com Website: www.wclconsulting.com	Overall Role: Warehouse and Logistics Chief Support – Task 4, 6, 7 & 8
Steve Brooks, AICP Principal, Project Director Jones and Stokes	811 West 7th Street, Suite 800, Los Angeles, CA 90017 Phone : (213) 627-5376 Fax : (213) 627-6853	sbrooks@jsanet.com Linda Weston – lweston@jsanet.com	Overall Role: Environmental and Community Impacts **Task Leader: 5.2**
Morrie R. Goldman Urban Solutions, LLC *(DBE---MTA Certified)*	900 Wilshire Blvd., Suite 930 Los Angeles, CA 90017 Phone: 213/689-4745 FAX: 213/627-3859 Mobile: 213/321-7545	mgoldman@urbansolutionsla.com	Overall Role: Public and Stakeholder Involvement Support: Task 2
Sharon Greene Principal, Sharon Greene and Associates *(DBE---MTA Certified)*	275 Centennial Way, Suite 104 Tustin, CA 92780-3708 Phone: (714) 669-9222 Fax: (714) 669-9359	greenesga@aol.com	Overall Role: Public and Private Financing Support Task 8

10. CONSULTANT TEAM ROLES AND RESPONSIBILITIES

To successfully complete the Multi County Goods Movement Action Plan (MCGMAP) we have assembled an exceptional team of renowned practicing freight professionals, transportation planners, engineers, economists, public involvement specialists with a wealth of recent, directly relevant experience. The WSA Team offers strong "hands-on" project management and a pool of highly qualified professionals with decades of consulting and research experience in all modes of freight transportation.

The WSA Team is made up of uniquely qualified professionals from **Wilbur Smith Associates** (WSA) and sub-consultant firms who will perform specified tasks for this project. This carefully constructed team is poised to address each facet of the MCGMAP with a maximized combination of local knowledge and national experience with projects such as this. This is a "specialty study", requiring specialty skills concerning transportation planning, engineering (limited), trade, commerce, freight logistics, economic analysis, financial feasibility, revenue enhancement opportunities, environmental issues, community impacts, public/private initiatives and corridor issues and realities.

Formed to conduct this study, the team is led by WSA, a well known transportation planning firm in the region, with support from a marquee team of local expert sub-consultants:

- **Gill V. Hicks and Associates (GVH)** is one of the most well established and well reputed freight experts in Southern California.
- **Economists and Politics, Inc. (EP)**, specifically John Husing, is the foremost expert on the economic and goods movement aspects of the Island Empire, as well as a highly trusted expert on the economic role of the logistics sector on the regional economic and social fabric.
- **George R. Fetty & Associates (GF)** is a locally based rail engineering and planning firm with seasoned hands-on experience implementing rail improvements in the region.
- **WCL Consulting (WCL)** is a locally based warehousing and logistics consolatory with direct knowledge of how that industry is likely to evolve over the coming decades and how that is to impact goods movement in the region.
- **Jones and Stokes (JS)** is a locally famed environmental planning firm with a wealth of experience working on projects in the region, specifically the environmental and community impacts.
- **Arellano Associates (AA)** is a locally based, woman-owned (WBE) and disadvantaged business (DBE) with a solid reputation for community and stakeholders outreach. AA will be supported by **Urban Solutions (US)**, a Los Angeles based DBE public policy firm.
- **Sharon Greene Associates (SG)** is a locally based DBE and WBE funding expert with a wealth of experience in local agency funding analysis and politics, industry goods movement projects.

EXHIBIT 1 – ROLES FOR THE VARIOUS FIRMS ON THE WSA TEAM

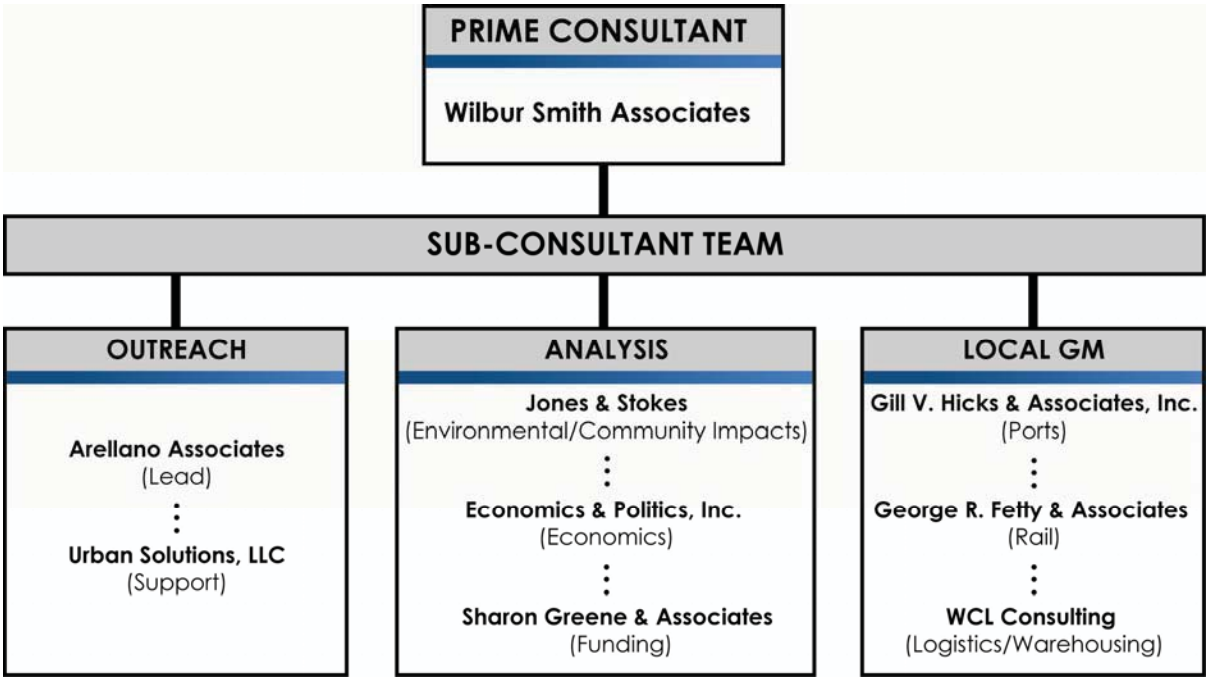
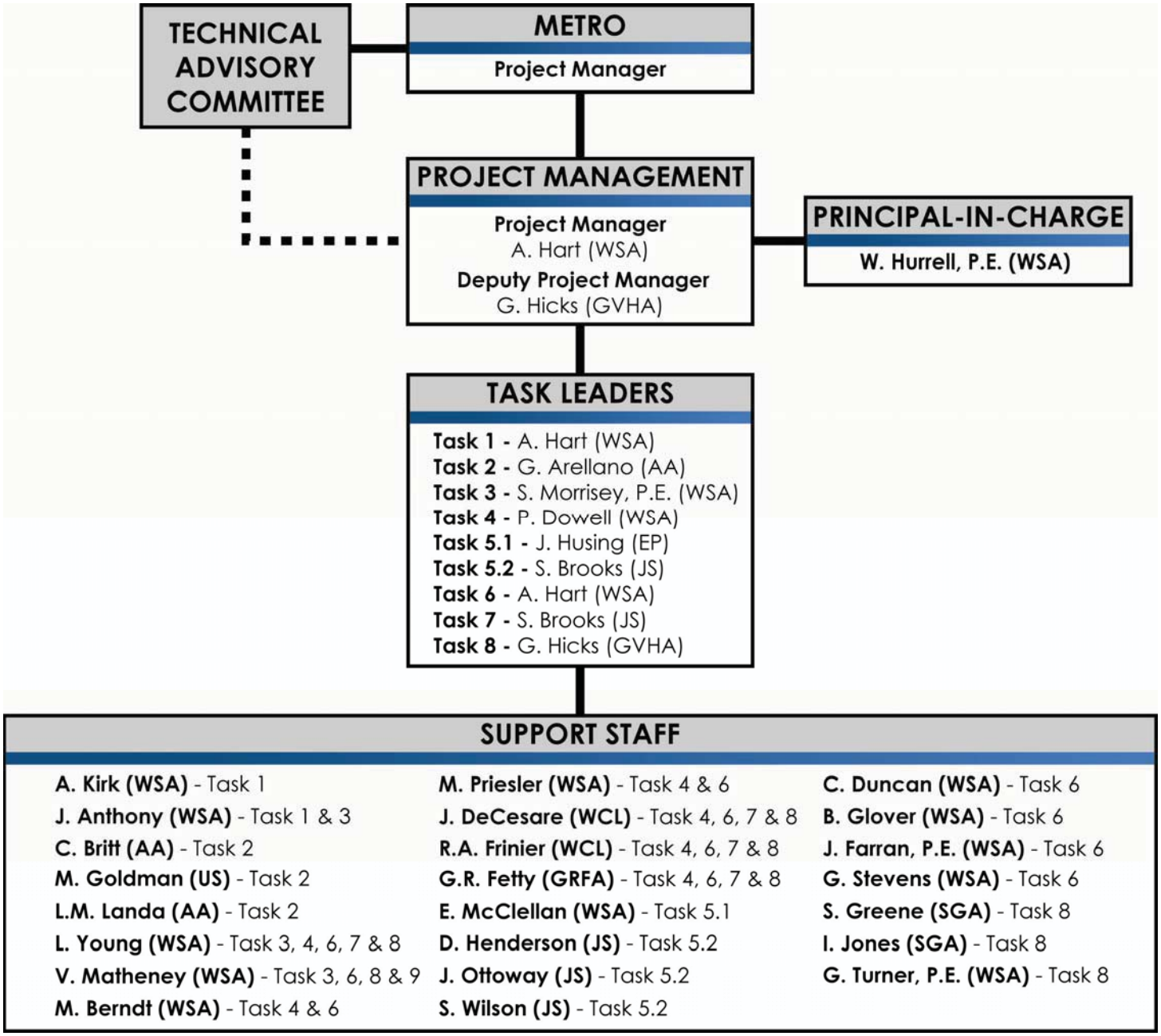


EXHIBIT 2 – WSA TEAM TASK ORGANIZATION



11. DATA AND INFORMATION NEEDS

The following is a list of data and information needed by the WSA Team to successfully complete this Project. This list was drawn principally from Task 3 of the Project Work Scope and should be considered an initial listing of needs. Other data requirements may emerge during the course of this Project.

- County-by-county goods movement data, including:
  - A physical inventory of the principal goods movement systems
  - The extent (volume) of goods movement on each system
  - To the extent possible, identification of goods movement origin and destination
- Capacity deficiencies and extent of delay for goods movement by various parts of the transportation network, including:
  - Sea ports
  - Airports
  - Intermodal terminals
  - Freeways
  - Rail lines
  - Other means
- Modeling and volume/capacity analysis for:
  - Rail - from the SCAG Inland Empire Railroad Mainline Study, and modeling/simulation of the rail network and intermodal yards by Metrolink and the railroads
  - Regional highway network – from the Regional Transportation Monitoring and Information System and modeling of the existing highway network by SCAG
- Highway peak and off-peak volumes by highway segment, for:
  - Trucks (only), by type
  - Total traffic
  - Direction of movement
  - Data for interchanges, ramps and intersections is not required
- A Regional inventory of warehouse, distribution and transload centers, including:
  - Historical and forecasted square footage
  - Distinction between domestic and international transload freight
  - Truck trip generation rates and trip lengths
- Information on other factors (operational, equipment, etc.) that my affect goods movement

Multi-County Goods Movement Action Plan

Technical Memorandum 2a:
Stakeholder Opinion Survey of Goods Movement Issues

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
San Diego Association of Governments

Prepared by:
Arellano Associates
In association with:
Wilbur Smith Associates
The RNO Group
Gill V. Hicks & Associates, Inc.
George R. Fetty & Associates
Economics & Politics, Inc.
Jones & Stokes
Urban Solutions, LLC
Sharon Greene & Associates

ENGINEERS
PLANNERS
ECONOMISTS
Wilbur Smith Associates

April 30, 2008

Table of Contents

1.0 INTRODUCTION **1-1**

2.0 SURVEY METHODOLOGY **2-1**

3.0 SURVEY RESULTS **3-1**

Number of Surveys 3-1
Survey Respondents 3-1
Breakdown by Category 3-2
Distribution by County 3-3

4.0 MAJOR FINDINGS **4-1**

Most Important Issues 4-1

5.0 ISSUES OF IMPORTANCE BY MODE **5-1**

6.0 GOODS MOVEMENT BENEFITS **6-1**

7.0 SOLUTIONS **7-1**

Highway/Truck Issues 7-1
Freight Train Issues 7-3
Port & Industrial Area Issues 7-3
Aviation Issues 7-4
Goods Movement Benefits 7-4

8.0 OTHER GOODS MOVEMENT ISSUES & COMMENTS AND SUGGESTED RESPONDENTS **8-1**

APPENDICES

APPENDIX A Survey Instrument and Cover Letter A-1
APPENDIX B Survey Results – Top Three Goods Movement Issues (On Own) B-1
APPENDIX C Survey Results – Top Three Goods Movement Issues (From List) C-1
APPENDIX D Survey Results – Highway/Truck Issues D-1
APPENDIX E Survey Results – Freight Train Issues E-1
APPENDIX F Survey Results – Ports and Industrial Areas Issues F-1
APPENDIX G Survey Results – Aviation Issues G-1
APPENDIX H Survey Results –Goods Movement Benefits H-1
APPENDIX I Survey Results – Other Goods Movement Solutions I-1
APPENDIX J Survey Results – Other Goods Movement Issues and Comments J-1
APPENDIX K Survey Results – Other Suggested Respondents K-1

The purpose of this memorandum is to present the methodology and findings associated with Survey No. 1 of the Multi-County Goods Movement Action Plan (MCGMAP). The survey was developed and administered to key stakeholders in the MCGMAP seven-county study area in order to gather perceptions and opinions of goods movement issues. From the results of the survey, the MCGMAP technical team is able to validate and/or re-consider existing assumptions about key issues and problems as they relate to goods movement in the Southern California region.

The MCGMAP Outreach Committee developed the Survey No. 1 survey instrument and cover letter for dissemination (included in Appendix A). Survey No. 2 will be conducted later in the MCGMAP process. The survey was comprised of 53 questions across five pages and took about 10 minutes to complete. It included a range of goods movement topics, including highways and trucks, freight trains, ports and industrial areas, aviation areas and benefits relating to goods movement. Each respondent was also asked to self-identify him/herself for documentation and future noticing purposes, however, all individual data results were kept confidential. All surveys were distributed and received between March and June, 2006.

Survey No. 1 was distributed to key stakeholders throughout the seven-county study area via each of the county transportation commissions (CTCs) and transportation agencies.[1] These included:

- Los Angeles County Metropolitan Transportation Authority
- Caltrans
- Orange County Transportation Authority
- Riverside County Transportation Commission
- San Bernardino Associated Governments
- Southern California Association of Governments
- Ventura County Transportation Commission

Each CTC utilized its own method for distribution, which was either by direct mail or electronic mail. Some county distributions were targeted to their local jurisdictions while others were more expansive to also include existing in-house contact databases or other targeted stakeholder lists. Predominantly, the targeted stakeholders included: local jurisdictions (staff and elected officials), business and community organizations, and environmental groups and community activists.

In addition, the survey instrument was made available via "Zoomerang," an online survey mechanism. This was coordinated by Southern California Association of Governments (SCAG) staff. All those who received the survey by direct mail or e-mail had the option to complete the hard copy format or to visit the MCGMAP website and click on the link to the survey. Those survey results were then electronically submitted and then downloaded by SCAG staff. All survey results, whether received by hard copy or electronically, were compiled in a master data spreadsheet. Final tabulations were completed by question and cross-tabulations were completed by question and by county.

[1] At the time of Survey No. 1, San Diego Association of Governments (SANDAG) had not yet joined the MCGMAP and was not included for the distribution of surveys.

Number of Surveys

A total of 166 surveys were received. The majority (55.4%) of surveys were completed online with the remaining batches received directly from the CTCs as follows:

Zoomerang (online system by SCAG)	92	55.4%
Orange County Transportation Authority	32	19.3%
San Bernardino Association of Governments	19	11.4%
Ventura County Transportation Commission	16	9.6%
Riverside County Transportation Commission[2]	7	4.2%
Total number of surveys received:	**166**	**100.0%**

Survey Respondents

The surveys were received from a cross-section of respondents with the majority being received from a representative of a public agency (53.6%):

Representative of Public Agency	89	53.6%
Individual	29	17.5%
Representative of an Organization	25	15.1%
Private Business	22	13.3%
No Response	01	00.6%
Total	**166**	**100.0%**

[2] This Report is updated as of April 27, 2007 to include the data from the 7 surveys received from Riverside County Transportation Commission.

Breakdown by Category

Public Agency		
Local Government	65	79.0%
County Government	10	12.2%
Council of Governments	03	4.0%
University	02	2.4%
Public Benefit Corp Managing State Lands	01	1.3%
State Government	01	1.3%
Total	**82**	**100%**
Organization		
Non-profit	15	39.5%
Professional Association/Organization	08	21.1%
Community Based	03	8.1%
Issue Advocacy	03	8.1%
Academic	01	2.7%
All of the Above	01	2.7%
Environmental advocacy non-profit	01	2.7%
Joint Powers of Authority of 15 cities	01	2.7%
Joint Powers of Authority	02	5.3%
Law Enforcement	01	2.7%
MPO	01	2.7%
Transportation/warehousing	01	2.7%
Total	**38**	**100.0%**
Private Business		
Trucking	06	18.7%
Warehouse/Distribution	04	12.5%
Agriculture	03	9.4%
Logistics/3PL	03	9.4%
Consulting	02	6.3%
Industrial/Manufacturing	02	6.3%
Maritime	02	6.3%
Real Estate Developer	02	6.3%
Automotive	01	3.1%
Aviation	01	3.1%
Customs Broker	01	3.1%
Export Seed Sales	01	3.1%
John Deere CNG Engines	01	3.1%
Professional	01	3.1%
Rail	01	3.1%
News Media	01	3.1%
Total	**32**	**100.0%**

Distribution by County

Surveys were received across all seven counties in the MCGMAP study area as follows (listed alphabetically):[3]

Imperial County

- City of Calexico
- City of El Centro
- City of Holtville
- City of Westmorland
- Dipp Brokers International
- Imperial County Air Pollution Control District
- Imperial County Planning & Development Services Department
- Imperial County Public Health Department
- Imperial Valley Association of Governments
- MTN & Associates
- Transporte Internacional de la Frontera (Calexico)
- United Postal Service
- Vessey & Company

Los Angeles County

- Alameda Corridor East Construction Authority
- Aldaron, Inc.
- BREATHE California of LA County
- California Cartage Co.
- California Natural Gas Vehicle Coalition
- California Trucking Association
- California Highway Patrol
- City of Arcadia
- City of Burbank
- City of Claremont
- City of Diamond Bar
- City of La Canada-Flintridge
- City of Los Angeles, Community Redevelopment Agency
- City of Los Angeles, Department of Planning
- City of Redondo Beach
- City of Santa Clarita
- Coalition for a Safe Environment

[3] Some surveys are listed more than once as they were represented in more than one county. One survey was not specific to any one Southern California county: Bluewater Network – Friends of Earth (San Francisco).

- County of Los Angeles, Department of Public Works
- DMJM Harris
- Greater Los Angeles Chamber of Commerce
- Las Virgenes-Malibu Council of Governments
- Long Beach
- Los Angeles Area Chamber of Commerce
- Los Angeles World Airports
- Majestic Realty Co.
- Mercury Air Group, Inc.
- NAIOP Southern California Chapter
- Palmdale
- The Cunningham Report
- Toyota Motor Sales
- Transport Express
- United Postal Service
- Wilmington Boaters Association
- XRT-Express Reefer Transport, Inc.

Orange County

- ASCE
- California Cartage Co.
- Cit of Tustin
- City of Anaheim
- City of Costa Mesa
- City of Garden Grove
- City of Huntington Beach
- City of Irvine
- City of La Palma
- City of Lake Forest
- City of Los Alamitos
- City of Orange
- City of Rancho San Margarita
- City of San Juan Capistrano
- City of Stanton
- City of Yorba Linda
- Costa Mesa
- DMJM Harris
- Friends of Harbors, Beaches + Parks, Inc.
- Majestic Realty Co.
- Orange County Business Council
- Orange County Taxpayers Association
- RDMD

- Santa Ana Watershed Project Authority
- The Cunningham Report
- United Postal Service

Riverside County

- California Cartage Co.
- CCAEJ
- Majestic Realty, Co.
- United Postal Service
- City of Riverside
- City of Murrieta
- Riverside Transit Agency
- Coachella Valley Association of Governments
- City of Palm Springs
- City of Coachella
- City of Indian Wells

San Bernardino County

- Apex Bulk Commodities
- California Cartage Co.
- California State University, San Bernardino
- Center for Community Action and Environmental Justice
- City of Big Bear Lake
- City of Chino Hills
- City of Colton
- City of Hesperia, Planning Division
- City of Highland
- City of Loma Linda
- City of Montclair
- City of Needles
- City of Ontario, Engineering Department
- City of Rancho Cucamonga
- City of Rialto, Development Services Department
- City of San Bernardino
- City of Twentynine Palms
- City of Victorville
- DMJM Harris
- Lee and Associates
- Majestic Realty Co.
- San Bernardino Economic Development
- United Parcel Service
- XRT – Express Reefer Transport, Inc.

San Diego County

- California Cartage Co.
- City of Holtville
- City of National City
- City of Solana Beach
- Don Breazeale and Associates, Inc.
- San Diego & Imperial Valley Railroad
- San Diego Association of Governments
- San Diego Unified Port District
- United Parcel Service
- Ventura County Railroad & San Diego & Imperial Valley Railroad
- DMJM Harris

Ventura County

- California Cartage Co.
- California State University, Channel Islands
- City of Fillmore
- City of Moorpark
- City of Ojai
- City of Port Hueneme
- City of Simi Valley
- City of Thousand Oaks
- City of Thousand Oaks, Public Works Department
- County of Ventura, Public Works Agency – Transportation
- Thousand Oaks – WLV Regional Chamber
- United Parcel Service
- Ventura County
- Ventura County Railroad
- Ventura County Railroad & San Diego & Imperial Valley Railroad
- Ventura County, Department of Public Works
- Ventura County, Economic Development Agency (EDA)
- Ventura County, Supervisor Kathy Long
- Ventura Department of Airports

Most Important Issues

In general, the survey results validated what the MCGMAP technical team had already known about people's concerns with goods movements. When asked to freely identify from their own perception and experiences which goods movement issues were the most important, the following were the top three (Appendix B):

1. Traffic congestion and truck issues
2. Infrastructure and traffic congestion issues
3. Infrastructure/construction and environmental issues

When asked to choose from a list of previously identified issues, the same list of issues reveals themselves with some additional level of specificity (Appendix C):

1. Traffic delays on freeway due to congestion (41 out of 158 responses)
2. Air/water pollution from cargo ships, including health impacts (33 out of 165 responses)
3. Traffic delays on local streets due to congestion (13 out of 129 responses)

Of the four modes listed for rating of issues by mode, the issues listed for the Highway/Truck mode were considered "major issues" or "substantial issues" more so than the other three modes:

Mode:	**Issues listed most as:**
1. Highway/Truck Issues	"Major issues"
2. Freight Train Issues	"Not at all" or "very little"
3. Port and Industrial Area Issues	"Not at All"
4. Aviation Issues	"Some"

The following is the presentation of data results by mode (majority result is **bolded**): A summary of all survey responses are included in Appendices D-H.

HIGHWAY/TRUCK ISSUES	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*									
	Not at All		Very Little		Some		Substantially		Major Issue	
Traffic delays on freeways due to congestion	04	02%	16	10%	17	10%	47	29%	**80**	**49%**
Traffic delays at freeway interchanges due to congestion	03	02%	15	09%	21	13%	52	32%	**72**	**44%**
Traffic delays on local streets due to congestion	01	01%	09	06%	35	21%	58	36%	**60**	**37%**
Truck noise	10	06%	30	18%	**56**	**34%**	45	28%	22	13%
Air pollution from trucks, including health impacts	03	02%	10	08%	37	27%	**49**	**36%**	39	28%
Truck traffic intrusion into neighborhoods	03	02%	11	08%	38	28%	**47**	**34%**	39	28%
Truck accidents	05	04%	16	12%	**49**	**35%**	46	33%	23	17%
Poor pavement condition	01	01%	09	06%	39	24%	55	34%	**58**	**36%**

FREIGHT TRAIN ISSUES	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*									
	Not at All		Very Little		Some		Substantially		Major Issue	
Delays at railroad crossings due to freight trains.	17	11%	34	21%	34	21%	37	23%	**38**	**24%**
Freight train noise	26	16%	37	23%	**37**	**23%**	31	20%	27	17%
Air pollution from freight trains, including health impacts	22	14%	31	19%	**40**	**25%**	33	21%	33	21%
Freight train accidents	24	15%	**51**	**32%**	39	24%	30	19%	16	10%

PORTS & INDUSTRIAL AREAS ISSUES	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*									
	Not at All		Very Little		Some		Substantially		Major Issue	
Air/water pollution from cargo ships, including health impacts.	**52**	**33%**	21	13%	32	20%	16	11%	37	23%
Daytime noise from the marine port terminals or land ports of entry.	**72**	**46%**	40	25%	25	16%	14	09%	07	04%
Daytime noise from the industrial/warehouse areas.	43	27%	**52**	**33%**	47	30%	11	07%	05	03%
Nighttime noise from the marine port terminals or land ports of entry.	**73**	**46%**	34	22%	29	18%	14	09%	07	05%
Nighttime noise from the industrial/warehouse areas.	**47**	**30%**	46	29%	39	25%	17	11%	08	05%
Air pollution from marine port terminals or land ports of entry, including health impacts.	**37**	**26%**	23	16%	22	15%	20	14%	42	29%
Air pollution from industrial/ warehouse areas, including health impacts.	32	20%	31	20%	**42**	**27%**	24	15%	28	18%
Increased truck traffic in and around marine port terminals or land ports of entry.	**43**	**28%**	27	17%	21	13%	26	17%	39	25%
Increased truck traffic in and around industrial/warehouse areas.	25	16%	20	13%	**47**	**30%**	30	19%	35	22%

AVIATION ISSUES	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*									
	Not at All		Very Little		Some		Substantially		Major Issue	
Aircraft noise	34	21%	41	26%	**49**	**31%**	23	14%	13	08%
Air pollution from aircraft, including health impacts	33	20%	**40**	**25%**	**44**	**27%**	26	16%	19	12%
Increased truck traffic in and around airports	31	20%	32	20%	**41**	**25%**	31	19%	25	16%

Survey respondents recognized that while goods movement in Southern California causes impacts to our infrastructure, traffic and health, it also offers a series of benefits to our local economy and our region. From a list of benefits, the survey respondents ranked them as follows:

Benefit:	**Issues listed most as:**
1. Job creation	"Major issue"
2. Increased economic activity	"Major issue"
3. Maintain standard of living	"Substantial" and "major issue"
4. Higher paying jobs without college degree	"Substantial issue"
5. Opportunities for entrepreneurship	"Substantial issue"
6. Abundance of low cost goods	"Some"

GOODS MOVEMENT BENEFITS	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*									
	Not at All		Very Little		Some		Substantially		Major Issue	
15. Job creation	03	02%	16	10%	33	21%	50	31%	**58**	**36%**
16. Higher paying jobs that do not require college degree.	08	05%	21	13%	34	21%	**54**	**34%**	42	26%
17. Increased economic activity that improves my job or business.	10	06%	13	08%	32	20%	46	29%	**57**	**36%**
18. Opportunities for private entrepreneurship and creation of wealth.	08	05%	21	13%	34	22%	**50**	**32%**	44	28%
19. Maintaining our standard of living in Southern California.	04	03%	12	08%	17	11%	60	39%	**61**	**40%**
20. Abundance of low cost goods to purchase at retail stores.	11	07%	27	17%	**59**	**37%**	37	23%	27	17%

Survey respondents offered a myriad of ideas as solutions for issues related to goods movement. (Other solutions not directly related to goods movement are included in Appendix I.)

Highway/Truck Issues

Truck Lanes / Truck Restrictions

- Add passing lanes up the mountain roads.
- Add truck lane(s) to I-5 freeway. Develop cleaner-burning fuels/technology for trucks and planes.
- Ban air brakes. Ban trucks on freeway during rush hours. Support sound barrier walls for freeways.
- Control the truck traffic on local streets, except for local deliveries.
- Dedicated lane for truck movement, separate area to load container on trains, use clean air engines.
- Enforcement of appropriate truck routes.
- Force large trucks to use designated truck routes. Improve freeway interchanges to improve circulation.
- Insuring adequate freeway capacity for trucking.
- Limiting truck movement during morning and evening traffic hours.
- Minimize truck traffic conflicts with passenger vehicles. Restriction of truck traffic during peak traffic periods.
- Modifications of truck travel tires on freeways, freeway expression.
- Off-peak truck travel.
- Restricting certain truck traffic similar to the Olympic Games in the 80's; deliveries in the evening hours were possible.
- Separate truck traffic from automobile where possible.
- Truck lanes, design-build option in the state, HOV lanes and connectors.
- Truck lanes, sound walls.
- Truck only bypasses/freeways.
- Truck route designations not including city streets.
- Trucks using other truck routes such as Port Hueneme Road instead of Ventura Road.

Grade Separations

- Dedicated truck lanes on SR-60 and SR-5T. Railroad grade separations ITS applications and optional maintenance.
- Funding for grade separation crossings and more trucking activity at non-peak traffic times.
- Grade separations at crossings funding to construct truck routes.
- Prepare to construct a minimum number of grade separations per year.

Congestion Pricing

- Congestion pricing, truck hour restriction in urban areas, by pass routes, widen or increase capacity on existing infrastructure (include removing height and weight retractions).
- Separate toll lanes for trucks.
- Toll freeway entrances to pay for infrastructure improvements since Sacramento won't step up for their state.

New or Improved Roads/Highways

- Additional road construction.
- Better freeway movement between Orange County and the Inland Empire.
- Better roads and new freeways.
- Build an alternative road to minimize trucks on SR-14.
- Build more infrastructure.
- Completion of Smart Streets and Super Street improvements for Katella Avenue and Beach Blvd.; improve north, south in usage between SR-91 91, SR-22 and I-405.
- Consideration should be given to fund the construction of the "final fix" for the 57/60 interchange.
- Develop grade-separated projects that will minimize freight/truck conflicts, increase system velocity, improve environment.
- Eliminate the need to use "AG" roads for major rough farming.
- Highway 241 extension southward to I-5.
- Highway improvements.
- Improve freeways and local streets.
- Improve mobility/average speeds on interstate and local streets.
- Improve roads; widen, maintain and build new roads.
- Improvement of U.S. Highway 101.
- Improvement of U.S. Highway 395 fro I-15 interchange to Southern CA Logistics Airport would assist in goods movement greatly.
- Increase freeways.
- Invest in new roads.
- Less congested freeways/interchanges.
- Major Highway connectivity, specifically Highway 115 to State Route 7.
- Need more soundwalls along freeways. Improve freeway on-ramps and reduce congestion at ramp meters.
- Regional transportation from Riverside County to Orange County.
- Repairs on Lewis R. and install guard rails "completely" on Potrero Rd. It is a fatal accident(s) waiting to happen!

Landscaping

- Better signage.
- Planting along the freeway to minimize air pollution from trucks.

Freight Train Issues

- Assistance with creation of rail, highway, and airport served logistics. Help us improve county airport to allow for development of industrial uses (county needs adequate water source there.)
- Better rail utilization, increased cargo to outgoing airports, (e.g. Ontario, Palmdale).
- Better use of rail; conversion to clean air trucks/ships.
- Continue public/private partnerships to improve rail infrastructure and add capacity for rail movement.
- Eliminate/prohibit train warning whistles after 10:00 pm at night.
- Funding for more rail-street grade separation projects.
- Grade separate rail/road crossings, double track rail system.
- Grade separation on Union Pacific tracks is essential to the area. A JPA construction authority is essential for getting this work done. The current program, leaving it to individual agencies is too fragmented.
- Improve safety of at-grade rail road crossings
- Improved timing of train crossings.
- Limiting the train movement during the early morning hours.
- More creative research into potentials of rail logistics for short-haul and urban destination yard applications. Much more extensive, inter-disciplinary research into higher-intensity industrial development potentials, coordinate innovation in logistics.
- More freight by rail, rather than truck.
- Move more international cargo through the ports by shuttle train to inland facility designed to move freight faster, cleaner and cheaper and be a "green" regional distribution Hub.
- Rail capacity needs to be addressed immediately – this is a national problem.
- The addition of High Occupancy Toll lanes to major highways throughout the area, and increased use of rail to move containers across the region.
- The harbor district needs to figure out what to do with their rail road.
- Using rail to move freight and people effectively to get truck and cars off freeways.

Port & Industrial Area Issues

- 24 hour, 7 day a week port.
- Alternative routes and methods of turning cargo from ports. Public/private partnerships to fund the infrastructure.
- Continue surveillance of maritime traffic along with close lease agreement observation with homeland security.
- I think we need to develop a rail-based inland port concept to relieve port congestion – we're working on something called short fall train.
- Implement inland port concept, including highway and rail infrastructure from ports to the Inland Empire rationalize rail system.
- Inland port development

- Ports to be open during night, consider restricting truck traffic during peak hours.

Aviation Issues

- None.

Goods Movement Benefits

- Address current pollution problems before expanding goods movement system, especially for the most impacted communities.
- Move goods during our peak hours. Support emission or foothill south toll way. Seek additional funding to provide alternative travel/commute modes to lessen burden on freeways.
- Need to look at the complete picture when reviewing the movement of goods, beginning from the international border issues to the LA area issues.
- Shift movement of goods to rail.

The final questions of the survey were two open-ended questions for the respondents to provide any other issues and comments on goods movement and to also offer other individuals/organizations who should be included for future surveys. These results are contained in Appendix J and K, respectively.

Southern California Multi-County Goods Movement Action Plan

Purpose of this Survey

Significant increases in goods movement – the movement of merchandise, supplies, and commodities by truck, freight train, airplane, and cargo ship – are expected within the next 20 years in Southern California. A partnership of public agencies (listed below) is now jointly addressing transportation challenges related to goods movement.

We are seeking your opinion as an individual or as the representative of an organization or public agency on specific goods movement issues. The attached survey will take approximately 10 to 15 minutes of your time. This survey can also be completed online at www.metro.net/mcgmap. This survey is intended to collect anecdotal information only and will not achieve results that are statistically significant.

All personal contact information will be kept confidential unless you agree to let us add you to our mailing list for this project. Answers from all respondents will be combined so no one will be able to identify you by your answers. Thank you for taking the time to complete our survey!

Mail or fax survey to:

[Insert your own agency name, address and fax.]
Or by fax: (213) 999.9999

Or complete survey online at:

www.metro.net/mcgmap.

Please visit our website www.metro.net/mcgmap for additional project information, including dates, times and locations of stakeholder meetings in Southern California, or contact [Insert your own contact and phone number] or by e-mail at mcgmap@metro.net.

A partnership of:

Los Angeles County Metropolitan Transportation Authority *Orange County Transportation Authority* *Riverside County Transportation Commission*
San Bernardino Associated Governments *Ventura County Transportation Commission*
California Department of Transportation *Southern California Association of Governments*

Section 1: Individual, Public Agency or Organization Information

1. I am responding to this entire survey as a(n): (Check one only.)
   ___ Individual
   ___ Representative of Public Agency (Federal, state, county or city, etc.)
   ___ Representative of an Organization (Community-based, non-profit, professional association, issues advocacy, etc.).
   ___ Private Business

2. In which county are you located? (Check all that apply to you or your organization.)
   ___ Los Angeles County
   ___ Ventura County
   ___ San Bernardino County
   ___ Riverside County
   ___ Orange County
   ___ Imperial County
   ___ San Diego County
   ___ Other: _____

3. Would you like your name and contact information added to our mailing list for this project? (Check one only.)
   ___ Yes (Please complete form below.)
   ___ No (Skip to Question #11 below.)

4.	Individual's Name			
5.	Agency, Organization or Business Name			
6.	Address			
7.	City			
8.	State			
9.	Zip Code			
10.	E-Mail			
11.	If **Public Agency**, check one:	☐ Local government	☐ County government	☐ State government
		☐ Federal government	☐ Other, please describe:	
12.	If **Organization**, check one:	☐ Community Based	☐ Issue Advocacy	☐ Non-Profit
		☐ Professional Association	☐ Other, please describe:	
13.	If **Private business**, Check one:	☐ Rail ☐ Trucking ☐ Maritime	☐ Aviation ☐ Industrial/Manufacturing ☐ Warehouse/Distribution	☐ Logistics/3PL ☐ Other:

Section 2: Goods Movement Issues

14. What are the **top three** most important goods movement issues to you, your agency, organization or business?

#1 Issue: _____

#2 Issue: _____

#3 Issue: _____

How important are the following goods movement issues to you, your agency, organization or business? Place a check mark in the box that most closely describes the importance of each goods movement issue. The issues are organized by the following topics:

- Highway/Truck Issues
- Freight Train Issues
- Ports & Industrial Areas Issues
- Aviation Issues
- Goods Movement Benefits

HIGHWAY/TRUCK ISSUES	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*				
	Not at All	Very Little	Some	Substantially	Major Issue
15. Traffic delays on freeways due to congestion					
16. Traffic delays at freeway interchanges due to congestion					
17. Traffic delays on local streets due to congestion					
18. Truck noise					
19. Air pollution from trucks, including health impacts					
20. Truck traffic intrusion into neighborhoods					
21. Truck accidents					
22. Poor pavement condition					
23. Other:					

FREIGHT TRAIN ISSUES	*Level of importance to you, your agency, organization or business* (Please check only one box per line.)				
	Not at All	Very Little	Some	Substantially	Major Issue
24. Delays at railroad crossings due to freight trains.					
25. Freight train noise					
26. Air pollution from freight trains, including health impacts					
27. Freight train accidents					
28. Other:					

PORTS & INDUSTRIAL AREAS ISSUES	*Level of importance to you, your agency, organization or business* (Please check only one box per line.)				
	Not at All	Very Little	Some	Substantially	Major Issue
29. Air/water pollution from cargo ships, including health impacts.					
30. Daytime noise from the marine port terminals or land ports of entry.					
31. Daytime noise from the industrial/warehouse areas.					
32. Nighttime noise from the marine port terminals or land ports of entry.					
33. Nighttime noise from the industrial/warehouse areas.					
34. Air pollution from marine port terminals or land ports of entry, including health impacts.					
35. Air pollution from industrial/ warehouse areas, including health impacts.					
36. Increased truck traffic in and around marine port terminals or land ports of entry.					
37. Increased truck traffic in and around industrial/warehouse areas.					
38. Other:					

AVIATION ISSUES	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*				
	Not at All	Very Little	Some	Substantially	Major Issue
39. Aircraft noise					
40. Air pollution from aircraft, including health impacts					
41. Increased truck traffic in and around airports					
42. Other:					

GOODS MOVEMENT BENEFITS	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*				
	Not at All	Very Little	Some	Substantially	Major Issue
43. Job creation					
44. Higher paying jobs that do not require college degree.					
45. Increased economic activity that improves my job or business.					
46. Opportunities for private entrepreneurship and creation of wealth.					
47. Maintaining our standard of living in Southern California.					
48. Abundance of low cost goods to purchase at retail stores.					
49. Other:					

50. Of the issues from the previous tables, what are the **top three** most important goods movement issues to you, your agency, organization or business? (Use numbers 15-49 from previous tables.)

#1 important issue: ☐☐

#2 important issue: ☐☐

#3 important issue: ☐☐

☐ None of the goods movement issues from the tables above is important to me, my agency, organization or business

51. What solutions, if any, should be considered to address any of the goods movement issues identified above?

_____

_____

_____

_____

52. Is there anything else you would like to tell us about goods movement issues in Southern California?

_____

_____

_____

53. Please suggest any other possible survey responders.

_____

_____

_____

_____

Thank you for your time in completing this important survey!

We will be in touch again to survey you on improvement options.

Meanwhile, please visit our website for ongoing information on the Southern California Multi-County Goods Movement Action Plan.

www.metro.net/mcgmap

Q14: What are the top three most important goods movement issues to you, your agency, organization or business?

Issue #1

Traffic Congestion and ***Truck issues*** were most frequently listed as the most important.

Congestion

- 710 freeway safety and volume
- Congestion (listed twice)
- Congestion impacting local city streets
- Congestion of local and major streets
- Congestion on highways (5, 101, 23 & 118)
- Congestion on main rail routes
- Congestion on streets and highways
- Controlling rush hours
- Freeway congestion (listed twice)
- Freeway congestion caused by trucks
- Freeway mobility
- Highway/truck issues – Freeway congestion
- Impact on community/traffic
- Impact on freeway system
- Interstate congestion
- Port congestion
- Reduce traffic congestion
- Traffic
- Traffic congestion (listed 4 times)
- Traffic congestion and delay
- Traffic congestion impacting the city
- Traffic congestion on local circulation network
- Traffic Delays
- Traffic Delays at freeway interchanges
- Traffic delays on local streets

Trucks

- Affect of truck on local streets and roads and freeway interchanges
- Freeway noise related to large trucks
- Highway truck issues (listed 10 times)
- Increased truck traffic on city streets
- Minimizing trucks on city streets
- Overweight trucks on city arterials
- Reducing road traffic

- Truck availability
- Truck blocking roads/highways (listed twice)
- Truck movements within the city
- Truck on local agency highways
- Truck routes
- Truck traffic
- Truck traffic on local streets
- Truck traffic on US 101 LA County to Santa Barbara
- Truck traffic volume on Ventura Road and Channel Island Blvd.
- Truck/transport
- Trucks off car freeway
- Volume of trucks decreasing traffic flow

Capacity/Reliability

- Efficiency
- Freeway capacity problems
- Reliability i.e. road closures
- Reliable engines
- System reliability
- Transportation capacity
- Transportation infrastructure deterioration
- Maintenance of highway

Ports

- Easy access to port facility
- Efficient ports-of-entry
- Importance of international ports of entry
- Moving freight containers from the ports
- Port and industrial areas
- Port delays
- Port of Hueneme/Oxnard Harbor Dist.
- Port Pollution
- Port security
- Security (port inspections)

Safety

- Ensuring safety of commuters and commercial vehicles
- Highway safety
- Public Safety (listed twice)
- Safe, efficient truck movement on local streets
- Traffic/vehicle safety

Funding

- Funding at state and federal levels
- Lack of funding to fix streets
- No dedicated funding for goods movement needs
- Sufficient reliable funding source

Pollution/Health

- Air quality (listed 4 times)
- Clean Air
- Environmental Air Quality
- Freeway impacts – water quality and air quality – *listed twice*
- Pollution – *listed twice*
- Smog
- Air pollution and health effect
- Health
- Medical supplies
- Pollution creating health problems for residents
- Public Health
- Respiratory health

Train

- Coordination with transit movement rail
- Delays at rail crossing
- Freight Train Issues(listed 3 times)
- Freighter traffic

Aircraft

- Aircraft parking areas
- Airport Ground Access

Border

- Cross border goods
- Inadequate border crossing infrastructure truck/rail
- Rail access

Access

- Freeway access
- Freeway access program to Marine Terminal

Goods Movements

- Addressing the movement of goods on freeways
- Goods movement benefits
- Goods movement through Cajon pass

- Ground freight/goods movement

The following are additional goods movement issues listed singly as most important:

- Agriculture parts
- Building congestion
- Commuter transit
- Continued economic vitality of S. California
- Economic activity
- Grade separation
- High fuel prices
- Impact on communities
- Labor force
- People
- Predictable point to point transit times
- Preservation of positive business environment in city
- Re-investment in urban industrial land uses
- Shipping emissions
- Students and employees
- We have the rail that stops here, but doesn't load or drop here

Issue # 2

Infrastructure and ***Traffic Congestion*** **issues** were most frequently listed as second most important.

Infrastructure

- Adequacy of roadway/freeway capacities
- Adequate Infrastructure
- Damage to street pavement
- Finish Alameda Corridor East
- Improving SD & AE with dedicated freight services
- Inadequate maritime infrastructure
- Incompatible land uses
- Increasing rail capacity
- Infrastructure
- Infrastructure capacity
- Infrastructure improvements
- Intermodal connectors
- Lack of convenient mass transit
- Lack of infrastructure
- Pavement conditions
- Pavement damage
- Pavement impacts on local streets
- Re-orientation of logistics to urban destinations
- Repair roads i.e. potholes
- Road conditions
- Signal coordination
- Stopping areas for trucks or the lack thereof

Traffic Congestion

- 5 freeway safety and volume
- Arterial street congestion
- Congestion
- Congestion of systems highway and rail
- Congestion related to large tucks and cars
- Freeway congestion
- Freeway congestion – lack of mobility
- Freeway gridlock
- Gridlock due to traffic growth
- Highway congestion
- Highway/Truck Issues (listed twice)
- Maintaining traffic flow

- Port congestion
- Traffic – listed 2 times
- Traffic congestion on regional circulation network
- Traffic congestion/dangerous truckers
- Truck congestion and safety
- Tuck movement within Caltrans ROW (freeway)

Trucks

- Added trucks on highways
- Highway/Truck issues(listed twice)
- Impact of trucks at intersections
- Lack of action by county to start our truck bypass
- Traffic by trucks on hwy 95 is very heavy
- Truck damaging roads/highways
- Truck traffic
- Truck traffic around industrial centers
- Truck traffic intrusion into city streets
- Truck traffic on 118 & 23 LA County line to US 101
- Trucks on freeways
- Trucks/roads

Environment/Pollution

- Air Pollution
- Air Quality (listed 6 times)
- Community livability/quality of life
- Deteriorated environmental quality
- Diesel emissions
- Engines meeting emission requirements
- Environmental impact
- Environmental impacts (noise & air quality) on community
- Harbor craft emissions
- Impacts on environment – open space
- Polluters not cleaning up their mess
- Pollution
- Recycled metals

Train

- Developing additional rail capacity
- Freight train issues (listed twice)
- Freight train traffic that impedes circulation
- Priority R/R grade separation projects
- Rail and Air Movement
- Rail crossings

- Rail impacts
- Railroad grade crossing delays
- Railway – Needs coordination and update
- Reduction of freight movement "windows" on main passenger corridors

Goods Movements

- Dedicated goods movement routes
- Goods movement benefits/Employment
- Goods movement corridors from Mexico ports of entry
- Goods movements benefits(listed 3 times)
- Goods shipped out of Imperial County
- Lack of mobility
- Mobility

Airport

- Affect of flight patterns on development near airport
- Airport expansion
- Airport traffic and noise
- Aviation
- Use of capacity at outlying regional airports

Noise

- Impact/Noise
- Noise(listed twice)
- Train noise (listed twice)
- Truck noise

Port

- Port sprawl
- Ports and industrial area issues (listed twice)

Economics

- Adequate funding for capital improvement projects
- Available labor
- Cost of transportation
- Fuel costs (listed twice)
- Increased economic opportunity
- Private Entrepreneurship

Following are other goods movement issues listed as second most important:

- Daily university services
- Efficiency
- High desert corridor
- Impact of local roadways
- Impact on arterials
- Impact on local streets (listed twice)
- International border transportation
- Land management
- Local roads and streets
- Minimal impact to streets
- Minimize transportation conflicts
- Not high enough priority to legislators
- Packing materials
- Poor public transportation system
- Projects must be prioritized
- Safety (listed 4 times)

Issue # 3

Infrastructure/Construction and ***Environmental issues*** were most frequently listed as the third most important.

Infrastructure/Construction

- Additional freeway construction
- Construction vehicle activity
- Deteriorating conditions of our roadways
- Expansion of rail-based logistics
- Freeway bridge widening
- Grade Separations
- Improve highway ramp access
- Improving Los Angeles corridor for freight
- Inadequate rail and border rail infrastructure
- Infrastructure funding
- Local infrastructure cost impacts
- Maintenance of truck route street pavement
- Need for grade separations
- Need more roads
- Poor pavement condition
- Poorly maintained streets
- Support facilities
- Time it takes for construction project to complete

Pollution/Health

- Air pollution caused by ships in port and trucks
- Air pollution from transportation, include ports
- Air quality
- Air quality impacts
- Air quality impacts from trucks and trains
- Alternative fuels
- Degraded quality of life (listed 3 times)
- Environmental concerns
- Environmental impacts
- Impacts on environment – water quality
- Minimize impact on quality of life
- Pollution
- Quality of life
- The lack of accountability for polluters
- Truck air pollution
- Hazardous Material Transporting

- Health and Environmental Impacts
- Health impacts (air pollution/noises)
- Public Health

Traffic/Congestion

- Alleviating traffic from G.M. from auto routes
- Congestion
- Congestion at the port
- Delays
- Highway issues
- Reduce truck traffic during am/pm peak
- Road congestion and street maintenance
- Traffic (listed twice)
- Traffic congestion and travel time
- Traffic delays on local streets (listed twice)
- Traffic flow
- Traffic on roads
- Traffic/truck routes
- Truck traffic is tearing up on residential streets
- Trucks on freeways during peak hours

Goods Movement

- Coordination among regions
- Goods movement benefits (listed twice)
- Goods shipped through Imperial County
- Location of destination goods
- Maintaining efficient delivery systems for goods
- Management of flow
- Planning for goods movement in general

Safety/Security

- Cargo security
- Disaster response
- International safety of different vehicles
- Safety
- Safety
- Safety at railroad at grad crossings(listed twice)
- Speed of trucks
- Truck safety

Funding/Legislation

- CEQA must be reformed to prevent delays/litigation
- Federal funding to upgrade local good movement corridor
- Government regulations & restrictions
- Legislation
- More media awareness of impacts needed
- Public subsidizing cost of goods movement industry
- State and federal funding in border region

Ports

- Increasing port capacity
- Industrial areas
- Industrial areas issue
- Industrial areas within Imperial County
- Ports and industrial issues (listed twice)

Jobs

- Driver shortage
- Loss of manufacturing jobs in America
- Nature of goods movement jobs
- Employment opportunities
- Quantity limits on number of truck trips per day and its impact on productivity

Access

- Ability to move between airports
- Access to rail
- Alternate routes
- Distance for commercial airport for shipping services is 2 hours
- Harbor access congestion

Economics

- Affect on economy
- Cost
- Drayage costs
- Economic vitality
- Freight cost (moving goods up the mountain)
- Fuel prices
- Non-recoverable infrastructure costs
- Standard of living

Rail/Train

- Freight train (listed 6 times)
- Increase RR traffic and impact on safety and public RR transit

- Light rail movement LA County to Thousand Oaks
- Mass transit
- Rail development

Community Impacts

- Deliveries on city arterials
- Intrusion into community from goods movement facilities
- Rail/Truck operations in residential neighborhoods

Noise

- Noise
- Noise from truck traffic deliveries
- Truck noise

Aircrafts

- Aircraft hours of operations
- Aviation issues

Following are other goods movement issues listed as third most important:

- Alameda Corridor East
- Corner radius turning allowance
- Engines to meet applications
- Lack of vision for future needs
- Machinery
- Public transit

#1 Most Important Issues (from List)

Highway/Truck Issues	*No. of Respondents*
Traffic delays on freeway due to congestion	41
Traffic delays on local streets due to congestion	27
Air pollution from trucks, including health impacts	16
Traffic delays at freeway interchanges due to congestion	08
Poor pavement conditions	05
Truck traffic intrusion into neighborhood	05
Truck noise	04
Truck accidents	01
Surface transportation congestion	01
Highway/truck issues	01
Freight Train Issues	
Delays at railroad crossings due to freight trains	08
Freight train noise	04
Air pollution from freight trains, including health impacts	03
Freight train accidents	01
Port & Industrial Area Issues	
Air/water pollution from cargo ships, including health impacts	04
Air pollution from marine port terminals or land ports of entry, including health impacts	03
Increased truck traffic in and around marine port terminals or land ports of entry	01
Port delays at terminal	01
Aviation Issues	
Aircraft noise	03
Increased truck traffic in and around airports	01
Goods Movement Benefits	
Job Creation	04
Higher paying jobs that do not require college degree	02
Maintaining our standard of living in Southern California	02
Traffic delays on freeways due to congestion	02
Goods Movement Benefits	01
High fuel prices	01
Increased economic activity	01
Other	
Air pollution	01
Noise	01
Air pollution from all sources	01

#2 Most Important Issues (from List)

Highway/Truck Issues	*No. of Respondents*
Traffic delays at freeway interchanges due to congestion	22
Traffic delays on local streets due to congestion	13
Poor pavement conditions	13
Air pollution from trucks, including health impacts	09
Truck noise	06
Truck traffic intrusion into neighborhood	05
Traffic delays on freeway due to congestion	04
Truck accidents (and increased risks)	01
Highway/truck issues	01
Increased truck traffic in and around industrial	01
Freight Train Issues	
Air pollution from freight trains, including health impacts	07
Delays at railroad crossings due to freight trains	06
Freight train noise	02
Freight train issues	01
Port & Industrial Area Issues	
Air/water pollution from ships, including health impacts	33
Air pollution from marine port terminals or land ports of entry including health impacts	04
Increased truck traffic in and around marine port terminals or land ports of entry	03
Air pollution from industrial/warehouse areas, including health impacts	01
Air pollution from vessels	01
Aviation Issues	
Air pollution from aircraft, including health impacts	02
Aircraft noise	01
Increased truck traffic in and around airports	01
Inadequate terminal capacity	01
Airport access expansion	01
Air pollution from industrial/warehouse areas	01
Goods Movement Benefits	
Increased economic activity that improves my job/business	10
Job creation	03
Higher paying jobs that do not require college degree	03
Opportunities for private entrepreneurship and creation of wealth	02
Goods movement benefits	01
Maintaining our standard of living in Southern CA	01

#3 Most Important Issues (from List)

Highway/Truck Issues	*No. of Respondents*
Traffic delays on local streets due to congestion	13
Traffic delays on freeway due to congestion	10
Poor pavement conditions	09
Truck traffic intrusion into neighborhood	06
Air pollution from trucks, including health impacts	04
Truck noise	02
Truck accidents	01
Freight Train Issues	
Delays at railroad crossings due to freight trains	09
Air pollution from freight trains, including health impacts	06
Freight train issues	01
Freight train noise	01
Inadequate mainline and yard capacity	01
Train issues	01
Port & Industrial Area Issues	
Air/water pollution from ships, including health impacts	05
Air pollution from marine port terminals or land ports of entry	04
Air pollution from industrial/warehouse areas, including health impacts	02
Increased truck traffic in and around marine port terminals or land ports of entry	02
Increase truck traffic in/around industrial/warehouse areas	02
Ports and industrial warehouse areas Issues	01
Lack of oversight by ports on marine terminals	01
Aviation Issues	
Increased truck traffic in a and around airport	04
Air pollution from aircraft, including health impacts	02
Air and noise pollution	02
Goods Movement Benefits	
Maintain our standard of living in S. California	12
Job creation	09
Higher paying jobs that do not require college degree	05
Increase economic activity that improves my job or business	04
Opportunities for private entrepreneurship and creation of wealth	03
Loss of manufacturing jobs	01
Abundance of low cost goods available at retail	01
People taking rat runs through the City	01
Benefits significantly outweighed by costs	01

HIGHWAY/TRUCK ISSUES	*Level of importance to you, your agency, organization or business* (*Please check only one box per line.*)									
	Not at All		Very Little		Some		Substantially		Major Issue	
Traffic delays on freeways due to congestion	04	02%	16	10%	17	10%	47	29%	**80**	**49%**
Traffic delays at freeway interchanges due to congestion	03	02%	15	09%	21	13%	52	32%	72	44%
Traffic delays on local streets due to congestion	01	01%	09	06%	35	21%	58	36%	60	37%
Truck noise	10	06%	30	18%	56	34%	45	28%	22	13%
Air pollution from trucks, including health impacts	03	02%	10	07%	37	27%	49	36%	39	28%
Truck traffic intrusion into neighborhoods	03	02%	11	08%	38	28%	47	34%	39	28%
Truck accidents	05	04%	16	12%	49	35%	46	33%	23	17%
Poor pavement condition	01	01%	10	06%	39	24%	55	34%	58	36%

The following were listed as other highway/truck issues of importance:

Drivers

Depleted driver pools depleted truck pools

- Driver availability and fuel costs
- Driver hours and truck safety
- Low pay rates for port truckers – they can't afford new trucks
- Underpaid Independent truck drivers
- Unlicensed truck drivers
- Vehicle equipment safety, loading regulations, driver qualifications
- Working drivers too hard
- Safety trucks more likely to trigger accidents.

Trucks and Roads

- Delay at US Mexico Border Crossing Lack of Truck Parking
- Illegal truckers/dangerous, poorly maintained trucks and equipment
- Need dedicated truck lanes
- Parking on streets. May need truck parking ordinance to prohibit
- Truck idling on residential streets
- Truck pollution
- Truck/freight parking and storage areas
- Trucks are small percentage of vehicles on highways
- Trucks crossing international border that do not meet minimum emission standards
- Trucks not maintained – brakes, mud flaps, mufflers
- Unnecessary mixing of trucks and cars on highways

- Better understanding/coordination of truck fleet/vehicles, urban area logistic regimes, urban destination users, and strategic investments in local access infrastructure.

Public Safety and Health

- Emergency response
- Health of people along goods movement corridors
- Safety with children crossing hwy
- Unsafe roads i.e. AG roads and Potrero Rd.

Environmental

- Diesel Pollution
- Increase roadway pollution to water
- Older diesels = air pollution, reliance on fossil fuel
- Runoffs affecting quality of water

Rail

- Grade separating freight rail from truck freights
- Katella & Beach Blvd. smart street improvements.
- Need for grade separations (near Ontario Airport)
- Freight Train Issues

Other Comments

- Caltrans ineptitude
- Empty containers
- Intermodal facilities in residential communities
- Lack of funding to small cities where dollar amounts are based on population
- The fact that ARB is failing to incorporate best available control technologies to this source category.
- This may be unrelated but what about the beginning of the process at the ports and security issues?
- Tolling
- Using local streets to store vehicles overnight
- We are concerned about the impacts congestion has on the number of turns at the ports that other issues driving truckers out of the business

FREIGHT TRAIN ISSUES	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*									
	Not at All		Very Little		Some		Substantially		Major Issue	
Delays at railroad crossings due to freight trains.	17	11%	34	21%	34	21%	37	23%	**38**	**24%**
Freight train noise	24	16%	37	23%	**37**	**23%**	31	20%	27	17%
Air pollution from freight trains, including health impacts	22	14%	31	19%	**40**	**25%**	33	21%	33	21%
Freight train accidents	24	15%	**51**	**32%**	39	24%	30	19%	16	10%

The following were listed as other freight train issues of importance:

General Rail Comments

- Available capacity upstream
- Conditions of rail coming in from Mexico shared use with passenger service
- Development of much broader, variegated rail logistics that can better connect with more compact urban area destinations and users
- Expansion of rail yards into community areas and the health risk involved
- National rail capacity and interchange of eastern/western railroads is a major issue
- Need to expand rail capacity
- Need to increase the use of rail for transport of containers (hay export) to sea ports
- Rail road industry failure to mitigate environmental and public health impacts
- Rail yard expansions in residential communities
- Railroad manufacturers have technology to significantly clean up emissions but refuse to implement.
- Reliability of rail as a service option
- Too much cargo not enough public rail transportation. We want Metro-Link not Metro-Stink
- Train whistles at night – **listed twice**

Grade Separations

- Grade separating freight rail from trucks
- Lack of funding for grade separation
- Need grade separations throughout So. California
- Need more travel routes, and grade separations at rail crossing in urbanized areas

Rail Congestion

- Hub congestions
- Impact congestions impact on police fire response time

- Our additional concerns are with the fact that the railroads are unfairly targeted when they are doing as much as they can in a reasonable amount of time. We supported their MOU with CARB, and would like to see more recognition.

Other Comments

- The ability to get construction flagmen
- Truck prevent access to land locked property needed for economic development

PORTS & INDUSTRIAL AREAS ISSUES	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*									
	Not at All		Very Little		Some		Substantially		Major Issue	
Air/water pollution from cargo ships, including health impacts.	**52**	**33%**	21	13%	32	20%	16	11%	37	23%
Daytime noise from the marine port terminals or land ports of entry.	**72**	**46%**	40	25%	25	16%	14	09%	07	04%
Daytime noise from the industrial/warehouse areas.	43	27%	**52**	**33%**	47	30%	11	07%	05	03%
Nighttime noise from the marine port terminals or land ports of entry.	**73**	**46%**	34	22%	29	18%	14	09%	07	05%
Nighttime noise from the industrial/warehouse areas.	**47**	**30%**	46	29%	39	25%	17	11%	08	05%
Air pollution from marine port terminals or land ports of entry, including health impacts.	**37**	**26%**	23	16%	22	15%	20	14%	42	29%
Air pollution from industrial/ warehouse areas, including health impacts.	32	20%	31	20%	**42**	**27%**	24	15%	28	18%
Increased truck traffic in and around marine port terminals or land ports of entry.	**43**	**28%**	27	17%	21	13%	26	17%	39	25%
Increased truck traffic in and around industrial/warehouse areas.	25	16%	20	13%	**47**	**30%**	30	19%	35	22%

The following were listed as other ports and industrial issues of importance:

Environmental

- Environmental fall-out
- Marine terminals holding up trucks for hours with no accountability to the trucker for making them work for free or the community for the pollution this causes.
- Pollution, noise and traffic from off-port facilities e.g. Rail yard intermodal & inspection facilities, container storage yards and distribution centers.
- Wastewater discharges by ships and harbor craft, port and ferry terminal expansion air and water pollution and the impact to people and wildlife; also lighting impact from terminals on people and wildlife, ship collisions with whales and other marine mammals.
- Visual impact – providing landscape buffers to reduce visual blight
- I don't live near the ports but they are very unhealthy for residents living near them.

Operations

- Delays at commercial and auto ports of entry
- Delays at marine terminals
- Lack of integration with other SC Ports
- Port/container security... terrorist threat, nuclear, bio-chemical, WMD/smuggling
- Hours of operation. The ports and truck traffic would be better if operated during night time.
- Security

Public Agencies

- ARB failing to incorporate best available control technologies for all sources and failure to have the political will to adopt container handling fees.
- Congress controls a number of the above issues not local agencies.

Local Issues

- Adequate freeway access minimizing truck impact to residents of Barrio Logan from the Port of San Diego must be developed.
- Destroying neighborhoods
- Taking residential land use areas and agriculture land for industrial uses.

Other Comments

- Outreach
- Silo mentality along the supply chain causes inefficiencies.

AVIATION ISSUES	*Level of importance to you, your agency, organization or business* (Please check only one box per line.)									
	Not at All		Very Little		Some		Substantially		Major Issue	
Aircraft noise	34	21%	41	26%	**49**	**31%**	23	14%	13	08%
Air pollution from aircraft, including health impacts	33	20%	**40**	**25%**	**44**	**27%**	26	16%	19	12%
Increased truck traffic in and around airports	31	20%	32	20%	**41**	**25%**	31	19%	25	16%

The following were listed as other aviation issues of importance:

Airport Operations

- Our biggest concerns with the airports are expanding the airports to meet demands of business/tourism travel and proposed larger aircraft that will keep LAX competitive. We support regionalization with the understanding that all airports need to expand.
- Need to take advantage of the County's centralized location and either improves our existing airport or build a new regional airport to better handle freight/goods coming to and from Mexico.
- Actual aircraft operations at the airport (ramp space, hours of operation, type of aircraft)
- Airport capacity/land availability
- Lack of runway to handle largest aircraft
- Need additional runway length to accommodate regional passenger jets and cargo planes

Environmental

- ARB and EPA's total unwillingness to improve conditions for airport communities and selling our communities out with weak MOU's.
- Aviation industry failure to incorporate new pollution & noise control technologies and mitigate environmental & public health impacts
- Congress control FAA regulations
- Air quality for ground support equipment

Local Issues

- Flight of military aircraft over residential neighborhoods
- Neighborhood intrusion
- Influx of air cargo ports near residential areas

Other Comments

- Demands for air freight and passengers are not being met.
- It would seem that this plan should include Imperial County not only with regard to the related transportation issues for freight from a through the County but also with regard to San Diego's airport and the plan to possibly locate a cargo airport.

- Lack of vision for future needs and lack of future funding sources
- Outreach

GOODS MOVEMENT BENEFITS	*Level of importance to you, your agency, organization or business* *(Please check only one box per line.)*									
	Not at All		Very Little		Some		Substantially		Major Issue	
51. Job creation	03	02%	16	10%	33	21%	50	31%	**58**	**36%**
52. Higher paying jobs that do not require college degree.	08	05%	21	13%	34	21%	**54**	**34%**	42	26%
53. Increased economic activity that improves my job or business.	10	06%	13	08%	32	20%	46	29%	**57**	**36%**
54. Opportunities for private entrepreneurship and creation of wealth.	08	05%	21	13%	34	22%	**50**	**32%**	44	28%
55. Maintaining our standard of living in Southern California.	04	03%	12	08%	17	11%	60	39%	**61**	**40%**
56. Abundance of low cost goods to purchase at retail stores.	11	07%	27	17%	**59**	**37%**	37	23%	27	17%

The following were listed as other goods movement benefits of importance:

Economic Analysis

- Comparison of goods movement vs. other economic opportunities benefits to California from handling nation's freight at natural gateway.
- Goods movement industrial jobs provide economic diversity and means that we are not solely dependent on tourism/high tech.
- I do not agree with the analysis that we have an overall economic benefit from goods movement when we factor in health costs, etc.
- Need an economic analysis to be sure that this industry is in fact supplying career ladders into mid level jobs.
- Want a cost-benefit study to prove goods movement benefits vs. made in America and US companies.
- Developing strategies that optimize performance of high-intensity, urban industrial development, reduction of regional ton-miles, while increasing local enterprise and economic activity opportunities.
- Ports creating "high paying jobs" higher than what - McDonalds. I don't see the costs/benefits for Long Beach... I see pollution; traffic and increased risk of terrorism without any benefits... containers just pass through the port on their way to somewhere else for the most part.

Other Comments

- Accepting that our region's future depends solely on the goods movement sector due to the belief by some that our kids are too stupid to get a job that is more skilled than typing on a keyboard (i.e., the Housing [Husing] theory).
- Emergency service access; elimination of death due to accidents; elimination of deal due to pollution.
- The goods movement is not equitable to working Americans, only corporations and foreign interests being accommodated.
- This world is flat so we can not afford not to participate.

- We have the land, the work force, the power and the water, we only need the jobs.
- We need everything.
- Establishment of international institution – world peace.
- Focus planning and investment.
- Keep Southern California and Los Angeles specifically as the gateway to/from the Pacific Rim for the US economy, and keeping us competitive with the rest of the world.

Other Solutions

Funding and Investment

- Bring businesses back to America.
- California needs more federal and state funding for transportation projects, and more opportunities for public private partnerships.
- Dedicated state and federal funding source for goods movement needs. Container fees or tolls to finance projects through partnership with private sector. Increase pressure on congress to regulate ship emissions in US ports.
- Earmarked funding for researching and correcting truck movement problems at the local, county and state level. E.G., MTA call for projects should include a goods movement category, as reflected in the RTIP. Educational campaign for elected officials.
- Government and private infrastructure investment.
- Imperial County would be a willing partner. There is inexpensive land, plenty of water, a stable power supply and a good labor force available.
- Increased funding to increase capacity and improve efficiencies.
- Investment in infrastructure. Finding new ways to move cargo besides adding more freeway lanes, reforming bureaucratic log jams, requiring goods movement to pay true cost of doing business by requiring environmental compliance, fees on infrastructure.
- Major infrastructure funding to construct improvements to relieve backlog/bottlenecks. Full integration of SC ports and rail plan to provide strategy for handling all freight (not losing it to others, ensuring that it works).
- Major infrastructure funding to construct improvements to relieve backlog/bottlenecks. Full integration of SC ports and rail plan to provide strategy for handling all freight (not losing it to others, ensuring that it works).
- More funding for grade separations and traffic management.
- More funding to cities/counties for rebuilding or reinforcing their highways and streets.
- More funding to cities/counties for rebuilding or reinforcing their highways and streets.
- Protect existing transportation funding sources, reduce regulatory barriers that slow planning and development, and support new user fees (such as truck toll lanes) to help finance capital projects.
- Provide funding sources to small cities that does not depend on population numbers.
- Provide funding to local jurisdictions for traffic modeling and to improve intersections with LOSE or F.
- We need our agencies to step up to industry and require BACT for all source categories and administer programs to finance these actions like container fees.
- Win fall tax on oil companies.

Public/Private Partnerships

- Public private partnerships in the creation of infrastructure improvements to facilitate goods movement.
- Public/private partnerships to address impacts of goods movement, e.g. container/trip frees to finance needed infrastructure improvements. Continued strong federal lobbying to acknowledge goods pass through the area to reach intended customers east of CA.

Environment and Technology

- Air quality issues from trains – interstate commerce – SCAQMD can't regulate – feds should be more mindful of effects trains have in SO. CA due to size of port.
- Alternative fuel, smaller trucks.
- Clean up the pollution... rebuild the Alameda Corridor the way it was suppose to have been w/truck as well as train lanes, increase pre-inspections outside of Port explosive/hazard limits.
- Cleaner burning engines in the trucks and trains.
- Greater penetration of alternative fuels.
- I think a container premium makes sense. Natural gas trucks must be deployed to reduce our dependency on foreign oil and harmful diesel emissions.
- Improve the massive public transportation systems increase smog fees & off incentives for cleaner burning fuels put screens up when dealing with an accident.
- Innovative technology.
- International border air pollution issues, goods movement need enforcement of emission standard Mandatory rules, regulations and Laws for reducing air, water and land pollution by 90%. Mandatory best available control technology.
- Let's worry first about significantly improving our air quality (and by that I mean attaining air quality that approaches fully clean air- not a 2 or 3 percent of even 10 percent improvement) Before we even remotely consider expanding port and trucking operations.
- Making the polluters clean up their mess.
- New fuels, better enforcement of laws already in place. Ports/diesel pollution are causing measurable, verifiable conditions that are very unhealthy and borderline carcinogenic.
- Replace all petroleum fuel transportation technologies (trains and trucks).
- Require electrical hook ups for ships and use electric vehicles imports areas.
- Seriously investigate the application of new technology and modes of transportation. I believe the maglev technology is a great application for goods movement.
- Sound wall installation, HOV lanes and pavement replacement with "quiet" pavement materials.
- Stricter emission controls on railroads and trucking operations. Let local air districts have control in their region.
- This cannot be answered in a simple box. Refer to our comments and those of other environmental and community groups on the goods movement action plans and the ARB port emissions reduction plan.
- Utilize technology to significantly mitigate emissions to substantially reduce the negative impact on health.

Public Education and Outreach

- Demonstrations, protests, actions, press conferences.
- Education and enforcement.
- Educate the public on the rail role of trucking to our economy.

Other Comments

- Incentives to attract companies to relocate to Palmdale. Re-evaluate existing truck route planning and coordinate with train operators regarding problems areas.
- Extending the Alameda Corridor easterly.
- Planning.
- Produce products in USA.
- Reduce fuel taxes, fix the roads.
- Routes of travel.
- Orange County needs to continue to fight for its fair share. Current goods movement plans are LA -centric.

Highway/Truck Issues

- Besides road repairs and highway widening, add additional corridors improve flow of movement across the East and West counties. Add rapid transit systems and bike paths.
- Caltrans should look comprehensively at needed interchange improvements and evaluate funding sources.
- Expand rail and highway systems or construct a new high capacity transportation system.
- Highway safety/maintenance
- Improve signal coordination between agencies. i.e. Local agency, county, state.
- Perhaps restricting trucks movements to non-peak runway traffic hours.
- Routing trucks and trains away from schools and residential neighborhoods. Truck restrictions on city streets.
- Seems each local agency is addressing warehousing/industrial developments and associated truck traffic individually. Perhaps a more regional approach should be taken to look at truck routes within the entire valley area and high desert area.
- The next gold rush for California is the increased logistical jobs that increasing international trade will bring. But we must improve our freeways to insure the jobs remain in Southern California.
- We need truck bypass done ASAP l. We have been waiting six years for the Imperial County Public Works Department to get going.

Freight Train Issues

- Amount of rail Spurs available
- Better use of rail and expansion of rail for multi-users
- Need additional rail to inland port.
- Need PUC to create "quiet zones" in residential areas to eliminate train whistles after 10pm at night.
- Railroads can reduce congestion on our roads and highways. As well moving hundreds of trucks and containers with fewer engines that are less pollutant.

Ports & Industrial Areas Issues

- Cargoes should flow to the nearest port to maximize waterborne delivery (short sea shipping) and avoid truck/rail congestion.
- Greater effort on land port issues
- Ports of entry are just as important in goods movement as seaports

Aviation Issues

- Much of the LAX air cargo arrives in the bellies of passenger planes. Therefore, it is difficult to ship air cargo to other airports.
- Need better airport access for shipping.

Goods Movement Benefits

- Future planning for goods movement is critical to Palmdale and Lancaster. The High Desert Corridor included planning for goods movement. When considering funding for projects, those making the decisions, should reward proactive planning rather than react.
- Goods movement and its importance has not been an issue at this chamber. Do appreciate learning more so as to pass along to our members.
- Goods movements/traveling should be scheduled to work in off-peak hours as to reduce congestion on freeways and local arteries.
- Improvement to goods movement infrastructure should be combined with other transportation improvements, e.g. the inclusion of commuter rail with freight rail.
- The current goods movement debate in Southern California is focusing on headlines rather than solutions. This will prolong the inability to achieve real solutions – and may result in the imposition of "solutions" which have very negative consequences.
- There should be more national and state resources focused on the issue of goods movement.

Other Comments

- 90% or so of the negative impacts visited upon 2% of the population, usually low income, neighborhoods of color.
- An imperial county partner should be added to the list of involved agencies heading this effort, hopefully the public at large could be solicited for input.
- Call me 951-333-9514.
- Continued immigration studies along with scrutinized drug traffic that presents problems throughout the area.
- Gridlock issues have driven manufacturers and distribution centers from the LA/Orange County areas. Continued congestion at the unprecedented scale seen to date may cause additional large business to leave the state.
- Hard to find good people due to high cost of living.
- I commend this group on attempting to put together a plan to mitigate the problems associated with goods movements in Southern California. However, I believe that we are framing the questions in the wrong way–our efforts are skewed by an ideology that doesn't work. As a resident of San Pedro, I am APPALLED that there is an apparently acceptable level of sickness and death in our communities. This happens despite our understanding of exactly what that's related to–a major portion of that being past and current goods movement practices and technology. I, for one, understand that economic growth is not a birthright and is not even necessarily a good thing all of the time. All of this discussion boils basically down to the fact that I have an extremely high chance of getting cancer because someone needs that extra-cheap Wal-Mart bath mat. That is unacceptable. I will soon want to have children, and believe me, even though I do care that MY health is compromised by living here, I certainly will not expose any children to it. I am not the only young, highly educated, highly motivated person to feel this way. Many like me have the ability to get out. Others do not. Sadly, one of the economic costs that no one seems to be taking into consideration is the brain drain that is going to happen to this area if we can't figure out a way to clean it up and SOON.

- I think disaster response it's totally overlooked – we're working on another concept called Supply Chain Restoration.
- Imperial County encourages these types of facilities. There is no NIMBY.
- Issues need to be addressed from an overall systems approach with institutional management, operations and infrastructure funding designed to support Southern California's role in overall global trade/shipping.
- It is a privilege not a right to do business in CA. If a company refuses to incorporate clean fuel and technologies we do not need or want them. We do not need to import 90% of the products being imported.
- It is extremely severe in my neighborhood and would like it moved to an industrial area away from our families and add stricter measures to the air emissions.
- It is insane to base our economy on moving foreign product making us more reliant upon foreign oil (trucks, trains, ships, etc). We should put our emphasis on creating jobs in green manufacturing.
- It is very important for our local and nation economy, however, it is impacting our quality of life and we are not getting enough assistance from other States and Federal to address related impacts.
- Keep them moving at a reasonable pace.
- Major nationwide issue
- Many industrial businesses rely on just in time materials deliveries.
- More industrial business for job creation and higher paying jobs.
- Much is being done in the urban areas. Need to spread out facilities to areas like Needles. Easy access to Nevada, Arizona and CA and East from hub. Rail access, freeway, airport with larger runways but no water. We can create a great logistics position.
- Need to train logistics personnel.
- No questions were asked about opinion on container fees or tolls to help finance projects needed to address issues
- Redevelopment, warehouse location near schools
- Regions that support parts benefit rest of county - when talking about "fair share" perhaps other states should be sending transportation $ to SOCA to support parts + their (other states) consumption demands.
- Safety is very important. Concerned about border trucks and lack of regulation of equipment and drivers.
- SCAG as the region's MP should lead the region in designating a primary goods movement corridor through the region and build support and power to lobby for funds to improve that corridor before considering other facilities. The logical primary corridors
- The cities of Pomona, Chino Hills, Diamond Bar and Brea have created a non-profit coalition of cities and private sector businesses called the Four Corners Transportation Coalition.
- The major problem is the antiquated infrastructure and the best remedy is to get a higher utilization from what exists by more efficient usage.
- The manufacturing job loss has been a killer in southern California

- The work has been done by the center for the commercial deployment of transportation technologies. Long Beach is very encouraging. I suggest contacting them at 562-985-2412 for more information.
- There is a need for one organization to take the lead on prioritizing projects, and for all of the regulatory agencies (CARB, SCAQMD, ports, City of LA, etc.) to work together to solve air quality issues.
- They need to be addressed because the problem is only getting worse and reversing the existing damage could become impossible at some point.
- This is critical for our future.
- We need some organization to take the lead.
- Would like to see container fees to address improving air quality and reducing premature deaths and health problems.
- Yes, we will oppose all efforts to triple trade if government at all levels is unwilling to do what it takes to make this region whole.
- You must include community, environmental justice and environmental groups from the inception of the planning process, and conduct on-the-ground outreach, and impose restrictions that provide real air and water pollution benefits with enforceable mechanisms.
- I truly feel the shipping industry has been enjoying absolute freedom from responsibility for a long time.

Agencies

- City of Calexico County Public Works Department
- City of Imperial County Public Works Department
- Community Development Directors
- Economic Development Agencies
- Members of Air Pollution Control Districts; leaderships/community adjacent to ports
- City of Needles City Manager
- State and Federal Legislation Offices

Business

- AMER on Pole Division, Fillmore, CA
- BNSF
- Major hauling companies (i.e. Yellow Freight, railroads, FedEx, UPS, etc...
- Would like to intensify involvement of current area operations, such as UPS, DHL, and FedEx.
- Would like to link into research resources/interest with American Railroad Association, et. al. on non-highway/freeway capacity enhancement potentials
- Coordination of good movements between different business to reduce redundancies and duplication of trips when the deliveries can be coordinated

Non-Profit

- Chambers of Commerce
- Local transportation commissions

Individuals

- Residents who live near railroad tracks at at-grade railroad crossings. Ask them if they "enjoy" train warning whistles at 2:00 a.m.
- People near train stations and rail lines.
- Professor Amelia Regan, UCI, aregam@uci.edu
- The Goods Movement and ARB Stakeholder Lists.

Multi-County Goods Movement Action Plan

Technical Memorandum 2b: Public Outreach - Survey No. 2 Report

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
San Diego Association of Governments

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April 30, 2008

Table of Contents

1.0 INTRODUCTION **1-1**

2.0 SURVEY METHODOLOGY **2-1**

3.0 SURVEY RESULTS **3-1**
- **3.1 Number of Surveys** **3-1**
- **3.2 Survey Respondents** **3-1**
  - Breakdown by Category 3-2

4.0 MAJOR FINDINGS **4-1**
- **4.1 Most Favored Goods Movement Projects and Strategies** **4-2**
- **4.2 Projects/Strategies Prioritization** **4-5**
- **4.3 Most Favored Highways for Improvement** **4-7**
- **4.4 Potential East-West Corridor Improvements** **4-8**
- **4.5 Sources of Funding** **4-9**

5.0 OTHER COMMENTS **5-1**

Appendix

APPENDIX A **A-1**

APPENDIX B **B-1**

APPENDIX C **C-1**

APPENDIX D **D-1**

1.0 Introduction

The purpose of this technical memorandum is to present the methodology and findings associated with Survey No. 2 of the Multi-County Goods Movement Action Plan (MCGMAP). The survey was developed and administered to key stakeholders in the MCGMAP seven-county study area, including Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura and Imperial counties. The purpose of the survey was to obtain perceptions and opinions of goods movement projects and strategies. From the results of the survey, the MCGMAP technical team is able to validate and/or re-consider existing assumptions about key issues and problems as they relate to goods movement in the Southern California region.

2.0 Survey Methodology

The MCGMAP Outreach Committee developed the Survey No. 2 instrument and cover letter for dissemination (Appendix A). The survey was comprised of 52 questions across eight pages and took about 15 to 20 minutes to complete. It included a range of goods movement topics, including port and rail related strategies, truck-related, highway-related, operational and technology, financial and policy, and environmental strategies related to improving goods movement. Each respondent was also asked to self-identify for documentation and future noticing purposes. However, all individual data results remain confidential. All surveys were distributed and received between December, 2006 and April, 2007.

Survey No. 2 was distributed to key stakeholders throughout the seven-county study area via each of the county transportation commissions (CTCs) and transportation agencies. These included:

1. Los Angeles County Metropolitan Transportation Authority
2. Orange County Transportation Authority
3. Riverside County Transportation Commission
4. San Bernardino Associated Governments
5. San Diego Associated Governments
6. Southern California Association of Governments
7. Ventura County Transportation Commission

Each CTC utilized its own method for distribution, which was either by direct mail or electronic mail. Some county distributions were targeted to their local jurisdictions while others were more expansive to also include existing in-house contact databases or other regional stakeholder lists. Predominantly, the targeted stakeholders included: local jurisdictions (staff and elected officials), business and community organizations, environmental groups and community activists.

In addition, the survey instrument was made available via "Zoomerang," an online survey mechanism. This was coordinated by Southern California Association of Governments (SCAG). All those who received the survey by direct mail or e-mail had the option to complete the hard copy format or to visit the MCGMAP website and click on the link to the survey. Those survey results were then electronically submitted and downloaded by SCAG staff. All survey results, whether received by hard copy or electronically, were compiled in a master data spreadsheet. Final tabulations were completed by question and cross-tabulations were completed by question and by county.

3.0 Survey Respondents

3.1 NUMBER OF SURVEYS

A total of 138 surveys were received from all seven counties. The majority (68%) of surveys were completed online with the remaining batches received directly from the CTCs as follows:

Source	No. of Respondents	Percentage of Responses
Zoomerang (online system by SCAG)	94	68%
Riverside County Transportation Commission	17	12%
Orange County Transportation Authority	15	11%
Los Angeles County Metro	07	05%
San Bernardino Association of Governments	03	02%
Ventura County Transportation Commission	01	01%
San Diego Associated Governments	01	01%
Total number of surveys received:	**138**	**100%**

3.2 SURVEY RESPONDENTS

The surveys were received from a cross-section of respondents with the majority (41%) received from public agencies:

Source	No. of Respondents	Percentage of Responses
Public Agency	54	40%
Private Business	39	30%
Individual	30	22%
Organization	15	08%
Total number of surveys received:	**138**	**100%**

BREAKDOWN BY CATEGORY

The following is the listing of the survey respondents further distributed by sub-category for public agencies, private business and organizations:

Public Agency	No. of Respondents	Percentage of Responses
Local Government	43	80%
County Government	05	09%
State Government	02	04%
Multi-County Special District	02	03%
Naval Institute	01	02%
Subregional Council of Government	01	02%
Federal Government	00	00%
Total number of surveys received:	**54**	**100%**

Private Business	No. of Respondents	Percentage of Responses
Warehouse/Distribution	07	18%
Logistics/3PL	05	13%
Consultants	05	13%
Rail	03	07%
Civil Engineering	03	07%
Trucking	03	07%
Maritime	03	07%
Industrial/Manufacturing	02	05%
Commercial Real Estate Developer/Owner	02	05%
Construction	01	03%
Automotive	01	03%
Musical Instrument & Electronics Importer	01	03%
Media	01	03%
Specialty Retail	01	03%
Heavy Duty Hybrid Electric Drive Systems	01	03%
Aviation	00	00%
Total number of surveys received:	**39**	**100%**

Organization	No. of Respondents	Percentage of Responses
Non-Profit	05	33%
Professional Association/Organization	03	20%
Community Based	03	20%
Issue Advocacy	01	07%
Other	03	20%
Total number of surveys received:	**15**	**100%**

4.0 Major Findings

During the MCGMAP study, many goods movement projects and strategies were identified to address the goods movement challenge in Southern California. The Survey No. 2 instrument presented six main categories of good movement projects and strategies. **These six categories are used throughout this report to present survey results:**

1. Port/Rail-related
2. Truck-related
3. Highway-related
4. Operation & technology
5. Financial & policy
6. Environmental

4.1 MOST FAVORED GOODS MOVEMENT PROJECTS AND STRATEGIES

Highly Supportive

Survey respondents were asked to indicate their level of support for a wide range of goods movement projects and strategies organized under each of the six main categories. **The following are the projects/strategies which received the highest level of support across all categories (in order of support)**:

Category	Projects/Strategies with Highest Response In "Highly Supportive"	% Highly Supportive
Port/Rail-Related	More rail grade separations, where highways will go over or under rail tracks and traffic will not have to wait for trains	67%
Port/Rail-Related	Increase capacity of port and railyards by more efficient operations	60%
Operational & Technology	Operation and scheduling techniques to reduce delays at ports and intermodal facilities	56%
Operational & Technology	Increased use of advanced technology for vehicle management, routing and safety inspections	53%
Highway-Related	Improvements to freeway interchanges to reduce congestion into and out of industrial areas	48%
Port/Rail-Related	Additional near-dock rail close to ports to load containers directly to rail and reduce truck trips	46%
Operational & Technology	Expand seaport and border crossing hours further to increase efficiency and spread traffic	46%
Operational & Technology	Expand delivery hours at warehouses to increase efficiency and spread traffic	44%
Financial & Policy	Charge a fee on containers to pay for infrastructure improvements that facilitate freight movement	41%
Environmental	Invest in air quality improvements at the same time as infrastructure improvements	40%
Highway-Related	Add new freeway lanes for all traffic, both trucks and cars together	37%
Truck-Related	Dedicated truck lanes, which are freeway lanes for trucks only, separated by barriers from other lanes (with or without tolls)	36%
Highway-Related	New express toll lanes (like SR-91 express lanes/Fast Track) on other freeways, which reduce congestion for both cars and trucks	32%

Financial & Policy	Require new dedicated truck lane facilities to be totally user-financed through either container fees and/or tolls	31%
Truck-Related	In San Diego County only, allowing trucks on the barrier-separated high-occupancy vehicles (HOV) lanes in the off-peak periods (with or without tolls)	26%

The top four projects/strategies that received 53% or more of a "highly supportive" response pertain to the **port/rail and operational/technology categories**. This indicates that respondents feel that the most potential for improvements in the goods movement system in Southern California is centered on changes at the ports, the railroads and operational or technological improvements that would either increase capacity and/or improve efficiencies of the goods movement system.

Supportive

When reviewing the next tier of projects/strategies which received the second highest rating of "supportive," **dedicated truck lanes** topped the list at 44%. (See table below.) Most of the remaining projects/strategies that received a "supportive" rating were from both the Port/Rail-Related and Environmental categories. Respondents still indicate a high level of support for port/rail-related ideas, but more than one environmental projects/strategies also appear on this secondary listing.

Category	Projects/Strategies with Highest Response In "Supportive"	% Supportive
Truck-Related	Dedicated truck lanes if significant impacts are avoided	44%
Port/Rail-Related	Other alternative technologies to move freight to intermodal facilities	43%
Port/Rail-Related	More intermodal facilities, where freight can be transferred between trains and trucks (existing facilities are at capacity)	41%
Environmental	The ports should negotiate with steamship operators to reduce pollutants through strict provisions in terminal leases	38%
Port/Rail-Related	New shuttle trains to move freight between ports and intermodal facilities	37%
Environmental	Local governments should require buffers between new residential development and heavily traveled freeways and rail lines	37%
Financial & Policy	Fund new dedicated truck lane facilities through a combination of public funds and user fees, if that is the only way they can be built	35%
Environmental	Local governments should require buffers between new industrial developments and new/existing residential areas	34%
Port/Rail-Related	Increase rail capacity by adding new track along existing rail lines	33%
Environmental	Invest in infrastructure improvements first, then focus on air quality improvements	28%
Environmental	Public funds should be used as an incentive to help truck operators to change over to cleaner engines	28%

No Support

Finally, the project/strategy which received the highest rating of "No Support" was in reference to **Longer Combination Vehicles (LCVs)**. When asked if LCVs should be allowed on dedicated truck lanes (if legalized), the majority of the respondents (32%) indicated no support for this project/strategy.

The complete set of results for all six main categories of project/strategies is contained in Appendix B.

4.2 PROJECTS/STRATEGIES PRIORITIZATION

In addition to identifying their level of support for specific goods movement projects/strategies, survey respondents were also asked to prioritize each project/strategy. Respondents were asked to identify their top five priorities among the listing of projects/strategies presented in the survey as well as any other original ideas from the respondent. The following table represents a summary of the projects/strategies which received a priority response. The "#1 Priority" column is highlighted to indicate that these project/strategies were identified as the most important project/strategy by the listed number of respondents. **Of all goods movement projects/strategies, survey respondents chose increasing rail capacity and grade separations as the most important priorities.**

	Number of Respondents				
Project/Strategies	**#1 Priority**	**#2 Priority**	**#3 Priority**	**#4 Priority**	**#5 Priority**
PORT/RAIL					
Rail capacity	7	6	1	2	3
Grade separations	6	1	1	1	2
Shuttle train from port to inland facility	1		2	1	
Direct ship-to-rail improvements (operations at Ports)	1				
Near dock facility improvements			1	1	
Port/Rail improvements, in general		1	2	1	
(Improve) Gerald Desmond Bridget					1
TRUCK-RELATED					
Dedicated truck lanes	3	6	3		
Truck operations (hours on freeways)	2		2		
Truck improvements, in general	2	1			
Longer combination vehicles					1
HIGHWAY-RELATED					
Improve Interstate 710	2		1		
Widen/improve all freeways	2				
Improve State Route 60	1				
(Add) new Orange/Riverside County corridor	1				
Add mixed flow lanes	1	2	3		
Improve interchanges (all and specifically, 10/215/60 connections)	1	1	3	1	
Improve transit first	1				
Improve Interstate 10				1	
Improve Interstate 15 (through Corona & south)				1	
Improve Interstate 215		1			
Improve State Route 91		1	2		
Expand I-5 and I-805 in San Diego County		1			
(Add) new High Desert Corridor (15 to 395)		1			
Improve entire east-west system		1			
Full use of HOV lanes		1			
Add extra HOV lane on I-10 (Santa Monica)				1	

OPERATIONAL & TECHNOLOGY					
Increase port & warehouse operating hours	2	2	2		1
Transfer technology		1	1	2	
Require electric engines for rail		1			
Operational & technology, in general		1	1	2	1
FINANCIAL & POLICY					
Container fees	3	1	1	1	1
User fees/toll lanes	1		1	2	1
Truck toll (I-710 to I-10, I-170 to I-5)	1	2			1
Financial & policy strategies, in general	1				1
Private sector/no new taxes			1	1	
ENVIRONMENTAL					
Invest in air quality improvements first, then focus on infrastructure improvements			1		
The ports should negotiate with steamship operators to reduce pollutants through strict provisions in terminal leases				1	
Local governments should require buffers between new industrial developments and new/existing residential areas					2
Incentives to encourage environmentally-friendly equipment and/or tax credits for infrastructure building					1
(Improve) air quality		1			

The complete listing of responses to this open-ended question is contained in Appendix C.

4.3 MOST FAVORED HIGHWAYS FOR IMPROVEMENT

From a listing of highways in the southern California region, the survey respondents were asked to select all highways which they believed **dedicated truck lanes** could be both feasible and beneficial. Additionally, respondents were asked to select those highways which they believed ***additional*** **mixed flow lanes** could be both feasible and beneficial. While the top five selected highways are listed below for both truck lanes and mixed flow lanes, **no highway received any significant level of support from survey respondents more so than any other highway.** If anything, this may indicate an equal need for improvement across all of these highways more so than any one highway being the most favored. The survey results were as follows:

Selected Highways for Truck Lanes	No. of Respondents	Percentage of Responses
1. Interstate710 in LA County	71	6.25%
2. Interstate 10 in San Bernardino County	64	5.63%
3. Interstate 10 in Riverside County	63	5.55%
4. State Route 60 in LA County	58	5.11%
5. Interstate 10 in East LA County	57	5.02%

Selected Highways for Mixed Flow Lanes	No. of Respondents	Percentage of Responses
1. Interstate 5 in LA County	49	5.50%
2. Interstate 710 in LA County	43	4.83%
3. State Route 91 in Orange County*	39	4.38%
3. State Route 91 in Riverside County*	39	4.38%
4. State Route 60 in LA County*	37	4.15%
4. State Route 60 in San Bernardino County*	37	4.15%
5. Interstate 10 in East LA County	36	4.04%

* Note: Two highways are listed in the same ranking since they received the same level of support.

Complete data results are included under Appendix D.

4.4 POTENTIAL EAST–WEST CORRIDOR IMPROVEMENTS

Much of the goods movement traffic travels east-west between the Ports of Los Angeles and Long Beach to points farther east in the Inland Empire. Many of the freight trucks travel from these two ports on the I-710 (Long Beach Freeway) and then transfer to one of four east-west freeways to get to the Inland Empire and points beyond. Survey respondents were asked whether improvements, which would encourage truck traffic, should be made to one of the four east-west freeways *more* so than the other three. **Most (51%) felt that a freeway should be preferred for truck traffic over the others, but one single freeway was not clearly identified as the preferred freeway.** The highest ranked freeways were SR-91 and I-10, which both received 20% support, while the majority (40%) of respondents chose not to select a freeway at all (no response).

Improvement Preferences	No. of Respondents	Percentage of Responses
Yes, improve one of these the most	69	51%
No, improve all about the same	47	35%
No response	19	14%
Total	135	100%

East-West Corridor Freeways	No. of Respondents	Percentage of Responses
No response	55	40%
State Route 91 (Artesia/Riverside Freeway)	27	20%
Interstate 10 (San Bernardino Freeway)	27	20%
State Route 60 (Pomona/Moreno Valley Freeway)	23	17%
Interstate 210 (Foothill Freeway)	04	03%
Total	136	100%

4.5 SOURCES OF FUNDING

While survey respondents indicated their support (or lack of support) for a wide range of goods movement projects/strategies, an open question is how these improvements should be funded. Survey respondents were asked to select which sources of funding should be used to construct and initiate new goods movement projects and strategies. Respondents were able to select more than one funding source as a preferred funding source. The following table indicates that respondents generally have a flat distribution of support across most funding sources with the majority (27%) of all respondents choosing container fees as the most favorable.

Funding Source	No. of Respondents	Percentage of Responses
Container Fees	64	27.00%
Tolls	46	20.00%
Taxes (gas, sales, other)	45	19.00%
Private Sector	41	18.00%
Public Bond Issue	36	15.00%
Other: Public/Private	1	0.50%
Other	1	0.50%
Total:	234	100.00%

5.0 OTHER COMMENTS

The final questions of the survey were four open-ended questions for the respondents to provide any other issues and comments on goods movements and to also offer other individuals/organizations who should be included for future surveys. A total of 21 out of the 138 respondents provided the following direct comments, which are organized along the six main goods movement categories used for this survey:

Port/Rail-Related

- Open up other Ports-Mexico/Seattle/other; distribute traffic. Better yet, have a "Buy American" program.
- Need a major rail terminal on Terminal Island for BNSF, UP, etc.
- Dollars should be prioritized on projects that increase the throughput capacity of rail traffic to inland intermodal facilities, to reduce overall truck trips on congested freeways. Overall investment may, thus, be reduced to increase goods movement capacity.
- Improve the productivity of the Long Beach and Los Angeles ports through better work rules in the LABA Contracts.
- If we don't improve the rail capacity, our traffic and smog will get worse due to increased truck traffic.
- Keep port activity in the United States.

Truck-Related

- Favor separate truck lanes.
- Financial feasibility would depend on charging tolls and higher speeds to encourage use of dedicated truck lanes. Must provide for trucks to pass slower trucks on dedicated lanes. (#22)

Highway-Related

- Strategy #28 must have a viable financing plan. Funding from private enterprise may be able to deliver projects earlier.

Operational & Technology

- No truck movements during peak hours on congested freeways.
- Find out where all freight originates and then terminates within basin. Then use technology to reduce mileage driven.
- Fast lanes! Increase times!! Open Saturdays for more time!!

Financial & Policy

- SAFETEA-LU & state money should be distributed fairly.
- Maintain industry and jobs
- Tax incoming products accordingly. Rebuild rustbelt productivity.
- Continued coordination by BACA Transportation agencies in all six counties.
- Stop studying; do something.
- We should not be subsidizing the rest of the country's ability to buy cheap goods from China.
- Policies on right of way/eminent domain will likely have a huge, detrimental effect on Infrastructure improvement. Relaxing governmental requirements for public facilities.
- This is a national issue and it is sad that the politics in Washington favors the Bay Area and Central Valley.
- Do not use the local portion of gas tax, sales tax, etc. (#46)
- There have been a number of entities involved in goods movement over the past and many of the same stakeholders. We need to be more efficient about processes and stakeholders need to commit to solutions.
- Our issues are not going away if nothing is done. The problems just intensify.

Environmental

- Stricter control of truck pollutants.
- Invest in air quality improvements to mitigate significant environmental impacts from a project. (#36) Should be a relatively small percentage of total investment. Diverting more goods from trucks to trains may improve air quality.
- Do not use local agency funding. Use federal funds. (#39)

APPENDIX A

Cover Letter and Survey Instrument

SOUTHERN CALIFORNIA MULTI-COUNTY GOODS MOVEMENT ACTION PLAN
COVER LETTER FOR SURVEY NO. 2 (As of 1-31-07)

January 31, 2007

Dear Colleague:

The **Southern California Multi-County Goods Movement Action Plan** has been under development since May, 2004. Your participation and many other key stakeholders in the region have been instrumental in the development and review of ideas and strategies to address this monumental issue facing our region. The movement of goods through Southern California, projected to increase dramatically over the next 20 years, is critical to the nation and provides significant economic benefits to the region. It also places disproportionate burdens on many communities and key transportation corridors.

The Action Plan is a joint effort of the region's transportation commissions (Los Angeles County Metropolitan Transportation Authority or METRO, Orange County Transportation Authority, Riverside County Transportation Commission, San Bernardino Associated Governments, San Diego Association of Governments and Ventura County Transportation Commission), Caltrans, and the Southern California Association of Governments (SCAG). METRO is serving as the lead agency. The Action Plan will develop strategies and an implementation plan to support the efficient movement of goods together with effective environmental and community impact mitigation strategies. It is building on initiatives already underway.

Toward this end, enclosed is Survey No. 2, which is focused upon capturing your preferences and opinions about proposed goods movement strategies and projects. This survey is being distributed to local jurisdictions, stakeholder groups and private business in the entire SCAG region. The attached survey will take approximately 10 to 15 minutes of your time. This survey is intended to collect anecdotal information only and will not achieve results that are statistically significant.

We would appreciate your survey response by **February 28, 2007** so that the thoughts and observations of your organization can be adequately represented in documentation for the Action Plan. You can complete this survey by:

1. Completing it online at: **www.metro.net/mcgmap**
2. Completing the hard copy and e-mail a PDF file to: **MCGMAP@ArellanoAssociates.com**
3. Completing the hard copy and faxing to: **(909) 628-5804**
4. Completing the hard copy and mailing to:

MCGMAP
c/o Arellano Associates
4091 Riverside Drive, Suite 117
Chino, CA 91710

If you should have any questions about the survey, please contact Michelle Smith at METRO at (213) 922-

3057 or by e-mail at SmithMi@metro.net. [You may consider including your own contact information here.] You will receive updates on the Action Plan through your area's council of governments or you may access the Action Plan website any time at www.metro.net/mcgmap for ongoing information.

Thank you very much for your assistance on this important effort!

Sincerely,

[Insert your signature.]
[Title]

Southern California Multi-County Goods Movement Action Plan
SURVEY NO. 2

Background

Significant increases in goods movement – the movement of goods for sale, supplies, and products by truck, freight train, airplane, and cargo ship – are expected within the next 20 years in Southern California. With imports coming in at an all-time high through the seaports of Los Angeles and Long Beach and the Mexican border crossings, Southern California not only serves as the network by which we receive our own goods, but also as the network by which eastern regions and states throughout the country receive their goods. In order for so many products to be readily available on our grocery and retail shelves, so much of them come through our ports, are "transloaded" or transferred off ship containers into local warehouses and then are trucked to our local stores or routed to points beyond Southern California.

Since May 2004, a partnership of public agencies (listed in the box below) has been studying transportation challenges related to goods movement. The **Southern California Multi-County Goods Movement Action Plan (MCGMAP)** will propose goods movement projects and strategies for six Southern California counties: Los Angeles, Ventura, San Bernardino, Riverside, Orange and San Diego. Technical review and stakeholder input has been steady and very helpful. We thank all who responded to Survey No. 1 in May 2006.

Purpose of this Survey

Based upon study work completed thus far, the MCGMAP team is now ready to propose goods movement regional strategies for public review and comment. **You are being asked for your opinions about these goods movement strategies with this Survey No. 2.** The attached survey will take about 10-15 minutes of your time.

All personal contact information will be kept confidential unless you agree to let us add you to our mailing list for this project. Answers from all respondents will be combined, so no one will be able to identify you by your answers.

Please complete the survey no later than **March 16, 2007** by:

5 Completing it online at: **www.metro.net/mcgmap**
6 Completing the hard copy and e-mail a PDF file to: **MCGMAP@ArellanoAssociates.com**
7 Completing the hard copy and faxing to: **(909) 628-5804**
8 Completing the hard copy and mailing to:

MCGMAP
c/o Arellano Associates
4091 Riverside Drive, Suite 117
Chino, CA 91710

For additional project information, including dates, times and locations of stakeholder meetings in Southern California, please visit our **homepage** website www.metro.net/mcgmap/ or e-mail us at mcgmap@metro.net.

Thank you for taking the time to complete our survey!

A partnership of:
Los Angeles County Metropolitan Transportation Authority ♦ Orange County Transportation Authority
Riverside County Transportation Commission ♦ San Diego Association of Governments
San Bernardino Associated Governments ♦ Ventura County Transportation Commission
California Department of Transportation ♦ Southern California Association of Governments

Section 1: Individual, Public Agency or Organization Information

1. I am responding to this entire survey as a(n): (Check one only.)

___ Individual

___ Representative of Public Agency (Federal, state, county or city, etc.)

___ Representative of an Organization (Community-based, non-profit, professional association, issues advocacy, etc.).

___ Private Business

2. In which county are you? (Check all that apply to you or your organization.)

___ Los Angeles County
___ Ventura County
___ San Bernardino County
___ Riverside County
___ Orange County
___ Imperial County
___ San Diego County
___ Other: _____

3. Would you like your name and contact information added to our mailing list for this project? (Check one only.)

___ Yes (Please complete #4-10 below.)
___ No (Skip to Question #11 below.)

4.	Individual's Name			
5.	Agency, Organization or Business Name *(if applicable)*			
6.	Address			
7.	City			
8.	State			
9.	Zip Code			
10.	E-Mail			
11.	If **Individual**, please check County of residence:	Los Angeles Ventura San Bernardino	Riverside Orange Imperial	San Diego Other: _____ _____
		Local government	County government	State government
		Federal government	Other, please describe:	
		Community Based	Issue Advocacy	Non-Profit
		Professional Association	Other, please describe:	
14.	If **Private business**, Check one:	Rail Trucking Maritime	Aviation Industrial/Manufacturing Warehouse/Distribution	Logistics/3PL Other:

Section 2: Goods Movement Projects and Strategies

Many ideas have been suggested during the MCGMAP study that help address our goods movement challenge here in Southern California. Many project ideas and strategies have been identified. Ultimately, a mix of these ideas – rather than just one strategy – will be needed to improve our traffic flow and stem the negative impacts on our air quality, neighborhoods and overall environment. Of the following categories, please rate your level of support:

	Level of support from you, your agency, organization or business *(Please check only one box per line.)*				
	1 No Support	**2 Little Support**	**3 Some Support**	**4 Supportive**	**5 Highly Supportive**
PORT/RAIL-RELATED					
15. Additional near-dock rail close to ports to load containers directly to rail and reduce truck trips					
16. More intermodal facilities, where freight can be transferred between trains and trucks (existing facilities are at capacity)					
17. New shuttle trains to move freight between ports and intermodal facilities					
18. Other alternative technologies to move freight to intermodal facilities					
19. Increase rail capacity by adding new track along existing rail lines					

20. More rail grade separations, where highways will go over or under rail tracks and traffic will not have to wait for trains					
21. Increase capacity of port and railyards by more efficient operations					
TRUCK-RELATED					
22. Dedicated truck lanes, which are freeway lanes for trucks only, separated by barriers from other lanes (with or without tolls)					
23. In San Diego County only, allowing trucks on the barrier-separated high-occupancy vehicle (HOV) lanes in the off-peak periods (with or without tolls)					
24. Dedicated truck lanes only if significant impacts are avoided					
25. Allow Longer Combination Vehicles (LCVs), also known as "triple trailers," on dedicated truck lanes if legalized (LCVs are trucks that are allowed to haul an added trailer)					
HIGHWAY-RELATED					
26. Improvements to freeway interchanges to reduce congestion into and out of industrial areas					
27. Add new freeway lanes for all traffic, both trucks and cars together					

28. New express toll lanes (like the SR-91 express lanes/"Fast Track") on other freeways, to reduce congestion for both cars and trucks					
OPERATIONAL & TECHNOLOGY					
29. Expand seaport and border crossing hours further to increase efficiency and spread traffic					
30. Expand delivery hours at warehouses to increase efficiency and spread traffic					
31. Increased use of advanced technology for vehicle management, routing and safety inspections					
32. Operational and scheduling techniques to reduce delays at ports and intermodal facilities					
FINANCIAL & POLICY					
33. Charge a fee on containers to pay for infrastructure improvements that facilitate freight movement					
34. Require new dedicated truck lane facilities to be totally user-financed through either container fees and/or tolls					
35. Fund new dedicated truck lane facilities through a combination of public funds and user fees, if that is the only way they can be built					
ENVIRONMENTAL					
36. Invest in air quality improvements at the same time as infrastructure improvements					

37. Invest in air quality improvements first, then focus on infrastructure improvements					
38. Invest in infrastructure improvements first, then focus on air quality improvements					
39. Public funds should be used as an incentive to help truck operators to change over to cleaner engines					
40. Public funds should be used as an incentive to help the railroads switch to cleaner engines					
41. Railroads and truckers should fund cleaner engines entirely on their own					
42. The ports should negotiate with steamship operators to reduce pollutants through strict provisions in terminal leases					
43. Local governments should require buffers between new industrial developments and new/existing residential areas					
44. Local governments should require buffers between new residential development and heavily traveled freeways and rail lines					

Section 3: Specific Project Questions

The following questions pertain to issues or projects which have drawn a high level of stakeholder attention during this **MCGMAP study**.

45. STEP 1: Check all highways on which you believe *dedicated truck lanes* could be both feasible and beneficial.

    STEP 2: For those highways you have selected, please indicate your order of priority with "1" being the most important, "2" being the second most important, and so on.

    STEP 3: Check all highways on which you believe *additional mixed flows lanes* could be both feasible and beneficial.

    STEP 4: For those highways you have selected, please indicate your order of priority with "1" being the most important, "2" being the second most important, and so on.

	TRUCK LANES			**MIXED FLOW LANES**	
	Step 1:	**Step 2:**		**Step 3:**	**Step 4:**
	Truck Lane? *(check all that apply)*	Truck Lane Priority *(number)*		Mixed Flow? *(check all that apply)*	Mixed Flow Priority *(number)*
Interstate 5 (Golden State Freeway) in Los Angeles County					
Interstate 5 (Santa Ana Freeway) in Orange County					
Interstate 5 (San Diego Freeway) in San Diego Co. (to Mexico Border)					
Interstate 10 (Santa Monica Freeway) in West Los Angeles County					
Interstate 10 (San Bernardino Freeway) in East Los Angeles County					
Interstate 10 (San Bernardino Freeway) in San Bernardino County					
Interstate 10 (San Bernardino Freeway) in Riverside County					
Interstate 15 (Barstow/Mojave Freeway) in San Bernardino County					
Interstate 15 (Temecula Valley Freeway) in Riverside County					
Interstate 15 (Escondido Freeway) in San Diego County					

Interstate 110 (Harbor Freeway) in Los Angeles County					
Interstate 210 (Foothill Freeway) in Los Angeles County					
State Route 210 (Foothill Freeway) in San Bernardino County					
Interstate 215 (Barstow Freeway) in San Bernardino County					
Interstate 215 (Riverside/Escondido Freeway) in Riverside County					
Interstate 405 (San Diego Freeway) in Los Angeles County					
Interstate 605 (San Gabriel Valley River Freeway) in Los Angeles Co.					
Interstate 710 (Long Beach Freeway) in Los Angeles County					
State Route 57 (Orange Freeway) in Los Angeles County					
State Route 57 (Orange Freeway) in Orange County					
State Route 60 (Pomona Freeway) in Los Angeles County					
State Route 60 (Pomona Freeway) in San Bernardino County					
State Route 60 (Moreno Valley Freeway) in Riverside County					
State Route 91 (Artesia/Riverside Freeway) in Orange County					
State Route 91 (Artesia/Riverside Freeway) in Riverside County					
State Route 118 (Ronald Reagan Freeway) in Ventura County					
State Route 118 (Ronald Reagan Freeway) in Los Angeles County					
State Route 126 (Santa Paula Freeway) in Ventura County					
State Route 126 (Santa Paula Freeway) in Los Angeles County					
State Route 138 (Pearblossom Highway) in North Los Angeles County					
State Routes 905/11 (Otay Mesa Road) in San Diego County					

US Route 101 (Ventura Freeway) in Ventura County					
US Route 101 (Hollywood Freeway) in Los Angeles County					
US Route 395 (Eastern Sierra Highway) in San Bernardino County					
State Routes 86 and 111 in Imperial County (to Mexico border)					

46. For all goods movement improvement projects, what sources of funding should be used to construct new projects?

Sources of Funding	Check all that apply	What is your priority? *(number)*
Tolls		
Container fees		
Public bond issue		
Taxes (gas, sales, other)		
Private sector		
Other:		

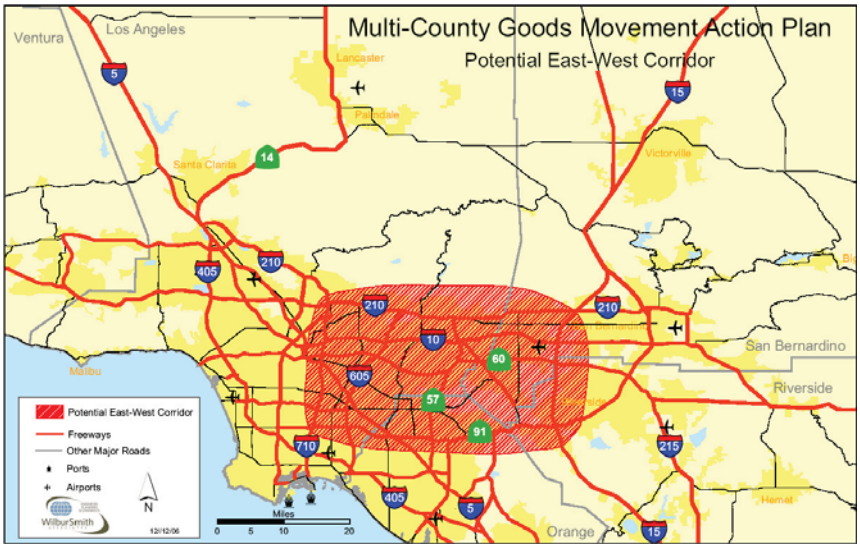
47. Much of the goods movement traffic travels east-west between the Ports of Los Angeles and Long Beach to points farther east. Many of these trucks travel from these two ports on the I-710 (Long Beach Freeway) and then transfer to one of four freeways to get to the Inland Empire and points beyond. They are:

1 State Route 91 (Artesia/Riverside Freeway),
2 State Route 60 (Pomona/Moreno Valley Freeway),
3 Interstate 10 (San Bernardino Freeway)
4 Interstate 210 (Foothill Freeway).

Do you think improvements, which would encourage truck traffic, should be made to one of these four east-west freeways *more so* than the others?

_____ Yes, improve one of these the most *(Go to question #48.)*

_____ No, improve all about the same *(Go to question #49.)*



48. If yes, which one? (Check one only.)

_____ State Route 91 (Artesia/Riverside Freeway) in Orange and Riverside Counties
_____ State Route 60 (Pomona/Moreno Valley Freeway) in Los Angeles, San Bernardino and Riverside Cos.
_____ Interstate 10 (San Bernardino Freeway) in Los Angeles, San Bernardino and Riverside Counties
_____ State Route 210 (Foothill Freeway) in Los Angeles and San Bernardino Counties

Section 4: General Questions

49. Of all the goods movement strategies presented here, or which you are aware, which <u>five projects or strategies</u> do you believe should absolutely be implemented in Southern California?

1. _____

2. _____

3. _____

4. _____

5. _____

50. What projects or strategies, if any, should be added for consideration?

_____

_____

51. Is there anything else you would like to tell us about goods movement issues in Southern California?

_____

_____

52. Please suggest any other possible survey responders.

_____

_____

Thank you for your time in completing this important survey!

Please visit our website for ongoing information and final steps on the Southern California Multi-County Goods Movement Action Plan.

www.metro.net/mcgmap

APPENDIX B

Survey Results:
Goods Movement
Strategies by Categor

LEVEL OF SUPPORT FOR PROJECTS/STRATEGIES BY CATEGORY

The following is the presentation of data results by category (majority result is **bolded**).

PORT/RAIL-RELATED	***Level of support from you, your agency, organization or business*** *(Please check only one box per line.)*									
	No Support		**Little Support**		**Some Support**		**Supportive**		**Highly Supportive**	
Additional near-dock rail close to ports to load containers directly to rail and reduce truck trips	10	7%	03	02%	14	10%	46	34%	**61**	**46%**
More intermodal facilities, where freight can be transferred between trains and trucks (existing facilities are at capacity)	06	05%	04	03%	18	14%	**55**	**41%**	50	38%
New shuttle trains to move freight between ports and intermodal facilities	11	08%	08	06%	22	16%	**49**	**37%**	44	33%
Other alternative technologies to move freight to intermodal facilities	07	05%	08	06%	30	23%	**56**	**43%**	30	23%
Increase rail capacity by adding new track along existing rail lines	13	10%	06	05%	27	20%	**44**	**33%**	43	32%
More rail grade separations, where highways will go over or under rail tracks and traffic will not have to wait for trains	03	02%	01	01%	11	08%	29	22%	**90**	**67%**
Increase capacity of port and railyards by more efficient operations	05	04%	05	04%	11	08%	33	25%	**80**	**60%**

TRUCK-RELATED	***Level of support from you, your agency, organization or business*** *(Please check only one box per line.)*									
	No Support		**Little Support**		**Some Support**		**Supportive**		**Highly Supportive**	
Dedicated truck lanes, which are freeway lanes for trucks only, separated by barriers from other lanes (with or without tolls)	05	04%	13	10%	21	16%	47	35%	**48**	**36%**
In San Diego County only, allowing trucks on the barrier-separated high-occupancy vehicles (HOV) lanes in the off-peak periods (with or without tolls)	11	14%	15	19%	14	18%	18	23%	**20**	**26%**
Dedicated truck lanes only if significant impacts are avoided	03	02%	13	10%	24	18%	**58**	**44%**	34	26%
Allow Longer Combination Vehicles (LCVs), also known as "triple trailers," on dedicated truck lanes if legalized(LCVs are trucks that are allowed to haul an added trailer)	**42**	**32%**	26	20%	20	15%	27	20%	17	13%

HIGHWAY-RELATED	***Level of support from you, your agency, organization or business*** *(Please check only one box per line.)*									
	No Support		**Little Support**		**Some Support**		**Supportive**		**Highly Supportive**	
Improvements to freeway interchanges to reduce congestion into and out of industrial areas	02	01%	05	04%	10	07%	54	39%	**66**	**48%**
Add new freeway lanes for all traffic, both trucks and cars together	08	06%	10	07%	24	18%	43	32%	**49**	**37%**
New express toll lanes (like the SR-91 express lanes/Fast Track) on other freeways, reduce congestion for both cars and trucks	08	06%	18	14%	36	27%	29	22%	**42**	**32%**

OPERATIONAL & TECHNOLOGY	***Level of support from you, your agency, organization or business*** *(Please check only one box per line.)*									
	No Support		**Little Support**		**Some Support**		**Supportive**		**Highly Supportive**	
Expand seaport and border crossing hours further to increase efficiency and spread traffic	05	04%	07	05%	16	12%	44	33%	**62**	**46%**
Expand delivery hours at warehouses to increase efficiency and spread traffic	05	04%	02	01%	19	14%	50	37%	**60**	**44%**
Increased use of advanced technology for vehicle management, routing and safety inspections	02	01%	03	02%	15	11%	43	32%	**72**	**53%**
Operation and scheduling techniques to reduce delays at ports and intermodal facilities	02	01%	06	04%	11	08%	41	30%	**76**	**56%**

FINANCIAL & POLICY	***Level of support from you, your agency, organization or business*** *(Please check only one box per line.)*									
	No Support		**Little Support**		**Some Support**		**Supportive**		**Highly Supportive**	
Charge a fee on containers to pay for infrastructure improvements that facilitate freight movement	12	09%	12	09%	25	19%	31	23%	**55**	**41%**
Require new dedicated truck lane facilities to be totally user-financed through either container fees and/or tolls	15	11%	14	10%	29	22%	35	26%	**41**	**31%**
Fund new dedicated truck lane facilities through a combination of public funds and user fees, if that is the only way they can be built	14	10%	18	13%	24	18%	**47**	**35%**	24	18%

ENVIRONMENTAL	***Level of support from you, your agency, organization or business*** *(Please check only one box per line.)*									
	No Support		**Little Support**		**Some Support**		**Supportive**		**Highly Supportive**	
Invest in air quality improvements at the same time as infrastructure improvements	02	01%	03	02%	27	20%	49	36%	**55**	**40%**
Invest in air quality improvements first, then focus on infrastructure improvements	25	19%	**37**	**27%**	36	27%	19	14%	18	13%
Invest in infrastructure improvements first, then focus on air quality improvements	21	16%	27	20%	33	24%	**38**	**28%**	16	12%
Public funds should be used as an incentive to help truck operators to change over to cleaner engines	19	14%	30	22%	32	24%	**38**	**28%**	17	13%
Public funds should be used as an incentive to help the railroads switch to cleaner engines	26	19%	**37**	**27%**	29	21%	28	21%	16	12%
Railroads and truckers should fund cleaner engines entirely on their own	13	10%	22	16%	**43**	**32%**	34	25%	23	17%
The ports should negotiate with steamship operators to reduce pollutants through strict provisions in terminal leases	02	01%	10	07%	30	22%	**51**	**38%**	42	31%
Local governments should require buffers between new industrial developments and new/existing residential areas	03	02%	14	10%	32	24%	**46**	**34%**	39	29%
Local governments should require buffers between new residential development and heavily traveled freeways and rail lines	05	04%	12	09%	28	21%	**49**	**37%**	38	29%

APPENDIX C

Survey Results:
Top Five Priorities of
Goods Movement Projects/Strategies

PRIORITY PROJECTS/STRATEGIES

The following are verbatim responses to this open-ended question sorted by project/strategy within each main category. Numbers in parentheses at the end of some projects/strategies listed below refer to the specific project/strategy as numbered in the survey instrument.

Q49: Of all the goods movement strategies presented here, or which you are aware, which five projects or strategies do you believe should absolutely be implemented in Southern California?

Priority #1

Port/Rail Related

- All projects with grade-separation; railroads crossings
- Rail Grade separations
- Grade separations
- Grade separations
- More Rail Grade separations
- Increase rail capacity by adding new track along existing rail lines (#19)
- Increased use at rail
- More intermodal facilities-SCLA intermodal yard (#16)
- More intermodal facilities for freight transfer
- Increase Roadway capacity by adding lanes even if right-of-way is needed.
- Southern California Intermodal Gateway-BNSF
- Rail Capacity increase with grade separation and double track in the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor
- Direct ship to rail improvements
- Shuttle train from Port to Intermodal Facility

Truck-Related

- More lanes
- Dedicated truck Lanes
- Truck lanes dedicated
- Trucks, Tractor-Trailers make basin deliveries only at night or around peak freeway hours
- Limit daytime travel on freeways by trucks
- Truck related
- Truck related

Highway-Related

- Improve I- 710
- Improvements on 710 for everyone (vehicles/trucks)
- I-60
- New Orange/Riverside County Corridor
- Improvements to freeway interchanges to reduce congestion into and out of industrial areas (#26)
- Freeway Improvements
- Improve and widen all freeways.
- Mixed flow lanes
- Transit first

Operational & Technology

- Longer operating hours at Ports of Los Angeles and Long Beach
- Expand seaport and border crossing hours further to increase efficiency and spread traffic (#29)

Financial & Policy

- Container Fees for Funding
- Container Fees
- Container fees
- Truck only toll road 710 to 10
- Additional lanes paid via user fee, i.e., miles on the road
- Financial & Policy

Environmental

- None

Priority # 2

Port/Rail-Related

- Increase capacity of port and railroads
- ICTF Improvements (UFRR)
- Additional Rail trails from both Ports to Inland Rail Heads.
- On dock rail expansion (LB/LA)
- Increase Rail capacity
- Add additional rail transit facilities.
- Rail separate crossing in Corona
- Port/rail-related

Truck-Related

- Dedicated truck lanes only if significant impacts are avoided (#24)
- Dedicated truck lanes
- Truck lanes
- Dedicated truck lanes # 710
- Truck lanes or specific freeways
- Dedicated truck lanes
- Truck to rail trucker at edge of region
- Truck related

Highway-Related

- Add new freeway lanes for all traffic, both trucks and cars together (#27)
- New Freeways- High Desert Corridor (I-15 to US 395) (#27)
- Add freeway lanes
- I-215
- Improve entire East/West system. Singling out one will lead to EIR that never gets done
- Upgrade interconnections between #10 #215 and 60
- Full use of HOV lanes at Real hours
- Improve Highway 91
- Expansion of the 5 & 805 in San Diego County

Operational & Technology

- Increasing hours of operation & spreading traffic
- Expand delivery hours at warehouses to increase efficiency and spread traffic (#30)
- Require R/R to handle freight by electric engines so no pollution
- Transfer technology
- Operational & technology

Financial & Policy

- Truck only toll road 710 to 5 North
- Tolls
- Charge of fee on containers to pay for infrastructure improvements that facilitate freight movement

Environmental

- Air quality

Priority # 3

Port/Rail-Related

- Shuttle trains - port to intermodal
- New shuttle trains to move freight
- Near dock facility improvements & additions
- Rail capacity improvements
- Grade separation
- Port/Rail-related
- Port/Rail-related

Truck-Related

- Dedicated truck lanes
- Dedicated truck lanes from ports to Inland Empire
- Construct special truck lanes on I-5 and I-605
- Truck deliveries within basin only made at night
- Trucks avoid rush hours

Highway-Related

- Add new freeway lanes
- Add new freeway lanes for all traffic
- Improvement to overall freeway capacity
- Improve freeway interchanges
- Interchange Improvements
- Improvements to freeway interchanges to reduce congestion into and out of industrial areas (#26)
- I-710 Freeway Improvements (Port to I-10 Freeway)
- I-91
- Improve SR 91 between I15 and SR 55

Operational & Technology

- Longer warehouse hours
- Expand seaport hours & delivery hours at warehouses
- Increased use of advanced technology for vehicle management, routing and safety inspections (#31)
- Operations & Technology

Financial & Policy

- New express toll lanes (like the SR91 express lanes/Fast Track) on other freeways, to reduce congestion for both cars and trucks (#28)
- Container pays
- Private sector

Environmental

- Invest in air quality improvements first, then focus on infrastructure improvements (#37)

Priority # 4

Port/Rail-Related

- New rail lanes
- Adding double/triple track where feasible
- More rail separation, reduce wait for trains
- New shuttle trains to move freight between ports and intermodal facilities (#17)
- Additional near dock rail close to ports
- Efficiency at terminal

Truck-Related

- None

Highway-Related

- I-10
- Improve I-15 through Corona and southerly
- Add extra carpool lane en Santa Monica Freeway
- Improvements to freeway interchanges

Operational & Technology

- Operational and scheduling techniques to reduce delays at ports and intermodal facilities (#32)
- Use of advanced technology for routing & vehicle management
- Alternative technologies to move freight
- Operational & Technology

Financial & Policy

- Toll lanes
- Toll roads
- Container fees
- No new taxes

Environmental

- The ports should negotiate with steamship operators to reduce pollutants through strict provisions in terminal leases (#42)

Priority # 5

Port/Rail-Related

- Grade separations
- New grade separations.
- Increase rail capacity by adding new track along existing rail lines (#19)
- Additional rail line going east
- Identify intermodal facilities and have operators bid for them
- Gerald Desmond Bridge

Truck-Related

- Longer combination vehicles

Highway-Related

- None

Operational & Technology

- Operational and scheduling technologies to reduce delays
- Expand delivery hours at warehouses

Financial & Policy

- User-financed truck lanes
- Dedicated truck lanes totally financed by container fees or tolls.
- Container fees
- Governmental

Environmental

- Local governments should require buffers between new industrial developments and new/existing residential areas (#43)
- Buffers to Industry
- Incentives to encourage environmentally friendly equipment and/or tax credits for infrastructure building

APPENDIX D

Survey Results:
Most Favored Highways
for Improvement

MOST FAVORED HIGHWAYS FOR IMPROVEMENT

The following questions pertain to issues or projects which have drawn high level of stakeholder attention during this MCGMAP study. Respondents were asked to select all highways they believed dedicated truck lanes and/or ***additional*** mixed flow lanes would be both feasible and beneficial.

HIGHWAY *(In alphabetical and numerical order)*	TRUCK LANES				MIXED FLOW LANES			
	Step 1:		Step 2:		Step 3:		Step 4:	
	Truck Lane (check all that apply)		Truck Lane Priority (number)		Mixed Flow (check all that apply)		Mixed Flow Priority (number)	
Interstate 5 (Golden State Freeway) in Los Angeles County	52	05%	**#5** #14	**15%** 50%	**49**	**05%**	**#1** #7 #10 #14	**11%** 17% 13% 33%
Interstate 5 (Santa Ana Freeway) in Orange County	48	04%	#8 #15	13% 100%	33	04%	**#4** #8	**17%** 14%
Interstate 5 (San Diego Freeway) in San Diego County (to Mexico Border)	45	04%	#16	100%	33	04%	**#5** #9 #15	**18%** 17% 50%
Interstate 10 (Santa Monica Freeway) in West Los Angeles County	29	03%	#2	07%	34	04%	**#4** #10 #16	**17%** 13% 50%
Interstate 10 (San Bernardino Freeway) in East Los Angeles County	**57**	**05%**	#13 #14	50% 50%	**36**	**04%**	#12 #14	20% 33%
Interstate 10 (San Bernardino Freeway) in San Bernardino County	**64**	**06%**	**#4** #7 #8 #13	**21%** 13% 13% 50%	34	04%	**#4** #12 #15	**17%** 20% 50%
Interstate 10 (San Bernardino Freeway) in Riverside County	**63**	**06%**	#6 #8 #12	18% 13% 33%	29	03%	#16	50%
Interstate 15 (Barstow/Mojave Freeway) in San Bernardino County	54	05%	#8 #9 #11	13% 22% 40%	34	04%	#9	17%
Interstate 15 (Temecula Valley Freeway) in Riverside County	44	04%	#7 #10	13% 50%	30	03%	#6 #8	22% 14%
Interstate 15 (Escondido Freeway) in San Diego County	33	03%	#6 #12	18% 33%	22	02%	#7 #10 #13	17% 13% 25%
Interstate 110 (Harbor Freeway) in Los Angeles County	36	03%	**#5** #7	**15%** 13%	18	02%	#10	13%

Interstate 210 (Foothill Freeway) in Los Angeles County	22	02%	#7	13%	16	02%	#1 #3	04% 07%
State Route 210 (Foothill Freeway) in San Bernardino County	22	02%	**#3** #8	**14%** 13%	16	02%	#2	09%
Interstate 215 (Barstow Freeway) in San Bernardino County	21	02%	**#5**	**15%**	25	03%	#7 #17	17% 100%
Interstate 215 (Riverside/Escondido Freeway) in Riverside County	22	02%	#6 #7	18% 13%	20	02%	#7 #8 #14	17% 14% 33%
Interstate 405 (San Diego Freeway) in Los Angeles County	27	02%	#8	13%	32	04%	#8	14%
Interstate 605 (San Gabriel Valley River Freeway) in Los Angeles County	32	03%	#1	02%	22	02%	#9	17%
Interstate 710 (Long Beach Freeway) in Los Angeles County	**71**	**06%**	**#1**	**09%**	**43**	**05%**	#13	25%
State Route 57 (Orange Freeway) in Los Angeles County	24	02%	#7	13%	26	03%	#8 #10	14% 13%
State Route 57 (Orange Freeway) in Orange County	26	02%	#1 #2	02% 03%	28	03%	#7 #10 #12 #13	17% 13% 20% 25%
State Route 60 (Pomona Freeway) in Los Angeles County	**58**	**05%**	**#5**	**15%**	**37**	**04%**	#7 #9	17% 17%
State Route 60 (Pomona Freeway) in San Bernardino County	55	05%	**#2** #7	**15%** 13%	**37**	**04%**	#7 #8 #10	17% 14% 13%
State Route 60 (Moreno Valley Freeway) in Riverside County	46	04%	**#3** #8	**14%** 13%	33	04%	#8 #9 #10	14% 17% 13%
State Route 91 (Artesia/Riverside Freeway) in Orange County	44	04%	**#1**	**09%**	**39**	**04%**	**#2**	**27%**
State Route 91 (Artesia/Riverside Freeway) in Riverside County	42	04%	#7	13%	**39**	**04%**	**#3**	**29%**
State Route 118 (Ronald Reagan Freeway) in Ventura County	05	0.44%	#1	01%	07	01%	#1	04%
State Route 118 (Ronald Reagan Freeway) in Los Angeles County	04	0.35%	#1	01%	08	01%	#1	04%
State Route 126 (Santa Paula Freeway) in Ventura County	05	0.44%	#1	01%	09	01%	#1	04%
State Route 126 (Santa Paula Freeway) in Los Angeles County	04	00%	#1	01%	08	01%	#1	04%

State Route 138 (Pearblossom Highway) in North Los Angeles Co.	09	01%	#1 #2	01% 03%		09	01%	None
State Routes 905/11 (Otay Mesa Road) in San Diego County	11	01%	#1	02%		06	01%	None
US Route 101 (Ventura Freeway) in Ventura County	18	02%	#1 #11	01% 20%		23	03%	#13 25%
US Route 101 (Hollywood Freeway) in Los Angeles County	19	02%	#1 #11	01% 20%		34	04%	#12 20%
US Route 395 (Eastern Sierra Highway) in San Bernardino County	11	01%	#3	10%		11	01%	#9 17% #12 20%
State Routes 86 and 111 in Imperial County (to Mexico border)	11	01%	#8 #12	13% 33%		09	01%	#1 04% #5 09%
None	02	00%	None			02	00%	None

Multi-County Goods Movement Action Plan

Technical Memorandum 3: Existing Conditions and Constraints

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
Ventura County Transportation Commission
San Diego Association of Governments

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April 30, 2008

GLOSSARY OF TERMS G-1

LIST OF ABBREVIATIONS A-1

REFERENCES R-1

E.0 EXECUTIVE SUMMARY

- **E.1 MULTI-COUNTY GOODS MOVEMENT ACTION PLAN** E-1
- **E.2 EXISTING CONDITIONS** E-3
- **E.3 EXISTING ISSUES AND CONSTRAINTS** E-4
- **E.4 CONCLUSION AND NEXT STEPS** E-11

1.0 INTRODUCTION

- **1.1 PROJECT OBJECTIVES, STUDY AREA, AND ADMINISTRATION** 1-1
- **1.2 BUILDING AN ACTION PLAN: OVERVIEW OF PROJECT TASKS** 1-3
- **1.3 ORGANIZATION OF THIS TECH MEMO** 1-4
- **1.4 OVERALL CONTEXT** 1-5

2.0 EXISTING CONDITIONS

- **2.1 WAREHOUSING AND TRANSLOAD CENTERS** 2-1
  - Overview of Warehousing in the Goods Movement Supply Chain 2-1
  - Warehousing Market Outlook 2-4
  - Los Angeles County 2-10
  - The Inland Empire 2-10
  - Orange County 2-12
  - Ventura County 2-12
  - Trends in Warehousing 2-12
- **2.2 FREIGHT RAIL** 2-14
  - Rail Cargo Market Sectors 2-19
    - *Intermodal* 2-19
    - *Carload Traffic* 2-23
    - *Intra-Regional Rail Traffic* 2-24
  - Inventory of Systems 2-24
    - *Burlington Northern Santa Fe Railway* 2-24
    - *Union Pacific Railroad* 2-25
    - *BNSF and UP Lines in the Los Angeles Basin* 2-27
    - *Publicly Owned Track* 2-30
    - *Short Lines* 2-31
    - *BNSF and UP Train Volume* 2-32
    - *Rail Border Crossings* 2-33
  - Rail Processing Facilities 2-34
    - *On-dock Intermodal Facilities* 2-36
    - *Near-dock Intermodal Facilities* 2-36
    - *Off-Dock Intermodal Facilities - BNSF* 2-37
    - *Off-Dock Intermodal Facilities - UP* 2-37
    - *Carload Facilities and Support Yards* 2-38
    - *Automobile Distribution Centers* 2-39
    - *Bulk Transfer Facilities* 2-39

2.3 ROADWAYS **2-39**
Inventory of Systems 2-40
Truck Traffic and Goods Movement 2-43
Existing Volumes throughout the Study Area 2-43
Truck Lanes 2-51
Truck Activity by Truck Size 2-52
Historical Growth Trends for Truck Travel 2-53
Truck Travel Patterns 2-56
Time of Day Distribution of Truck Travel 2-63
Time of Day in Relation to Non-Truck Traffic 2-66
Port-Related Truck Travel 2-67

2.4 PORTS **2-69**
Air Cargo and Cargo Airports 2-71
The Overall Air Freight Structure 2-71
Air Cargo Activities in the Study Area 2-72
Inventory of Air Cargo Systems 2-73
Potential MCGMAP Air Cargo Airports 2-75
Ocean Cargo and Seaports 2-76
Inventory of Port Systems 2-77
Overview of Containerized Trade 2-86

3.0 THE MODAL SYSTEM'S ROLE IN THE SUPPLY CHAIN

3.1 OVERVIEW OF THE SUPPLY CHAIN **3-1**

3.2 INTEGRATION ACROSS THE SUPPLY CHAIN **3-3**
Ocean Carriers 3-4
Railroads 3-4
Trucking 3-5
Air Cargo Industry 3-5
Shippers 3-5
Third Party Logistics Providers 3-6
Technology in the Supply Chain 3-6
Coordinated Logistics 3-7

3.3 MEASURING THE PERFORMANCE OF THE INTERMODAL SYSTEM **3-7**
Performance Optimization within the Modes 3-7
Lack of Industry Standards for Performance 3-8
The Importance of Performance Measures 3-9
System Performance Monitoring 3-9

4.0 CONSTRAINTS, ISSUES, AND PROBLEMS

4.1 COMMUNITY CONCERNS ABOUT AIR QUALITY, CONGESTION, AND LAND USE **4-1**
Port Development 4-2
Highway Capacity Expansion 4-3
Warehouse Expansion 4-3
Air Cargo Expansion 4-4
Rail Expansion 4-4

4.2 PORT AND AIRPORT CAPACITY AND THROUGHPUT **4-5**

Container Terminal Throughput Capacity 4-5
Competition for Port Terminal Capacity 4-5
Limited Air Cargo Capacity at Existing Airports 4-6

4.3 HIGHWAY CONGESTION AND DELAY 4-7
Highway Bottlenecks 4-10
Impact of Highway Congestion on Air Cargo Industry 4-11
Impact on Warehousing, Distribution, and Logistics Industry 4-12
Highway Maintenance 4-12

4.4 TRUCK ACCESS AND TURNAROUND AT FACILITIES 4-13

4.5 MAINLINE RAIL CAPACITY 4-13

4.6 INTERMODAL RAIL CAPACITY CONSTRAINTS 4-14
On Dock Rail Facilities 4-15

4.7 GRADE–CROSSINGS 4-16

4.8 HIGHWAY SAFETY AND TRUCK ACCIDENTS 4-18
Highway Design Deficiencies 4-23

4.9 SECURITY 4-23
Air Cargo Screening 4-24
Maritime Security Issues 4-25

4.10 AVAILABILITY OF FUNDING 4-26

4.11 CHANGES IN REGIONAL SHIPPING AND TRANSFER MODES 4-27

4.12 MIGRATION OF LAND USES AND DEVELOPMENT 4-27

4.13 SYSTEM-WIDE GOODS MOVEMENT DATA AND INFORMATION 4-28

4.14 A DISPARATE GOODS MOVEMENT SYSTEM AND COMMUNITY 4-29
The Private Sector 4-30
The Public Sector 4-30
Communities and Politics 4-30

4.15 ADDITIONAL ISSUES AND CONSTRAINTS 4-31
Environmental Issues and Constraints 4-31
Water Quality Impacts 4-31
Land Use Conflicts, Noise, and Other Community Impacts 4-31
Scattered Land Use Impacts 4-32
Economic Issues and Constraints 4-33
Goods Movement and the Employment Base 4-33
Shortage of Labor 4-33

FIGURES

Figure E-1 MCGMAP Study Area E-2
Figure 1 MCGMAP Study Area 1-2
Figure 2 Locations of Warehousing and Distribution Facilities 2-3
Figure 3 Southern California Warehousing and Industrial Real Estate Market 2-6

Figure 4 Union Pacific Railroad Freight Density Year 2002 Million Gross Tons (MGT) 2-16
Figure 5 Burlington Northern Santa Fe Railroad Freight Density Year 2002 Million Gross Tons (MGT) 2-17
Figure 6 Railroads and Mainlines in the MCGMAP Study Area Serving California, Arizona, Nevada, and Oregon 2-18
Figure 7 Photo of a 3 Unit Articulated Intermodal Rail Car (Carries 6 Containers, Double-Stacked) 2-21
Figure 8 Photo of a 5 Unit Articulated Intermodal Rail Car (Carries 10 Containers, Double-Stacked) 2-21
Figure 9 BNSF Transcon West of San Bernardino, UP Los Angeles Subdivision, and UP Alhambra Lines 2-29
Figure 10 Major Rail Facilities in the MCGMAP Study Area 2-35
Figure 11 Existing Highway System within the MCGMAP Study Area 2-42
Figure 12 Nationwide Percentages of Truck Freight Shipments by Weight and Value 2-43
Figure 13 2003 Percentage of Truck Vehicle Miles of Travel (VMT) on the State Highway System within the MCGMAP Study Area 2-44
Figure 14 Percent of Trucks by Type and Facility Type 2-53
Figure 15 Truck Vehicle Miles of Travel (VMT) by County on the State Highway System within the MCGMAP Study Area 1998 and 2003 2-54
Figure 16 Non-Truck Vehicle Miles of Travel (VMT) on the State Highway System within the MCGMAP Study Area 1998 and 2003 2-55
Figure 17 Historical Percentage of Truck Vehicle Miles of Travel (VMT) to Total VMT on the State Highway System within the MCGMAP Study Area 1998 to 2003. 2-56
Figure 18 Screenline Locations 2-58
Figure 19 Truck Counts by County across MCGMAP Study Area Screenlines 2-59
Figure 20 Hourly Distribution of East-West Truck Traffic in the Eastern Part of Study Area 2-64
Figure 21 Hourly Distribution of North-South Truck Traffic - Southern Parts of Study Area 2-65
Figure 22 Hourly Distribution of North-South Truck Traffic - Northern Parts of Study Area 2-65
Figure 23 2003 Peak Period Truck Percentages as Share of Total Traffic Volume on I-15 between I-10 and SR-60 2-66
Figure 24 Ports in the MCGMAP Study Area 2-70
Figure 25 Air Freight Imports and Exports via Los Angeles International Airport (1994- 2005) 2-74
Figure 26 Typical Sources of Congestion 4-10
Figure 27 Fatal Crash Rates on Different Highway Classes 4-19
Figure 28 2003 Truck-Involved Accidents by Hour on a Weekday 4-21
Figure 29 Truck-Involved Accidents by Day of Week 4-22

TABLES

Table 1 Summary of Warehouse and Industrial Space within the MCGMAP Study Area 2-4
Table 2 Summary of Warehouse and Industrial Space within the Inland Empire 2-11
Table 3 MCGMAP Study Area Intermodal Volume in Units for 2001-2004 2-22
Table 4 Average Daily Trains on BNSF East-West Mainline between Hobart Yard and Fullerton Wednesday-Friday 2-32

Table 5 Average Daily Trains on UP East-West Mainlines at Fontana on the Alhambra Subdivision and at West Riverside on the Los Angeles Subdivision Wednesday-Friday 2-33
Table 6 San Pedro Bay Ports Direct Intermodal Rail Volumes 2003-2005 (Marine Containers per Year) 2-38
Table 7 MCGMAP Study Area Lane Miles by Facility Type, Year 2000 2-40
Table 8a MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes Year 2003 – Segments of High Congestion 2-45
Table 8b MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes Year 2003 – Segments of Moderate Congestion 2-46
Table 8c MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes Year 2003 – Segments of Low Congestion 2-48
Table 9 2003 Daily Truck and Total Vehicle Miles of Travel by District and County 2-53
Table 10 Truck Counts by Type across MCGMAP Study Area Screenlines 2-57
Table 11 Summary of Year 2001 Freeway Congestion on SR-60 2-60
Table 12 Summary of I-15 Total ADT and Truck Percentages Year 2001 2-61
Table 13 I-710 Total AADT and Total Trucks Year 2004 2-62
Table 14 Comparison of Port Truck Volumes to Total Daily Truck Volumes on Study Area Roadways, Year 2003 2-68
Table 15 Air Cargo Activity 2003-2005 MCGMAP Study Area Airports Tons of Air Cargo 2-72
Table 16 Port of Los Angeles Tonnage FY 2005 Metric Revenue Tons (1000s) 2-77
Table 17 Port of Los Angeles Terminal Details 2-78
Table 18 Port of Long Beach Tonnage CY 2005 Metric Revenue Tons (1000s) 2-81
Table 19 Port of Long Beach Terminal Summary 2-81
Table 20 Port of Hueneme Cargo Volumes 2002 and 2003 (Metric Revenue Tons) 2-85
Table 21 2005 Top Ports in North America and the World (millions of TEUs Annually) 2-86
Table 22 Growth in Containerized Cargo at the San Pedro Bay Ports, CY 1985 - 2005 (1000s of TEUs Annually) 2-87
Table 23 Loads and Empties by Direction, San Pedro Bay Ports, 2005 (1000s of TEUs Annually) 2-88
Table 24 Total Daily Truck Volumes in Congestion on Study Area Freeways Year 2004 4-9
Table 25 Top 6 Bottleneck Locations in the MCGMAP Study Area Year 2004 4-11
Table 26 Mainline Rail Emissions (tons per year) for Year 2000 4-17
Table 27 Truck Accident Summary by County Year 2000 and Year 2003 4-19
Table 28 Truck Involved Accidents by Freeway in Los Angeles County Year 2004 4-20
Table 29 Truck-Involved Accidents by Collision Severity in Los Angeles County Year 2003 4-22
Table 30 Occupations with the Most Job Openings Occupational Employment Projections 2004-2006 (California) 4-34

E.1 MULTI-COUNTY GOODS MOVEMENT ACTION PLAN

This Technical Memorandum (Tech Memo) documents the existing conditions and constraints in the goods movement system within the Multi-County Goods Movement Action Plan (MCGMAP) study area (counties of Los Angeles, Orange, Riverside, San Bernardino, and Ventura). (See Figure E-1 on page E-2.) It also sets the stage for the analysis of future conditions, followed by strategies for improving the movement of goods as well as mitigation strategies to reduce the environmental, health, and community impacts of goods movement.

The MCGMAP is a multi-agency effort led by the Los Angeles County Metropolitan Transportation Authority (Metro), and includes the Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), Ventura County Transportation Commission (VCTC), Southern California Association of Governments (SCAG), and the California Department of Transportation (Caltrans).

The goods movement system is vital to the local economy and provides many jobs in the study area. Southern California has become an important trade gateway for the rest of the nation. However, the increasing volume of goods movement in and through the area is straining the existing infrastructure, and is compromising the quality of life, health and safety of the residents and communities in the study area.

The MCGMAP is a strategic opportunity for improving the competitiveness of the goods movement system while minimizing adverse impacts on air quality and public health. While there are numerous interrelated economic and environmental forces driving the need for the MCGMAP, they can be narrowed down to:

- Globalization of trade, particularly the rise of China as a leading manufacturing center
- Changes in logistics management
- Employment and upward mobility
- Transportation capacity limitations, productivity, reliability, and labor availability
- Growing public concerns over the health and air quality impacts of goods movement
- Funding shortages.

All of these factors are being considered as a backdrop to the development of the MCGMAP. The following is a summary of the key findings of this review of the existing conditions and constraints related to the study area's goods movement system.

ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates

Figure E-1
MCGMAP STUDY AREA
524930/BASE - 3/1/06

E.2 EXISTING CONDITIONS

A national policy that promotes reduced barriers to trade, combined with the export of U.S. industrial jobs, particularly to Asia, has increased the nation's reliance on imports. As a result, U.S. manufacturing employment in 2004 reached its lowest level since 1950 14.3 million jobs dropping 3 million from 2000. The U.S. trade deficit in manufactured goods rose by $164 billion from 2000 to 2004.[1] The study area bears the impacts of a trade policy that has rapidly increased the flow of goods through its system. The MCGMAP study area also represents the third largest manufacturing center in the nation.[2] Its strategic location makes the study area the nation's largest goods movement gateway, carrying a disproportionate share of international trade.

The study area's San Pedro Bay Ports of Long Beach and Los Angeles are the largest container ports nationally, and the fifth largest in the world. They handled 14.2 million Twenty-Foot Equivalent Units (TEUs) of containers in 2005, a full one-third of all US waterborne container traffic, and 6 times as much as the Bay Area ports. Three quarters of the trade through the ports is produced or consumed elsewhere.[3] Only one quarter is for local consumption. Nearly $200 billion in trade passing through the ports in 2000 supported a national total of two million jobs, which generated over $61 billion in income.[4]

The Ports of Los Angeles and Long Beach handle a broad variety of bulk and containerized cargo. Goods arrive at the ports and are transferred to rail, or highways for movement to final customers. About 40,000 TEUs units move every day through the port.

The study area is home to the nation's busiest rail intermodal operations. The Burlington Northern Santa Fe Railway (BNSF) has three terminals in the area, located in Los Angeles, City of Commerce and San Bernardino. The Hobart (Los Angeles) terminal handles over 1.3 million units annually with one of the highest throughput densities at 5,500 units per acre annually. The Union Pacific Railroad (UP) operates four terminals: City of Industry (255,000 lifts per year capacity), City of Commerce (500,000 lifts per year capacity), the Intermodal Container Transfer Facility (ICTF) near the ports (capacity of 800,000 lifts per year), and the Los Angeles Transportation Center (LATC) in Los Angeles (250,000 lifts per year capacity). The total domestic and intermodal volume moving through terminals in the study area approaches 5 million containers annually, 64 percent of which are international and 36 percent are domestic containers[5].

Southern California is served by two Class 1 railroads, the BNSF and the UP. On an average weekday, 80 freight trains run through the study area, hauling 52 percent[6] of the ports' international containerized goods to and from other parts of the country. This rail network also carries traditional rail carload traffic and finished import automobiles moving in multilevel railroad autorack cars. In addition to the freight trains, the network carriers 145 commuter trains on average each weekday.

Passenger trains, both Amtrak (intercity passenger rail) and commuter (transit rail) operations also share the freight rail network. The 2001 California State Rail Plan projects growth in passenger use of 2.5-3 fold increase in passenger use by 2011. Metrolink trains operate on time 95% of the time on Metrolink controlled trackage. On tracks owned by the BNSF and UP, Metrolink trains only operate

on time 70-85% of the time. In 2001 when passenger trains were late, delays were attributed to BNSF freight trains 37% of the time and to UP 25% of the time. Delays created by Metrolink trains only accounted for 4% of the delays, delays caused by Amtrak were only reported as the cause for 2% of the delays. Freight interface causes significant operating problems for Metrolink, especially on the UP's Los Angeles subdivision between Riverside and Los Angeles. "Heavy UP port rail traffic results in Metrolink trains operating late almost on a daily basis. Heavy BNSF port rail traffic on their San Bernardino Subdivision between Los Angeles and San Bernardino also causes delays for Metrolink trains"[7]

The study area's highways are the most congested in the nation and carry some of the highest truck volumes.[8] This area has six of the most congested truck routes in the nation.[9] One third of the region's 9,000 lane miles of highways carry more than 10,000 trucks per day. I-710, which links trucks directly to and from the ports, and I-605 and SR 91, carry up to 40,000 trucks on an average weekday.[10]

The second largest air cargo hub in the nation is Los Angeles International Airport, handling approximately 75% of the study area's 2.7 million tons of air cargo in 2003.[11]

Warehouse, distribution, transload, or cross-dock operations occupy over 1.5 billion square feet of building space throughout the study area, representing 15 percent of the national market, and 60 percent of the entire west coast. Another 32 million square feet of building space are under construction.[12]

The Alameda Corridor, at a cost of $2.4 billion, is one of the largest public/private goods movement projects in the nation. It has doubled railroad speeds between the ports and downtown Los Angeles and allows nearly 50 trains a day to avoid conflicts at 200 at-grade crossings between downtown Los Angeles and the ports.

While the MCGMAP study area goods movement system is large, its disproportionate role in supporting the growth in international trade creates significant impacts on the local multi-modal goods movement system, communities, and the environment. The following is a discussion of the issues and constraints that impact the area's goods movement system.

E.3 EXISTING ISSUES AND CONSTRAINTS

Community Concerns about Environmental Impacts - Community-based concerns over public health and other environmental impacts present a significant challenge to the future development of the goods movement system. Over time, the focus on types of air quality impacts has changed. For much of the 20th century, concerns were generally about the visual impacts. In recent years, as the visual nature of air pollution (smog) was reduced, concern shifted to the health impacts associated with various pollutants. Research conducted by the Keck School of Medicine at the University of Southern California (USC) indicates that the combination of gases and fine particles in transportation exhaust, especially diesel fuels, affects lung function and contributes to arterial thickening, birth defects, and low birth weights.[13] Data also indicate that the closer one lives to pollution sources, such as the ports, intermodal yards, or major freeways, the higher the risk. As

examples, the increased incidences of cancer and of asthma in children are shown to be related by proximity to pollution sources. Furthermore, the study area is required to demonstrate attainment with National Ambient Air Quality Standards (NAAQS) established per federal mandate. The U.S. EPA routinely evaluates air quality nationwide and periodically updates or establishes new standards (NAAQS). For example, on April 15, 2004, EPA implemented an 8-hour ozone NAAQS (supplanting a previous 1-hour ozone standard), for which the South Coast Air Basin is to demonstrate attainment by 2021. These obligations cannot be achieved without significant investments in environmental mitigation as well as more focused efforts at reducing the level of emissions from goods movement activities, as well as from other sources.

The widespread dissemination of this information has raised awareness of these issues and increased concern within affected neighborhoods. Environmental groups have forced a significant slowdown in port development in recent years. An example is the proposed Pier J expansion at the Port of Long Beach that was halted due to concerns with the environmental document. Improvements to the China Shipping Terminal at the Port of Los Angeles were delayed because of a lawsuit by the Natural Resources Defense Council (NRDC). Community-based resistance has also affected plans to address the existing levels of highway congestion.

After nine months of deliberations by a broad-based group appointed by I-710 corridor communities and the I-710 Oversight Policy Committee (OPC) (collectively known as the Tier 2 Committee), a consensus emerged.[14] This consensus also involved community-level committees (known as Tier 1 Committees) consisting of the most directly impacted communities in the corridor. The chairs of the Tier 1 Committees were also represented on the Tier 2 Committee, along with a representative named by each City Council in the remaining corridor cities.[15] The committee recognized that something must be done to address the current congestion and design of the I-710 freeway, and that the hybrid design concept presented could accomplish maximum build-out in a manner that reflected the Tier 1 Committee's concerns and recommendations for their communities.[16]

The experience and results of the I-710/Major Corridor Study show that consensus can be achieved when the community is involved at the local level. The consensus achieved on the I-710 hybrid alternative is a major success story and is proof that responsible agencies and communities can resolve differences and find a common agenda to move forward. The efforts of the I-710 / Major Corridor Study were led by Metro and the Gateway Cities Council of Governments. The MCGMAP will require similar success stories. Nevertheless, concerns over the negative health impacts of diesel emissions potentially threaten the viability of the I-710 improvements and other goods movement projects, including plans to expand rail intermodal capacity, airport capacity, and the development of warehouse and distribution facilities.

Port and Airport Facility Efficiency, Capacity, and Throughput - In addition to community-related concerns, there are also physical and operational constraints affecting existing capacity and throughput at the ports and airports in the study area. The potential throughput at the port terminals is constrained by existing operational and management practices. While the estimated maximum throughput capacity at the San Pedro Bay ports is over 10,000 TEUs of containerized cargo per acre per year,[17] current average throughput at both ports combined is about 4,700 TEUs per acre per year.[18] Terminal capacity is affected by the availability of berths, backland acreage, and the number

of cranes, as well as operational and management practices related to container stacking and storage, container dwell times, hours of service, and labor productivity. Capacity has been recently enhanced by the use of information technology such as optical character recognition systems and Radio Frequency Identification (RFID).

PierPASS was introduced in July 2005 to help shift traffic from the traditional work day hours to off peak travel times. These off peak travel times are defined as 6:00 pm – 3:00 am Monday through Thursday, and 8:00 am – 6:00 pm on Saturdays. This program provides an incentive to importers to move containers during off peak times. In the past year the PierPASS official website estimates that on average 60,000 truck trips per week have been shifted to off peak hours, or roughly 30-35% of the port cargo now moves off peak. The PierPASS official website estimates that next year as many as 2.8-3 million truck trips may be shifted to off peak travel times.

While container traffic has received most of the attention in recent years, the terminal capacity for commodities such as petroleum liquid bulk is a growing concern at the ports. California is now an important net importer of refined fuels, and demand is outstripping petroleum storage capacity. The need to accommodate containerized cargo is crowding out the petroleum facilities, adding to the overall complexity surrounding the expansion of the terminals.

Competition for space also impacts the airports in the study area, particularly Los Angeles International Airport (LAX), where high demand exists for both passenger and cargo services. Needed for air cargo services are runways, taxiways, aprons to park aircraft, maintenance facilities, and cargo-handling facilities. One proposal to alleviate this competition at LAX is to attract cargo to outlying airports such as San Bernardino International, Ontario International, Palmdale, Victorville and March, where capacity exists. Some of these have been proposed as all-cargo airports. However, the potential for all-cargo airports is limited because a significant portion of air cargo moves in the bellies of large international passenger aircraft, due to the pricing advantage offered by the extra belly space, most of which fly out of LAX. In addition, since most air cargo is destined for use within the region, the location of LAX makes it the most convenient with respect to the cargo's final destination.

Highway Congestion, Delay, and Maintenance - While congestion and delay affect the everyday lives of commuters in the study area, they also have a significant impact on goods movement. Eighteen percent of all truck volumes on the freeways within the study area experience delay due to congestion, which results in an increase in the cost of transporting goods by 50 to 250 percent.[19] Goods rely substantially on trucking to connect warehouses, distribution facilities, intermodal facilities, and other businesses. For the most part, these facilities and businesses operate during daytime hours, though some operate during the night, too. Daytime operations cause conflicts between everyday commuter traffic and truck traffic. This conflict also creates a perception that goods movement is the sole contributor to congestion and delays. However, the bulk of truck traffic does not occur during the traditional morning and early evening peak commuter hours. Approximately two thirds of truck travel occurs during the off-peak hours. Therefore, the issue of congestion and delays on the highway system cannot be fully addressed without including strategies to reduce the impact of commuter traffic as well as goods movement. In addition, trucks contribute to pavement deterioration. While an 80,000 pound truck weighs as much as 20 automobiles, it has the same impact on pavement condition as 9,600 automobiles.[20] Insofar as trucks pay truck weight

fees that contribute toward a portion of growing road maintenance costs, these revenues do not contribute to congestion relief.

Truck Access and Turnaround Times at Goods Movement Facilities - While delay on the roadway system impacts goods movement, the most significant delays are at the goods movement facilities such as ports, intermodal facilities, and warehouse and distribution centers. The issue is most evident at the port container terminals, where almost half (44 percent) of the total roundtrip time is spent waiting for the container to be loaded and unloaded.[21] The delay is not associated with the actual turnaround of the load, which on average takes about 35 minutes, but with the queuing time to be loaded.[22] Regulatory measures, such as AB 2650, a state law passed to impose a fine on terminal operators if trucks idle outside the gate for a period longer than 30 minutes, have been effective in reducing queuing outside terminal gates. [23] However, some truckers complain that the queuing has simply moved inside the terminal gates. Terminals that maintain appointment systems or extend gate hours are able to avoid AB 2650-related fines. With PierPass in effect, all terminals have extended hours and are therefore exempt from these fines.

Mainline Rail Capacity - There are two immediate issues facing the railroads serving Southern California; terminal capacity to load and stage freight and mainline capacity east of Los Angeles over the mountains. As a result of historical growth in the intermodal container market, mostly due to growth in Asian imports, mainlines are reaching their capacity. Terminals are being stretched to their limits, recent reduction in free time at the terminals has provided some relief but the growing volumes are exceeding the capacity of the existing terminals. Some carriers have actively tried to relocate business segments to other terminals east of Los Angeles, with some success. The impact of mainline capacity constraints is a reduction in system velocity, which results in delay and increased backlog along the mainlines as well as at the rail yards. The average train trip is delayed by over 30 minutes east of Los Angeles.[24] A backup in the system is far reaching, resulting in the delay in the delivery of time-sensitive shipments to customers nationwide. In addition, Metrolink commuter passenger rail services, in general, operate on the existing freight rail system.

In addition, Metrolink commuter passenger rail services operate on the existing freight rail system. Metrolink is planning major increases in passenger trains using BNSF and UP mainlines in the study area; these increases will further strain capacity in the absence of any improvements. Metrolink trains are most frequent during the morning and afternoon weekday commute periods, and are oriented inbound to Los Angeles in the morning and outbound in the afternoon. About a third of Metrolink trains operate on BNSF and UP mainlines today. Amtrak long distance and Pacific Surfliner corridor trains also use BNSF and UP mainlines in the study area.

Capacity is also a concern on publicly owned track. As noted, Metrolink dispatches about 100 freight rains on publicly owned track, and these trains share the track with the majority of Metrolink trains. As freight and passenger trains increase, capacity will increasingly become a concern for all users of these publicly owned tracks.

Rail Intermodal Capacity Constraints - Rail intermodal facilities allow for the transfer of containers from one mode to another, specifically the transfer of containers between rail and truck. The location of an intermodal yard, relative to the ports, has an impact on the amount of truck travel through the study area. There are two general types of intermodal terminals. On-dock rail

terminals are typically single user facilities which are fed directly by an ocean vessel. While the inbound containers are significant, often time sensitive cargo or containers destined to secondary markets will move to the common user intermodal facilities, off-dock. Off-dock terminals as noted earlier, create blocks of traffic, and the terminal operators build these blocks to match the markets the train will be serving. So all the Chicago freight is grouped together and separated from the Dallas or the Kansas City blocks of traffic. These two types of terminal facilities have some important safety and velocity differences. On-dock terminals have been very successful in reducing truck traffic in the study area. A truck carrying a port-generated container to an intermodal yard in or near a port (i.e., an on-dock or near-dock intermodal yard) will travel a shorter distance than one going to an inland facility (i.e., an off-dock intermodal yard).

The efficiency of an intermodal yard has an impact on the overall productivity and velocity of the goods movement system. On-dock facilities typically are single-user facilities, and near-dock and off-dock facilities are typically common user facilities. Marine terminal on-dock rail yards have a different set of safety concerns than off-dock rail facilities. These safety issues are driven, in part, by the marine terminal workers. Even with this, the on-dock rail yards have made an enormous contribution to reduction of truck traffic on the highways. In 2005, over 1.6 million lifts (21% of the San Pedro Bay ports' volume) were handled at the on-dock rail yards.

Intermodal throughput capacity is also affected by the types of operations and practices utilized by the railroads operating the intermodal yards. For example, the UP uses a "wheeled operation" at its Intermodal Container Transfer Facility (ICTF), where almost every container is stored on a trailer chassis. While this lowers the cost of operations, it also limits the container throughput per acre. In comparison, the BNSF uses management techniques to increase throughput per acre at its Hobart facility, including stacking containers vertically, allocating containers (per carrier), and imposing fees on containers that stay longer than a day. The result is that throughput per acre per year is twice as high at Hobart[25] as it is at ICTF.[26]

Grade-Crossings - The impacts associated with at-grade crossings include noise, congestion, emissions, and safety. While communities and transportation agencies have worked hard to address at-grade crossing issues, in conjunction with efforts to encourage diversion from truck to rail, there is a significant shortfall in funding to fully implement existing plans. The Alameda Corridor project was successful in eliminating conflicts at 200 at-grade crossings between downtown Los Angeles and the ports. The project continues to reduce accidents, emissions, and congestion, as well as improve safety for the traveling public. There are existing efforts to eliminate at-grade crossings east of Los Angeles. However, the amount of federal funding provided accounts for only 23 percent of what was requested. Alameda-Corridor East related projects, including specific grade separations, received approximately $212 million of the estimated $900 million requested as part of the most recent national transportation reauthorization bill. This is arguably a national issue given that the freight traffic on the rail system is headed for destinations throughout the nation. The shortfall in funding for grade separation projects has implications for the safety of the communities along the rail freight corridors.

Metrolink is embarking on a Sealed Corridor initiative. The purpose of the project is to enhance safety at crossings as well as to inhibit unauthorized vehicular access to rail rights-of-way owned by Metrolink. The current focus is on at least 57 crossings in the San Fernando Valley and Ventura

County. This project gained increased attention following an incident within the railroad right-of-way within the San Fernando Valley.

Truck Safety - Truck accidents result in a higher probability of damage to the other vehicle and injury to its occupants. Of all accidents involving large trucks, 84 percent of fatalities are passengers in vehicles other than the truck.[27] In the same study of all large truck collision incidents, 50.7% of these events were caused by the driver of the passenger vehicle. Between 2000 and 2003, the number of fatalities in accidents involving a truck increased by 17 percent in the study area.[28] Moreover, an accident involving a truck impacts system traffic flow more so than an accident involving passenger vehicles. The lack of truck inspection and enforcement facilities within the study area presents a further constraint to addressing truck safety. Caltrans operates 37 truck inspection facilities in California.[29] Six (6) of these facilities are operational within the study area, at the following locations:

- Los Angeles County, Castaic (I-5)
- San Bernardino County, Cajon (I-15)
- Riverside County, Blythe (I-10)
- Riverside County, Desert Hills (I-10)
- Orange County, Peralta (SR-91)
- Ventura County, Conejo (US-101)

These facilities are located near the borders of the study area and inspect trucks entering or exiting the region. There are no inspection facilities within the study area that inspect the intra-regional truck travel.

Automobile drivers and passengers are often concerned about being involved in a traffic accident with a truck. These concerns may affect the implementation of goods movement and trade initiatives in the study area.

Changes in Regional Shipping and Transloading - There are several changes being made in the way goods are transferred from ports to inland locations that impact the goods movement system. These changes are already occurring and affecting the existing system. An example is the growth in the transload business, whereby contents from international containers arriving at international ports are transferred to larger containers at transloading locations across the study area, for distribution throughout the domestic network. This results in an increase in local truck traffic between ports and transloading centers where the consolidators mix international merchandise and reload it into domestic containers for shipment to inland distribution centers. These changes, as they exist today, are driven by market forces to continually reduce costs and improve the efficiency of the goods movement system. Improving the physical goods movement infrastructure system can take years, but market forces can make operational changes in relatively short periods of time.

Shifting of Land Uses and Development Patterns - The locations chosen by private sector developers for land uses associated with goods movement, specifically warehouses and distribution centers, are shifting away from the traditional locations close to the ports and intermodal rail yards. This practice is impacting communities located throughout the study area and, in particular, to the

east of Los Angeles. Increased truck travel to reach these more distant locations causes increased emissions and congestion. Moreover, these new warehouse and distribution facilities are appearing in high growth real estate markets where residential and other commercial development demands are growing. The result is a conflict between residential and goods movement uses. Therefore, the same concerns raised by communities around existing goods movement-intensive land uses (increased truck traffic, intrusion on neighborhoods and schools, noise, congestion, emissions, safety) are emerging in new areas.

System-wide Goods Movement Data and Information - Good information and data are required to make effective decisions about the goods movement system and its impacts. Currently, the level of existing data and information is not sufficient to effectively support decisions concerning an ever-changing, market-driven goods movement industry. This Tech Memo identifies two specific areas of concern. The first is the data and information used to support travel demand modeling tools and techniques. The second is a lack of system-wide performance data for the goods movement system. While the carriers and the modal operators typically have data and information regarding the performance of their particular areas, there is no system-wide approach to monitoring and managing the performance of the system as a whole. Shippers and receivers have good data about their specific shipments, including location, volume, type, and other information they need to make decisions about the allocation of their inventory and stock. But they do not track data on the operational aspects of the modal system, its efficiencies, its performance, where the bottlenecks and delays are, what the average speeds are, the velocity of the system, and the allocation of assets (e.g., trucks, chassis, container slots) other than the areas within their respective sphere.

Not having a means for measuring and determining performance across the system undermines the ability to identify opportunities for optimization throughout the system. System-wide measures will likely help to identify opportunities for improving performance. Also, the lack of system-wide performance data undermines the effectiveness of policies and investments directed at specific issues. For example, existing port policies directed at shifting truck traffic to off-peak hours have been effective at reducing congestion on the highway system.[30] However, these policies have had negative impacts for individual truck drivers who spend longer hours away from their families,[31] as well as for communities near warehouses and distribution centers that now have to deal with more noise and traffic at night. Performance measures for all aspects of the goods movement system, including operations and throughput, congestion and delay, air quality and emissions, and others, are needed to improve the effectiveness of the system.

Security - While there are existing federal programs to improve security, seaports and airports must fund many of the security projects using their own resources, which are already limited. Congress is currently evaluating the effectiveness of security procedures and programs for air cargo and maritime cargo. For example, one of the options for air cargo is to implement 100 percent screening, requiring large amounts of land near air cargo facilities, the consolidation of air cargo facilities, additional warehouse screening buildings, separate secure access roads for trucks, increased security personnel, and screening equipment and technology.

Availability of Funding - Funding for goods movement-related projects is falling behind. The most tangible example is the shortfall in funds requested by communities and agencies in the study area in conjunction with the most recent national transportation reauthorization legislation

(SAFETEA-LU). Although its political leaders and transportation agencies jointly supported several key projects for funding, the study area received a minor share of the total amount requested. While there is a growing awareness of the existing capital needs required to accommodate goods movement as well as to mitigate the impact of goods movement, this awareness has not translated into funding. The MCGMAP will address the need for mechanisms that translate the value (created by improvements to the study area's goods movement system) into revenue to be directed to improving infrastructure and meeting mitigation needs.

A Disparate Goods Movement System and Community - Today's goods movement system optimizes each mode within the supply chain. Gaps occur at the points of interface where information and ownership of the goods are exchanged. This fragmentation makes it difficult to tackle the issues in a coordinated and strategic manner. Although the system operates well enough to allow goods to effectively move from mode to mode, the organizations involved in goods movement -- private carriers, intermodal operators, warehouse and logistics operators, port owners and operators, and the public entities and transportation agencies -- function independently. Many of the identified issues and constraints require a system-wide solution. Private sector entities operate in a competitive environment that makes it difficult to create broad-based support for major solutions, since a solution that helps one mode may reduce the competitiveness of another. While individual operators within the system address operational and investment strategies within their respective sphere of influence, they do not have the means nor the information to address system-wide issues. Coordination among the modal components, where it does exist, is to increase their competitive edge. Wal-Mart is the leader in supply chain integration and it has often been said that Wal-Mart is a supply chain company that happens to have retail stores.

Public agencies each have their own specific transportation planning processes and typically have differing priorities and time horizons for decision making and investments. A project viewed as a priority in one jurisdiction may be viewed as competition for finite resources by a neighboring jurisdiction. There are many communities affected by goods movement throughout the study area, and each represents potentially different ideals and priorities. One community's view of economic growth and prosperity may translate to health and congestion concerns in another. The challenge is to develop an institutional approach that can garner the collective support of the private sector to tackle specific solutions that are broad and system-wide. The fragmented nature of the goods movement system will make it more difficult to address some of the major issues identified by this existing conditions Tech Memo.

E.4 CONCLUSION AND NEXT STEPS

The following summarizes the overall findings based on the data and information presented as part of the existing conditions task:

- The MCGMAP study area is a "World Class" goods movement system and is the model for North American distribution and logistics. It consists of an elaborate network of roadways and railroads that connect to a series of ports, intermodal yards, warehouse/distribution centers, businesses and retail centers.

- It creates local economic prosperity and job opportunities at the same time that it supports the national and global economies. The goods movement system impacts the health and safety of the communities in the study area. These impacts potentially undermine the future viability of the system.

- Community concerns about the impacts of goods movement, including emissions, congestion, health effects, noise pollution and land use conflicts, presents an obstacle for the future development of the goods movement system.

- The study area's ports, airports and rail carriers and intermodal terminals have existing capacity constraints that undermine the efficiency and productivity of the system as a whole. Furthermore, the volume of traffic on the existing roadway and rail networks are reaching capacity. As a result, the system as it exists today is susceptible to disruptions to the movement of goods, causing delays that reduce the quality of service, and increase costs to consumers.

- The existing conditions of the goods movement system present significant safety concerns for the traveling public, specifically safety concerns regarding at-grade crossings and truck accidents. In addition, the increased focus on the security of the system has placed a significant fiscal burden on the owners and operators of the goods movement system, particularly at the ports and airports.

- While the goods movement system is largely intermodal, allowing goods to seamlessly transfer from one mode to the other, the organizations and entities involved in movement of goods are structured to operate independently, often with competing interests. In addition, good information and data about the flow of goods and the performance of the system is not comprehensive and system-wide. These factors lead to missed opportunities for the coordinated funding and deployment of system-wide solutions.

- A lack of funding affects all modes. It presents a significant obstacle to reaching a balanced emphasis on expenditures that improves the competitiveness of the goods movement system and minimizes the impact on the health and well being of the community.

The next step of the MCGMAP effort, evaluating future conditions and forecasts, is currently underway. It is likely that many of the same conclusions drawn from this existing conditions Tech Memo will surface during this step. The findings of the forecasting analysis will be documented and presented to the stakeholders in the MCGMAP study area. Thereafter, strategies to accommodate goods movement and to mitigate their impacts will be evaluated and presented.

1.1 PROJECT OBJECTIVES, STUDY AREA, & ADMINISTRATION

The Multi-County Goods Movement Action Plan (MCGMAP) is a consensus strategy and implementation plan for the goods movement system within the project study area consisting of Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties.

The objectives of the MCGMAP are to:

- Document existing multi-modal freight movement systems and constraints
- Identify projected goods movement growth and trends
- Identify infrastructure improvements and operational strategies to enhance efficiency and the throughput of goods
- Identify strategies to lessen community and environmental impacts of goods movement
- Identify solutions for implementation and needed public-private institutional arrangements

The agencies participating in the development of the MCGMAP are:

- Los Angeles County Metropolitan Transportation Authority (Metro)
- Orange County Transportation Authority (OCTA)
- Riverside County Transportation Commission (RCTC)
- San Bernardino Associated Governments (SANBAG)
- Ventura County Transportation Commission (VCTC)
- California Department of Transportation (Caltrans) Districts 7, 8, 11 & 12
- Southern California Association of Governments (SCAG)

The administrative lead for the project is Metro. The participating members are all part of the Technical Advisory Committee (TAC), which meets approximately monthly. The TAC members also work with a committee consisting of the Executive Officers (TAC Exec Committee) of the participating agencies. A broader Stakeholder Advisory Group (SAG) meets approximately every second month. The MCGMAP also coordinates with existing forums (e.g., the SCAG Goods Movement Task Force) and provides regular updates and input obtained from a broad range of agency and private sector stakeholders.

Figure 1 shows the MCGMAP study area and illustrates the existing system for regional goods movement. Two additional terms are commonly used in this Tech Memo: 1) "Southern California," which is the study area plus San Diego County and Imperial County and 2) "SCAG," specifically in relation to SCAG data, which includes the study area plus Imperial County.

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Figure 1
MCGMAP STUDY AREA

524930/BASE - 3/1/06

1.2 BUILDING AN ACTION PLAN: OVERVIEW OF PROJECT TASKS

Tasks for the entire project are summarized below:

Task 1.0 Project Management and Administration - This task consists of the ongoing project management and administration of all tasks, including monthly TAC meetings and weekly correspondence between the consultant project team and Metro project manager.

Task 2.0 Outreach Assistance - This task comprises the stakeholder and private sector outreach elements of the project, including periodic SAG meetings, planned workshops within the study area counties, and stakeholder surveys.

Task 3.0 Compile and Collect Goods Movement Data – This Tech Memo provides a summary of Task 3, focusing on the existing conditions and constraints of the goods movement system.

Task 4.0 Assess Growth in Freight Demand, Trends in the Logistics Industry and Baseline (2030) System Performance – Task 4 focuses on the assessment of future freight growth within and outside of the study area. The goal of Task 4 is to identify the baseline conditions for the study area, as well as identify potential freight growth scenarios that could occur depending on local or global changes to the goods movement industry.

Task 5.0 Evaluate Economic, Environmental and Community Impact of Freight Movement Generators and Facilities – The purpose of Task 5 is to identify the economic, environmental and community impacts of the existing goods movement system described in Task 3. A secondary objective of this task is to identify the framework for evaluation of future economic, environmental and community benefits under future freight growth scenarios or with future goods movement projects.

Task 6.0 Identify and Evaluate Strategies for Improving the Movement of Goods – This task includes the critical element of the MCGMAP project; the evaluation of strategies and projects identified to improve the future movement of goods. These strategies and projects will be developed through coordination with the TAC and evaluated against the freight growth scenarios identified in Task 4. The capital costs and operating of the strategies and projects will be quantified wherever possible, while the costs of environmental and community impacts will be identified in a qualitative manner.

Task 7.0 Identify Strategies for Mitigating the Effect of Goods Movement on Local Communities and the Environment – This task will consist of the identification of strategies and measures to mitigate the environmental and community impacts of the goods movement strategies identified in Task 6.

Task 8.0 Develop Multi-County Goods Movement Action Plan Report and Identify Institutional/Funding Arrangements Needed to Implement the Plan – Task 8 will be the culmination of the project and will include the identification of institutional and funding arrangements necessary to implement the action plan.

The tasks described above are building blocks leading to the ultimate development of the MCGMAP. Each task focuses on one element of the MCGMAP, with the goal of creating a comprehensive action plan.

1.3 ORGANIZATION OF THIS TECH MEMO

This Technical Memorandum (Tech Memo) documents the existing conditions and constraints of the goods movement system within the study area. Collected as part of Task 3 of the MCGMAP, the data provide the foundation for the analysis of future regional goods movement conditions and the development of strategies to facilitate the movement of goods throughout the study area.

The roles of each component of the goods movement system are addressed from a regional perspective. The Tech Memo also documents the existing constraints on the regional goods movement system. Finally, it presents an initial discussion of the existing environmental and economic conditions within the study area. This Tech Memo is not intended to provide a complete description of the environmental, health, and community impacts or the economic benefits of goods movement. These items will be addressed in more detail in subsequent project tasks and reports.

The Tech Memo consists of five major sections:

- **Executive Summary** – An overview of this Tech Memo.
- **Section 1: Introduction** – Introduces the project, defines the study area, and sets the context.
- **Section 2: Existing Conditions** – Reviews the existing conditions of the goods movement system itself. It is organized by modal sector.
- **Section 3: Modal System's Role in the Supply Chain** – This section outlines how the various modes interact within the overall supply chain and discusses the performance of the overall system.
- **Section 4: Constraints, Issues, and Problems** – Provides an overview of the constraints, issues, and problems. It is intended to set the stage for the subsequent analysis in the project, providing insight into the kinds of issues that will be addressed.

1.4 OVERALL CONTEXT

The MCGMAP is being developed within the context of a rapidly evolving economic and social context. While numerous interrelated economic and environmental forces are driving the need for the MCGMAP, they can be narrowed down to:

- Globalization of trade, and off-shoring and outsourcing of manufacturing
- Changes in logistics management trends
- Need to create employment opportunities and upward mobility
- Transportation capacity, productivity, and reliability
- Environmental consciousness and protection
- Fiscal constraints

The rapid outsourcing of U.S. manufacturing to Asia, particularly China, has led to unprecedented growth in Pacific trade, which has resulted in enormous stress on port and transportation infrastructure in the multi-county region. The U.S. trade deficit with China doubled in just three years, between 2001 and 2004. Recognizing the changing economic reality, Governor Schwarzenegger visited Asia in 2005 and saw firsthand the shifting manufacturing landscape and its significance for California. The Governor's trip indicates that the study area's role in goods movement has geopolitical significance and stature. It means that governments and businesses throughout the world have a keen interest in solving goods movement-related issues in the study area.

Just-in-time delivery, regional warehouse development, and transloading have dramatically affected the distribution of goods in Southern California. Logistics managers, in their attempt to reduce transportation and inventory carrying costs, are continuing to look for ways to improve their companies' bottom lines. Government agencies have found it difficult to anticipate and to respond to these changes, but to effectively plan for goods movement facilities, government and industry must do a better job of collaborating.

Another critical issue to the MCGMAP study area is providing jobs, particularly to employees with limited educations. The logistics industry has proven to be a valuable employer, giving many of the region's citizens a chance for upward mobility. If employment related to goods movement activities in Southern California is not resolved, a significant segment of working class people will be directly affected.

Two recent events illustrate the fragility of the supply chain: 1) the west coast port lockout of September and October of 2002, which in just 10 days disrupted over $6 billion in trade through the San Pedro Bay ports, and 2) the San Pedro Bay ports congestion during the fall of 2004, which was caused by an insufficient supply of longshore labor and railroad equipment to handle the volume of cargo during the busy fall peak season. Questions about the reliability of the San Pedro Bay port complex have led some shippers to diversify their cargo routes. However, despite these

setbacks, most experts believe that the ports of Los Angeles and Long Beach will continue to be the primary gateway for Asian imports into the United States.

The growth in international cargo has put unprecedented demands on port and port-access infrastructure. The ability to move cargo through port terminals is also being tested by the advent of mega-ships capable of carrying over 8,000 twenty-foot equivalent containers. There are increasing demands to make better use of existing transportation assets, such as terminals and freeways. A good example is the continued effort – through the private PierPASS program established in response to a legislative initiative – to move more cargo at night and on weekends. Another example is the use of technology, such as radio frequency identification (RFID) and optical character recognition systems, to improve productivity at port terminals.

Traffic congestion, land use, and the health impacts of air pollution are probably the biggest concerns facing goods movement stakeholders. Communities rose up in opposition to the original plans for the expansion of I-710 primarily because of the anticipated displacement impacts. In 2005, however, consensus was reached by all I-710 corridor cities, the Gateway Cities Council of Governments, and the Los Angeles County Metropolitan Transportation Authority (Metro) on a hybrid alternative that minimized right-of-way impacts. Still, concerns over the health impacts of diesel emissions threaten the viability of the I-710 improvements and all other goods movement projects. The two ports, California Air Resources Board (CARB), the South Coast Air Quality Management District (SCAQMD), the Southern California Association of Governments (SCAG), the Los Angeles County Metropolitan Transportation Authority (Metro), and other agencies have responded by aggressively seeking reduction in emissions.

These issues are playing out in the context of limited financial resources. The recent federal transportation reauthorization bill provided far fewer dollars to key projects than anticipated. Several bond proposals have surfaced in the last year, including SB 1266 and the Governor's Strategic Growth Plan; however, even with these new resources, additional funding from the private sector through negotiated public-private partnerships will be essential.

All of the issues described above have played a role in motivating goods movement stakeholders to initiate the groundbreaking multi-agency MCGMAP effort. The political leadership within the study area realizes the importance of working together to solve problems and to secure funding for goods movement infrastructure and the mitigation of impacts. The MCGMAP represents collaboration, inclusiveness, and compromise, for only through consensus can true progress be made.

This section presents the existing conditions of the various facilities related to goods movement throughout the study area. Other very important components of the MCGMAP study area's goods movement system are the social, environmental, economic, and air quality impacts that will be addressed as part of Task 5. Existing conditions are presented for the rail, highway, sea, and air components of the regional goods movement system, as well as the warehousing and distribution centers which support the goods movement industry.

2.1 WAREHOUSING AND TRANSLOAD CENTERS

This section provides an overview of warehousing's role in the supply chain, the outlook for the market, and identifies specific trends that impact this sector. The section also addresses transloading, which is the practice of transferring goods from marine containers to/from domestic intermodal containers or trucks at a distribution center or warehouse. Warehousing and transload centers serve as storage and transfer nodes in the regional goods movement network. These nodes serve both domestic and international freight

Overview of Warehousing in the Goods Movement Supply Chain

Warehouses and distribution centers in the MCGMAP area are an integral part of the regional goods movement system. These centers are the place in the supply chain where goods merge and flow from various origins to multiple consumer end points. Some centers are proprietary within a network and serve one store chain, others may be operated by Third Party Logistics (3PL) providers that handle products for multiple customers. Some centers provide value added services or repackaging to meet specific customer demands. Some facilities provide inventory and storage service, others simply move product from international 40' containers to domestic 53' equipment.

Warehousing and distribution centers are sites for the reception, delivery, consolidation, distribution, and storage of goods. The warehousing industry can be divided into private, public, and contract functions:

- Private warehouses are generally owned by larger firms that use the facilities for the storage and distribution of their own goods.
- Public warehouses have many customers, often with short-term commitment, offer flexible services in order to compete, and normally store a variety of commodity types.
- Contract (third-party) warehouses have a dedicated customer, usually specializing in certain commodities, and offer value-added services such as inventory control and management, order entry and fulfillment, labeling, packaging, and price marking.

The study area is home to a large number of warehouses and distribution facilities, for two key reasons. First, the two largest ports on the West Coast - the Port of Los Angeles (POLA) and the Port of Long Beach (POLB) - are located side by side in the San Pedro Bay. These two ports are responsible for unloading goods arriving from Asia and other parts of the world and preparing them for distribution to centers around the United States. Second, it is very convenient for

warehouse managers in the study area to have access to other Western U.S. cities such as Las Vegas and Phoenix. In addition, along with Los Angeles International Airport (LAX), which is a center for international shipping, Ontario Airport (ONT), the regional hub for United Parcel Service (UPS), has become a center for many logistics-related activities. Access to multiple transportation modes and distribution facilities makes this area a desirable logistics hub.

The most significant warehouse/distribution activity focuses on goods moving through the ports, airports and intermodal facilities to final destinations outside of the study area. Approximately 65 percent of inbound truck trips to these warehouse/distribution centers originate from port and airport terminals in the study area For this component of the market, the average roundtrip length of a truck trip (to/from warehouse/distribution centers) is 35 miles.

The remaining 35 percent of inbound truck trips to warehouse/distribution centers originate from local industries and railyards where domestic intermodal shipments arrive from elsewhere in North America. The average inbound truck movements are over 500 miles. The average inbound intermodal (rail) movement is over 1,100 miles long.

The nature of the truck trips related to warehouse and distribution activities typically varies, depending upon the distribution role and market area served by the warehouse. Typical distribution roles are defined as local, Pacific southwest, or regional distribution. These roles are best defined in terms of their market reach. The market reach for a local warehouse is typically within 75-150 miles, a Pacific southwest facility within approximately 250-500 miles, and a regional warehouse within approximately 750 miles of the center.

Local and regional warehouses typically are selected to serve final users within a 24-hour order placement window. Because the Southern California region is the largest population center west of the Mississippi, many domestic facilities are located in the study area. International goods come to the study area from multiple origins around the world and through local ports, seeking to merge international products coming from multiple origins to single regional inland locations (such as Memphis, Chicago, Columbus, etc.). This mixing of international cargo is usually referred to as cross docking which means little or no product is going to be delivered locally. This confluence of two types of warehousing activities (serving inbound international freight and local domestic distribution) leads to the wide dispersion of warehouse locations.

The areas in the study area where warehousing and distribution centers are allowed by zoning are shown in Figure 2.

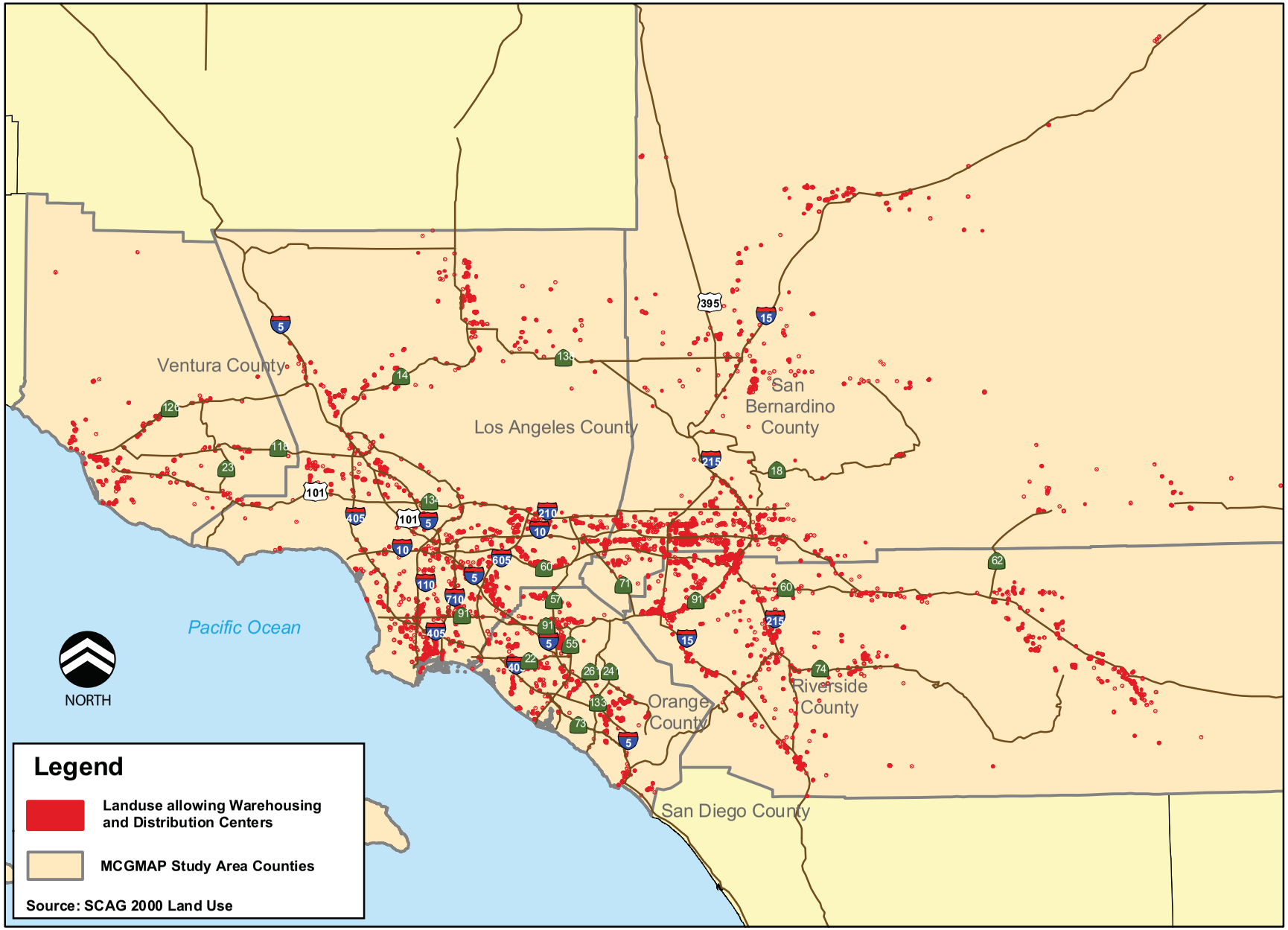

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Figure 2
LOCATIONS OF WAREHOUSING/DISTRIBUTION FACILITIES

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Warehousing Market Outlook

Industrial real estate plays a vital role in the study area's economy. Strong industrial demand and a scarcity of large parcels of available land for development continue to strengthen and add to the long-term viability of the warehousing and manufacturing sectors in the study area. As more than 40 percent of U.S. imports flow through the Ports of Los Angeles and Long Beach, industrial real estate within the study area is well-positioned by its proximity to these international ports of entry. The study area's distribution characteristics, quality of life, and abundance of skilled labor provide key advantages to businesses competing in today's world economy. Sales of core industrial investment properties and owner/user buildings continue to grow, and the long-awaited recovery in the leasing market has come to fruition. The demand for, and lack of available space for lease has stabilized rents in 2005 and will push positive rental growth in excess of 15 percent in 2006.[1]

Currently the warehousing, distribution, and manufacturing industry in the study area includes approximately 1.5 billion square feet (SF) of space, with an additional 32 million SF under construction as of the third quarter of 2005. Major commercial and industrial developers include Prologis, Majestic Realty, Watson Land Company, IDI, Overton Moore Properties, The Carson Estate Properties, and the AMB Property Corporation. Major importers include Wal-Mart, Target, and NYK Logistics. Table 1 summarizes the total square footage available and under construction for the warehousing, manufacturing and distribution industry in the study area.

Table 1
Summary of Warehouse and Industrial Space within the MCGMAP Study Area

Market Area	Net Rentable Area (SF)	Availability Rate	Vacancy Rate	SF Net Absorption	SF Under Construction	Avg. Asking Lease Rate per SF
Los Angeles County	915,852,664	5.0%	1.8%	2,956,887	8,813,316	$0.57
Inland Empire[i]	302,869,238	5.5%	1.9%	4,984,257	21,832,733	$0.39
Orange County	245,787,227	6.4%	3.6%	876,489	1,008,178	$0.61
Ventura County	59,973,660	9.2%	6.0%	434,635	616,791	$0.64
Study Area	1,524,482,789	5.99%	2.7%	9,252,268	32,271,268	$0.63

Source: National Association of Industrial and Office Properties (NAIOP) & C.B. Richard Ellis (CBRE), 3Q2005
Notes:
[i] The data used comes from a source that specifically breaks out the Inland Empire as a subregion without giving more detail at the county level.

There is an important distinction between the availability rate and the vacancy rate. The availability rate is the total amount of space available for lease expressed as a percentage of the competitive building inventory. Space that is available for lease may or may not be vacant. The vacancy rate is the total amount of vacant space available for lease as a percentage of the total inventory of space. Net absorption measures the total amount of square feet leased over a period of time, less the space that is vacated during the same period.

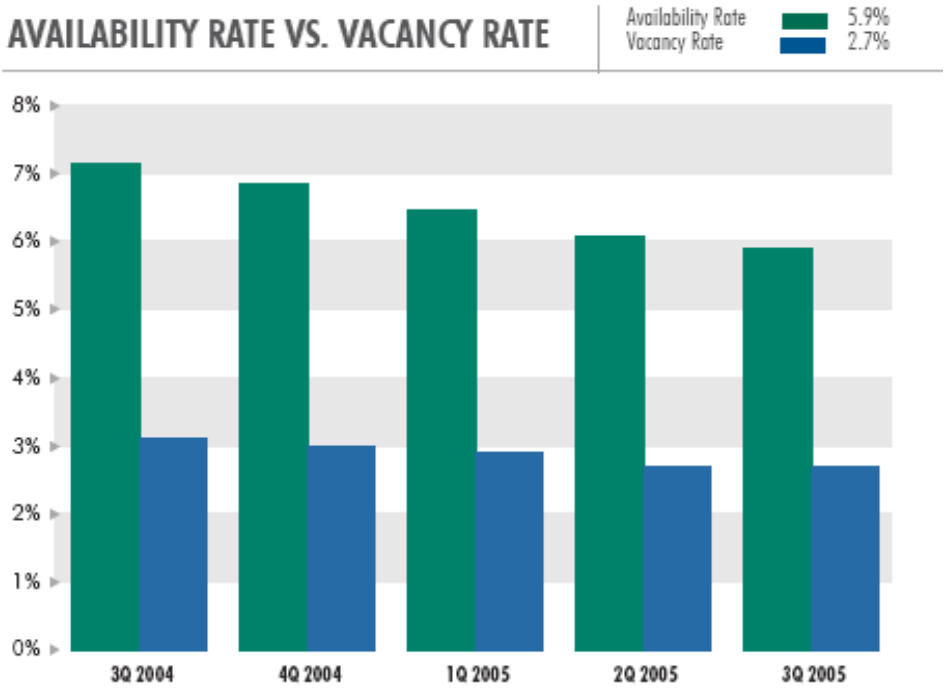
The three dominant reasons that firms have located their warehouses and distribution centers in the MCGMAP study area are:

- The two largest ports in the nation are in the study area, and are a strategic point for unloading goods arriving from Asia for distribution around the United States.
- The substantial "local" market of an estimated 17 million people living in the study area make it one of the largest consumer markets in the country.
- The study area represents the third largest manufacturing center in the nation.[2]

The significance of warehousing's impact on goods movement in the study area can also be described in terms of the annual county-to-county freight. California goods movement industry issues are driven in large measure by both the rise in U.S. outsourcing and the growing California marketplace. In the last 25 years, both California and the United States have shifted much of the domestic production and manufacturing to foreign countries with lower labor costs. As the supply chain becomes more global, California faces greater challenges to its goods movement transportation system of streets and highways, rail lines and yards, seaports, airports, and border crossings.

Figure 3 contains a series of graphs and summaries related to the warehousing and industrial market in Southern California., which includes the MCGMAP study area plus San Diego County. The figures on the following pages show several key indicators of the warehousing and distribution center marketplace: demand, price, utilization and construction activities within the study area.

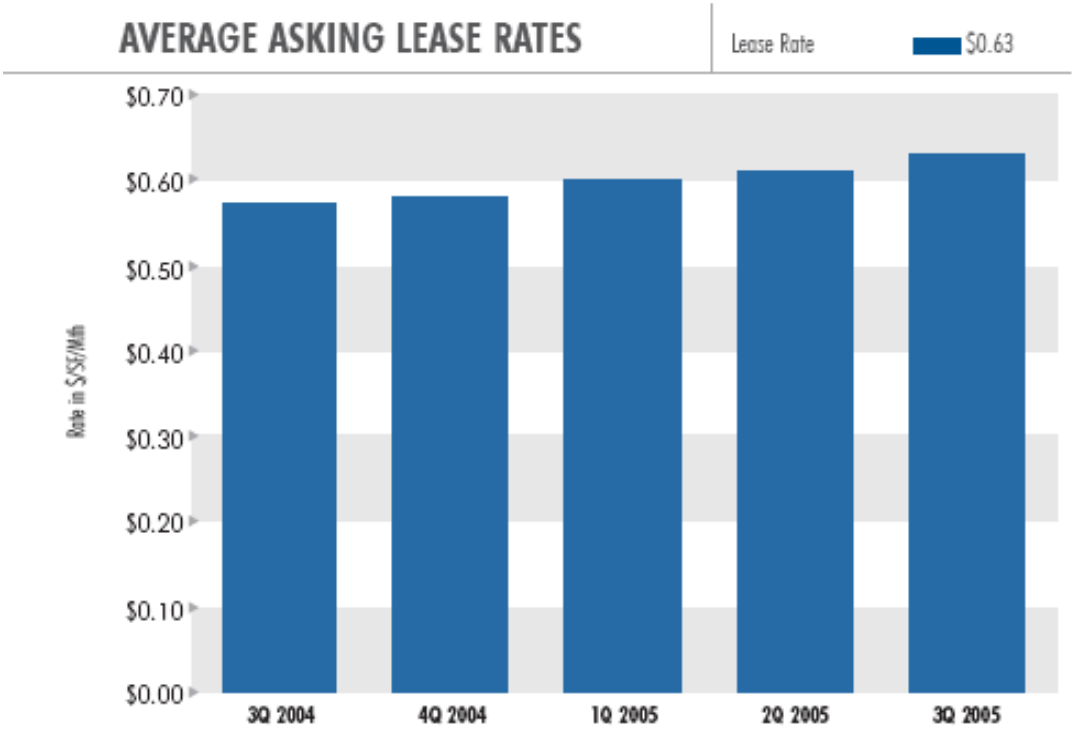
Figure 3
Southern California Warehousing and Industrial Real Estate Market



The Southern California industrial availability rate experienced another quarter of decline, while the vacancy rate held steady. The availability rate decreased 3% from 6.1% in the second quarter to 5.9%, and the overall vacancy rate remained at 2.7%. Los Angeles County holds the lowest availability rate at 5.0%, while San Diego County and Ventura County reported the highest rates of Southern California at 8.9% and 9.2%, respectively. Vacancy rates ranged throughout the five counties from the low 1.8% in Los Angeles County and 1.9% in the Inland Empire to Ventura County's rate of 6.0%.

Source: NAIOP / CBRE 3Q2005

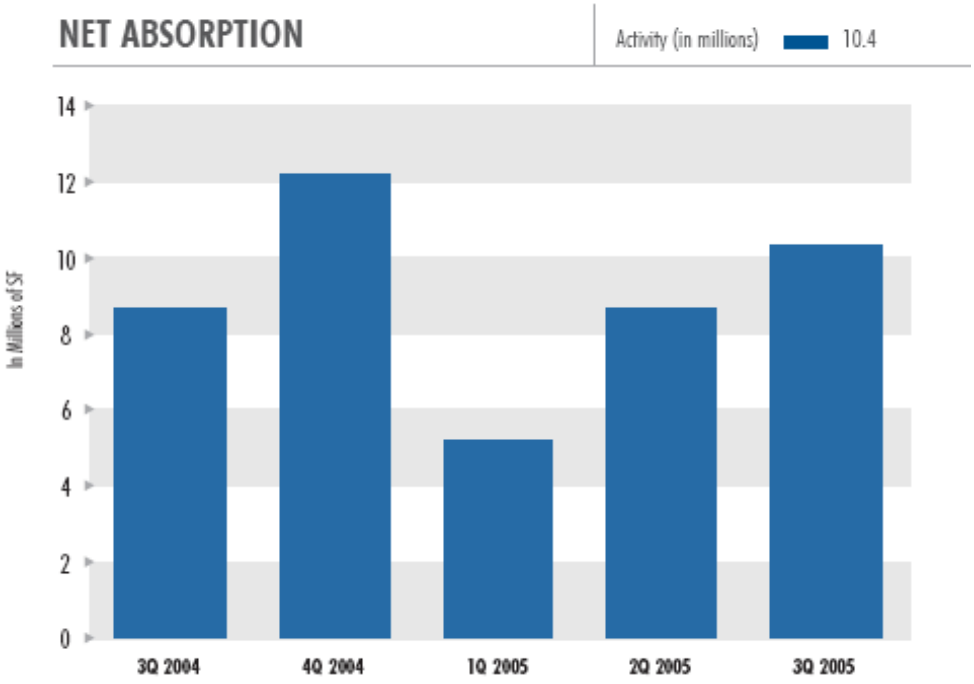
Figure 3 (Contd.)
Southern California Warehousing and Industrial Real Estate Market



The average asking lease rate for the Southern California industrial product increased an additional $0.02 this quarter to $0.63 per square foot. Contributing to this overall rise is the increases experienced in Los Angeles County, which added $0.01 this quarter to stand at $0.57 per square foot. The Inland Empire also witnessed an increase, rising $0.02 to $0.39 per square foot. San Diego County, which carries the highest lease rate in Southern California, rose $0.02 to $1.02 per square foot, and Orange County climbed $0.03 to end the first quarter at $0.61 per square foot. Ventura County declined one cent to $0.64 per square foot.

Source: NAIOP / CBRE 3Q2005

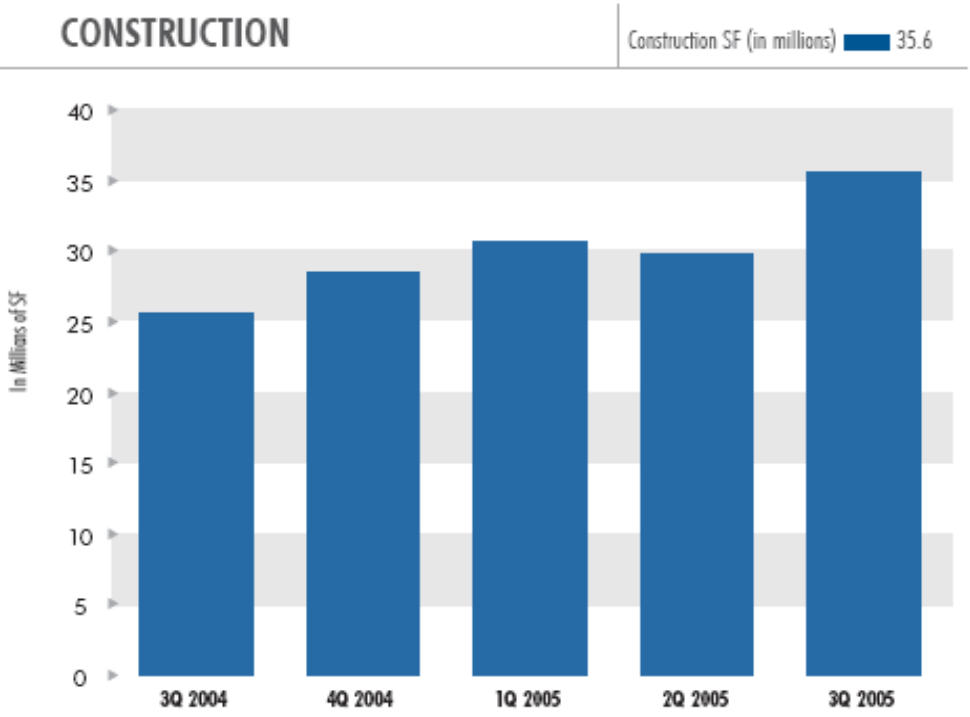
Figure 3 (Contd.)
Southern California Warehousing and Industrial Real Estate Market



The Southern California experienced 10,365,640 square feet of positive net absorption in the third quarter, representing a 20% increase in demand. The majority of the absorption was in the Inland Empire where 4.9 million square feet was absorbed into the marketplace. Orange County witnessed a dramatic increase of positive absorption with 876,489 million square feet, as did Ventura County, which ended the quarter with 434,635 square feet of positive net absorption. However, a slowdown in activity did occur in Los Angeles County with 2,956,887 square feet of positive net absorption. Ventura County demonstrated also experience decline of demand, which resulted in 1,113,372 square feet of net absorption.

Source: NAIOP / CBRE 3Q2005

Figure 3 (Contd.)
Southern California Warehousing and Industrial Real Estate Market



New construction of industrial product within the Southern California market jumped to nearly 36 million square feet under construction in the third quarter. This is representative of a 20% increase over the previous quarter. The Inland Empire accounts for 61% of the total construction activity with 21.8 million square feet currently in the construction phase. Construction activity increased in every Southern California market across the board. Los Angeles County's construction rose 5% with 8.8 million square feet under Construction, while Orange County's construction activity increased 1% to end the quarter with just over 1 million square feet under construction. The construction of new space in San Diego County increased 7% to 3.3 million square feet, as did Ventura County which currently has 616,791 square feet in the construction phase.

Source: NAIOP / CBRE 3Q2005

Los Angeles County

The greater Los Angeles County area is attractive to warehousing and distribution centers due to its proximity to the ports and consumers, the large labor force available, and the existing transportation centers and hubs. There are a number of downsides, however, including:

- Many buildings are old and simply too small for current operations
- Large blocks of land for new facilities are in short supply
- Lease costs are relatively high
- Increased highway and railroad congestion

In Los Angeles County, there are three primary types and sizes of warehouses:

- Private and third-party refrigerated or cold storage warehouses are grouped near the ports, with some clustered in or near downtown Los Angeles and in Vernon. These types of warehouses tend to be less than 100,000 SF.
- Primarily third-party transloading, cross-docking, and value-added services distribution centers are grouped near the ports. These types of warehouses tend to be between 50,000 SF and 150,000 SF.
- A mixture of private and third-party warehouses are clustered in the "Mid-County" and "Gateway Cities," such as City of Industry, Santa Fe Springs, Cerritos, and La Mirada, with a concentration of local distribution for food, beverages, paper goods, etc. These types of warehouses tend to be between 50,000 SF and 150,000 SF.

According to the U.S. Census Bureau, there were a total of 1,101 warehouses and storage facilities in Los Angeles County in 2001. The Census Bureau's definition for this sector (warehousing and storage) is based on industry codes 48 and 49 under the North American Industry Classification System (NAICS). Among them, 63 percent are general warehousing and storage, 20 percent are refrigerated warehousing and storage, 10 percent are other warehousing and storage, and the remaining seven percent are for farm product warehousing and storage.

The Los Angeles industrial market remains one of the strongest markets in the study area. The availability rate for Los Angeles County continues to decline, the overall vacancy rate is also gradually declining. Construction of new industrial facilities has increased, with approximately 8.8 million SF already in the planning and development phase.

The Inland Empire

The Inland Empire (essentially defined as San Bernardino and Riverside Counties) has an especially strong warehouse and industrial market. This subarea is attractive to warehousing and distribution centers because it has areas of land available for large (one million plus SF) facilities – something that is in short supply throughout other portions of the MCGMAP study area. New development of warehousing and distribution centers is spreading from the west end of the sub

area into the Moreno Valley area and north over the Cajon Pass into the high desert. The primary types and sizes of warehouses in this subarea are large private and contract warehouses and distribution centers. These types of warehouses and distribution centers tend to be in the 500,000 SF to 1.7 million SF range. As land has become scarce closer to the Los Angeles basin, large new facilities are being constructed in cities farther east such as Moreno Valley, Fontana, and Perris, and along I-15 toward Las Vegas.

The Inland Empire is becoming attractive to large sophisticated warehousing which supports more value added supply chain customization functions. Some importers are experimenting with bringing goods mostly completed and final customization is completed to match forecasts for final destination markets. Typical supply chains originating in China can span 6-11 weeks. By mass producing product overseas and customizing items closer to final markets, vendors improve their ability to provide the right quantities of the right product, more responsively. These locations in the inland empire are four days away from Midwestern markets and six days away from more dense eastern U.S. markets. Distribution and repackaging of goods (consolidation and deconsolidation) is expected to expand, driven by international trade and the MCGMAP study area's growing consumer market. The Inland Empire industrial market is expanding and developing rapidly. Almost as fast as real estate space can be constructed, unfaltering demand consumes the new capacity. The study area's growing economic base has led to improvements in local employment, personal income, retail sales, home sales, and prices. Near record-breaking activity has vaulted sales and leasing volumes to new heights. "The Inland Empire is shifting gears from being Southern California's affordable housing, blue collar Mecca to adding the kinds of income, sales, job centers, and job quality that have most recently developed in Orange County. This is the signal that the study area is reaching the final stages in its economic maturity with all of the upscale benefits that this implies."[3] Table 2 illustrates a summary of warehouse and industrial space in this area.

Table 2
Summary of Warehouse and Industrial Space within the Inland Empire

Market	Net Rentable Area (SF)	Vacancy Rate %	SF Net Absorption	SF Under Construction	Avg. Asking Lease Rate/SF	Availability Rate %
Inland Empire East[i]	93,228,068	2.1%	2,332,258	12,758,664	$0.42	5.0%
Inland Empire West[ii]	209,641,170	1.8%	3,193,453	9,074,069	$0.37	5.7%
TOTAL – Inland Empire	302,869,238	1.9%	5,525,711	21,832,733	$0.39	5.5%

Source: NAIOP/CBRE 3Q2005
Notes:
[i] Inland Empire East includes Rialto, San Bernardino, Redlands, Colton, Riverside, Corona, Moreno Valley, and Perris.
[ii] Inland Empire West includes Rancho Cucamonga, Ontario, Chino, Mira Loma, and Fontana

Orange County

In Orange County, industrial land is frequently redeveloped for retail activities. Older warehousing and distribution facilities are in the relatively more expensive northern parts of the county, due to proximity to the seaports and current consumers. New warehouse facilities are being built further to the south, where more land is available at relatively lower costs.

Most warehouse facilities in Orange County are private single user or contract warehouse and distribution centers, predominantly due to high land and employee costs. These facilities are typically less than 100,000 SF.

The Orange County industrial sector continues to be strong, with vacancy rates continuing to drop. Just over 1 million SF of industrial property are currently in the construction phase.

Ventura County

In Ventura County there are very limited warehouse and distribution facilities, relative to the other counties in the study area. The key contributing factor is the focus on agricultural land uses in the county, as well as relatively high housing costs for workers. Similar to Orange and San Diego Counties, most warehouse facilities are private and contract warehouse and distribution centers. These facilities are typically less than 50,000 SF.

The Ventura market is relatively stable with slightly declining vacancy levels and moderate increases in available space. The development of new industrial space has regained momentum.

Trends in Warehousing

Below is a summary of industry trends in warehousing that have implications for goods movements in the study area:

- Warehouses are evolving from bulk storage facilities to value-added or customization centers where goods are prepared as floor-ready merchandise for retail stores based on the latest point-of-sale data.
- As warehouses provide more value-added services (i.e., customization, etc.) and implement more technology to help move goods faster, cheaper, more economically and better, an area's labor quality and availability becomes more critical.
- In order to shorten supply chain transit times, some high volume warehouses are being designed for throughput operations (cross-docking or transload) much like truck terminal operations. This requires facilities to be designed with more doors, yard storage, and staging areas.
- Corporations are using their supply chain and warehouse networks to support their business plans and gain a competitive advantage in their marketplace. It has been said that Wal-Mart is a supply chain company that just happens to have retail outlets. Many corporations are trying to emulate the Wal-Mart example.

- Mega-sized facilities incorporating the latest innovations in warehouse design, layout and management systems are leveraging automation and advanced materials handling systems. Products are being sorted and segregated by their velocity within the distribution network. High volume fast moving products tend to be clustered together and often move in separate high velocity supply chains.
- Due to the recent Hours of Service legislation, shippers are realizing the importance of making warehouse operations more "truck driver" friendly (i.e., shipping documents ready and freight staged for quick load-out, faster equipment turnaround and a greater emphasis on trailer pool operations.) This effort to reducing driver wait time, often leads to larger, load storage and staging areas. In other words instead of having drivers wait for an unloading appointment, facilities are allowing the drivers to drop full loads and pick up stored or staged empties to reduce the driver's waiting time. Yard hostlers then position the trailers to the dock doors as space becomes available.
- Warehouse labor supply will continue to be tight. Companies need to improve hiring and retention programs in order to maintain quality workers who will meet the warehouse customers' stringent requirements.
- Just-in-time (JIT) inventory strategy has swung back to a just-in-case (JIC) inventory plan, where increasing amounts of safety stock are placed throughout the warehouse network and supply chain due to sagging service levels of the rail carriers. JIT is an inventory strategy companies employ to increase efficiency and decrease waste by receiving goods only as they are needed in the production process, thereby reducing inventory costs. This method requires that producers are able to accurately forecast demand. JIC inventory strategies provide a buffer in case shipments are delayed or late. JIC also provides safety stocks to offset unreliable demand forecasts.
- Corporate America continues to push for doing more with less. Logistics and warehouse managers will be challenged constantly to implement innovative cost-savings and productivity improvement tactics. These strategies are often based on new technologies and wireless tracking devices and more information collaboration with partners in the supply chain.
- Continued increase in fuel cost for trucking companies will result in the carriers' increased effort to reduce empty miles and bob tail movements.
- Logistics and warehouse managers' jobs are getting more complex as international complexity, carrier capacity short falls and order fill accuracy expectations increase.

Growing imports from China, Japan, South Korea, Taiwan and Thailand are revolutionizing global logistics. Corporations have increased their supply chains and logistics activities significantly by moving an increasing amount of manufacturing to China and Southeast Asian countries. This has increased the complexity of, and the challenges to, achieving fast, efficient and dependable goods movement. In an effort to offset these new challenges, corporations have invested millions in sophisticated supply chain information systems to gain goods movement visibility. Historically when international supply chain activities amount to less than 10% of the importers activities many of the processes were manual. Today it is typical that more than 40% of a companies' product line moves in extended international chains. Due the extended time in transit, there is an increasing need for integrated supply chain visibility between vendors, carriers and resellers.

The consolidation of logistics companies continues to affect the locations of warehousing and distribution centers. As major third-party logistics provider companies grow in size and scope from mergers and acquisitions, they try to gain a competitive edge by providing international shippers with "one-stop" for various goods movement services. These larger 3PL companies have the capital, processes, and technology to significantly increase the sophistication of goods movement.

Increasingly stringent customer service requirements are one of the main drivers changing the warehousing and distribution industry. Wal-Mart, Target Stores, Kohl's, and other mass retailers continue to impress customers with exceptional customer service (e.g., accepting product returns without receipts, out-of-stock product price guarantees). These mass retailers' vendors must then follow suit. The same strong customer service positions are now visible in the automobile, consumer electronics, furniture, toy, and apparel industries. Corporations use their supply chain and warehouse networks to meet these increasingly stringent customer service requirements. Warehouse operations use advanced software systems, e.g., real time data capture and RFID, to identify and expedite orders and document processing. Goods are customized into floor-ready merchandise to meet each customer's special requirements. The availability of a trainable workforce with a good work ethic has become more important in warehouse location decisions. In order to meet changing customer demands, warehouse facility designs are beginning to incorporate a higher ratio of container or trailer yard staging space per dock spots (2 ½ to 3 yard spots per dock door), increased area within the warehouse for product customization and value-added service work, and high-speed fiber-optics infrastructure to the site location.

Over the next few years, the warehousing and distribution industry in the MCGMAP study area is expected to grow at double-digit rates to parallel the growth in imports. Nevertheless, retailers in search of lower real estate and labor costs are establishing regional distribution centers away from major transportation hubs such as Los Angeles, and diversifying their supply chains to include East Coast facilities. Risk management is becoming a higher priority as many companies have been harshly impacted by recent natural disasters and fear the potential of future terrorist activities. As a result of these concerns, new site locations are being sought 200 miles or more inland, with equal access to two or more ports. This new trend in location strategy is based on the theory that this will improve the overall reliability of the supply chain.

Additional issues affecting the warehousing and transloading industry are presented in Section 4.0 of this report.

2.2 FREIGHT RAIL

Railroads have been involved in moving freight to, from and through California for over 140 years. There are 31 freight railroads in California operating over 7,420 miles of track[4] The Union Pacific Railroad (UP) operates the largest portion of the rail network, responsible for 3,708 miles of track. The Burlington Northern Santa Fe Railway (BNSF) operates 1, 889 miles or about 25% of the State's rail network. The remaining 25% of the state track miles are served by regional and

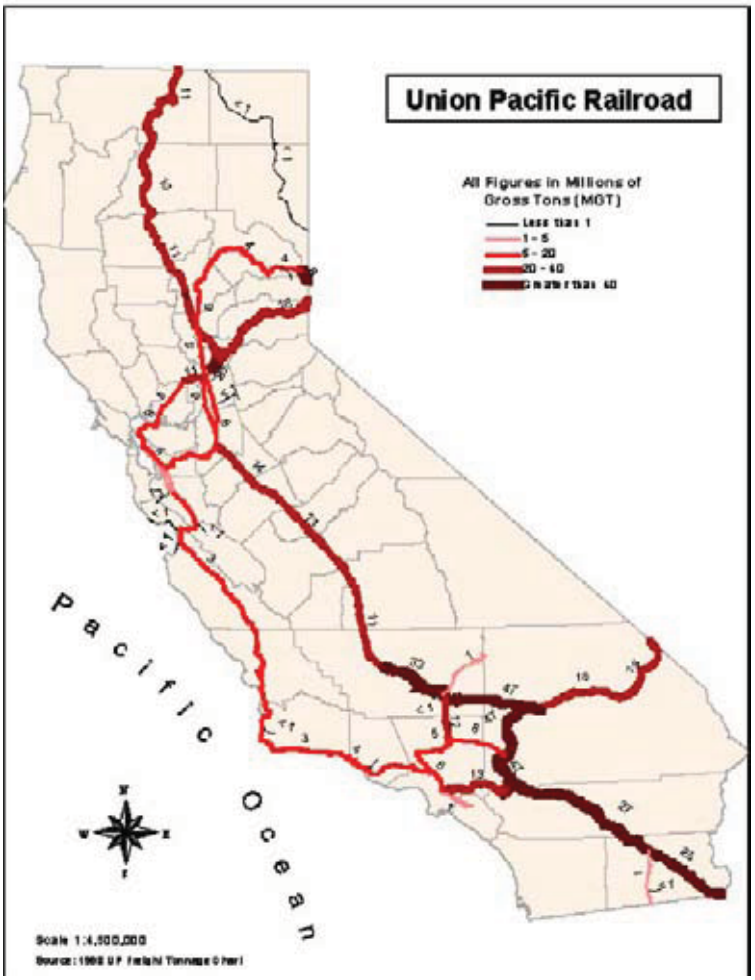
shortline carriers. The California State Rail Plan stated that in 2002 more than 55 million tons of rail freight originates in California and 87 million tons terminated in the state.[5]

With an extensive network throughout the MCGMAP study area, rail serves as a vital link in the goods movement supply chain. This mode is best known for its ability to move large volumes of goods over long distances. Existing rail facilities are extensive throughout the study area, served by two Class 1 railroads, the BNSF and the UP. These carriers connect Los Angeles to the gateway cities and intermediate markets of Chicago, Kansas City, Memphis, Dallas, St. Louis and New Orleans. From these gateways, freight is often transferred to eastern carriers who deliver shipments to dense eastern markets such as Columbus, Detroit, Boston, New York/New Jersey, Philadelphia, Baltimore, Norfolk, Atlanta and Jacksonville. These two railroads are also linked to the Mexican and Canadian rail systems.

Intermodal is one railroad business segment which includes the movement of international and domestic containers and trailers. Fifty percent of all international container traffic moves via intermodal service to inland U.S. points, another 12 percent of these international containers are transloaded to domestic 53' domestic containers, and move inland for final delivery[6].

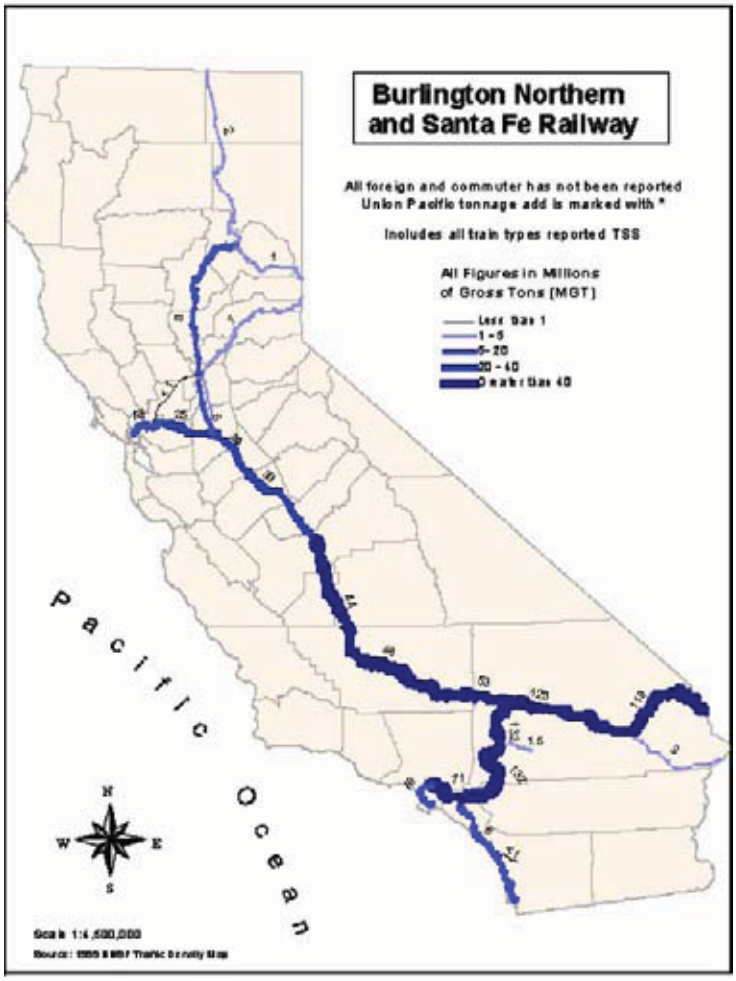
The railroads' mainlines in California and portions of Nevada and Oregon appear in Figure 6. In the study area, the railroads carry all forms of rail traffic: boxcar, tank, lumber and dimensional flat cars, intermodal containers, finished automobiles, and rail carload traffic.

Figure 4
Union Pacific Railroad Freight Density Year 2002
Million Gross Tons (MGT)



Source: California State Rail Plan 2001-02 to 2010-11, Caltrans, 2002

Figure 5
Burlington Northern Santa Fe Railroad Freight Density Year 2002
Million Gross Tons (MGT)



Source: California State Rail Plan 2001-02 to 2010-11, Caltrans, 2002

Source: The Professional Railroad Atlas of North America, Edition 2

Figure 6

RAILROADS AND MAINLINES IN THE MCGMAP STUDY AREA SERVING CALIFORNIA, ARIZONA, NEVADA, AND OREGON

Wilbur Smith Associates

ENGINEERS PLANNERS ECONOMISTS

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Rail Cargo Market Sectors

The following presents an overview of the various rail market sectors (intermodal, automobiles, and carload), provides an inventory of the rail system, and outlines the various types of facilities and their operating characteristics. Section 4 – Constraints, Issues, and Problems summarizes the specific issues related to the existing freight operations in the study area.

Intermodal

The Ports of Los Angeles (POLA) and Long Beach (POLB), known collectively as the San Pedro Bay ports, are major generators of rail goods movement traffic through the study area. Port-related container traffic growth has been double-digit for more than a decade. The UP and BNSF move an estimated 40 percent of all international containers through the study area (many of these are empty westbound containers) as part of their intermodal service.[7] An Alameda Corridor Transportation Authority (ACTA) study conducted in 2004 estimated that the railroads also transport another 12 percent of what had been international containerized cargo in domestic containers.[8] This is cargo that had been warehoused or transloaded in the study area before being transported in domestic containers eastbound. The value of POLA and POLB container cargo transported by rail was about $113 billion in calendar year 2004, based on rail intermodal's share of the declared value of container cargo moving through the San Pedro Bay ports at $218 billion.[9]

In addition to port-related traffic, UP and BNSF transport a large number of domestic containers, adding billions of dollars to the total value of intermodal cargo in the study area. Domestic intermodal cargo includes customers such as UPS, U.S. manufactured food products, and high value merchandise, e.g., cigarettes and alcohol.

Over time, intermodal shipments have become predominant in the freight rail traffic mix in the study area. The emergence of the intermodal sector initially gained strength following the deregulation of the railroad industry in the 1980s. As a result of both deregulation and service improvements, much of carload traffic shifted to intermodal. The shift from carload to domestic intermodal was largely completed during the 1990s. Also, there was a big shift of over-the-road truck traffic to intermodal after trucking was deregulated. With driver shortages and increased fuel costs more trucking companies have found ways to use the long haul rail network as driver substitute service. It is important to note that the process of transloading from marine containers to domestic containers is contributing to the "appearance" that the domestic intermodal segment is growing at a rate comparable to the international growth rate (which is higher).

Domestic containers are larger than international containers. While domestic containers are typically between 48 feet and 53 feet in length, standard marine containers are characterized as 20 feet, 40 feet, and 45 feet long, with 40 feet being most common length.

Intermodal Markets - Intermodal trains operate between the MCGMAP study area and all major Eastern markets and rail gateways. In many instances, multiple schedules are destined for the same

general market. This service segmentation is driven by customer needs and a recognition that the carriers can charge a premium rate for a day faster service.

UP also operates intermodal service to the Pacific Northwest and the Bay Area from the Basin. BNSF does not offer any intermodal service between the Basin and the Bay Area, the Central Valley, or the Pacific Northwest.

Intermodal Complexity - As the mix of railroad traffic continued to change from carload to intermodal, the railroads converted some carload yards to intermodal facilities. Examples of this are the Hobart Yard on BNSF and East Los Angeles (East LA) on UP, where each has been incrementally converted from carload classification centers and cross dock operations to intermodal facilities over the past 30 years. Each conversion represented a ready opportunity for the railroads in that they did not have to acquire property or comply with provisions of the California Environmental Quality Act (CEQA), since the prior and subsequent use of the properties were for railroad purposes. This type of railroad property conversion has taken place all over the U.S. as "intermodalism" has come to dominate the property needs of the railroad industry.

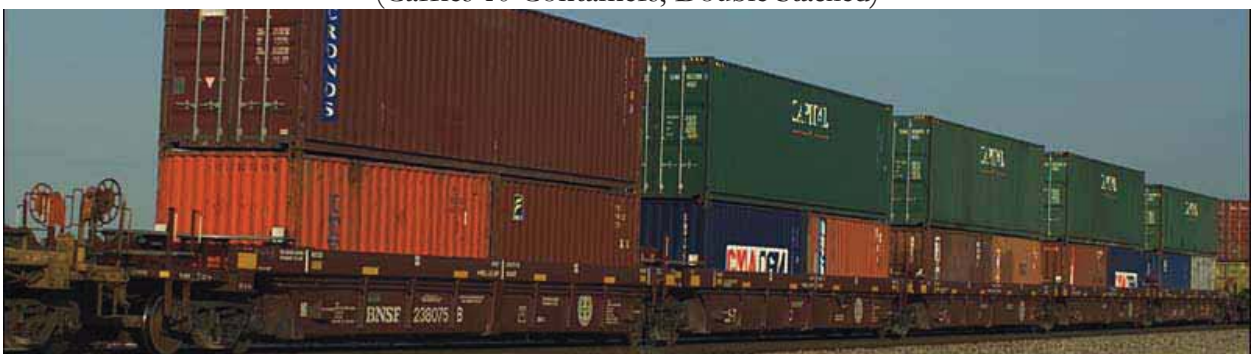
The railroads have invested heavily in articulated double-stack (containers stacked two high) rail cars for three significant reasons:

- Articulated configuration provides a better ride for the load, because it diminishes the in-train slack action thereby reducing in-train forces which results in load damage.
- Increased cargo density allows for the reduction of overall train length. Train length is critical in all corridors due to the limited length of many track sidings and passing tracks.
- The amount of terminal space needed to load and unload cargo. Since the number of loaded well slots per car is a railroad measure of productivity for all intermodal facilities, the objective is to have all the wells in a car fully utilized. A typical articulated rail car has five wells, although there are single and three-well rail cars in the system. Figures 7 and 8 show typical three and five well articulated rail car configurations. Railroads are also purchasing non-articulated, one-well cars. The reason for this variance in car well size is to allow the originating terminal to load (or block) a single well car with boxes all destined for the same final terminal. The loading objective is to fill all wells two high. A typical five-well railcar can be loaded with ten 40-foot containers (some lower wells can be loaded with two 20-foot containers, or with containers slightly longer than 40 feet; upper containers can be longer than 40 feet, but no 20-foot containers ride as upper containers).

Figure 7
Photo of a 3 Unit Articulated Intermodal Rail Car
(Carries 6 Containers, Double-Stacked)

Source: Charles Biel's BNSF Photo Archive.

Figure 8
Photo of a 5 Unit Articulated Intermodal Rail Car
(Carries 10 Containers, Double-Stacked)



Source: Charles Biel's BNSF Photo Archive.

The difficult aspect of the use of multiple-well, articulated, high-capacity double-stack railcars is that many on-dock intermodal facilities do not generate sufficient multiple double-stack car volume for some destinations. This is particularly true at the on-dock intermodal facilities, which are largely single-user or ocean carrier consortium-specific facilities. For example, in order to fully fill a 5-well (or unit) car for a single destination, ten 40-foot containers are required. The five-well car unit consists of one 40-foot container atop another in each well; alternatively, two 20-foot containers can be loaded in a well, with a 40-foot container on top, as shown in Figure 8. To load a 3-well car, six 40-foot containers for the same destination are needed. To load a 1-well car, two 40-foot containers are needed. Thus the difference in car sizes offers flexibility.

Railroad-owned near-dock facilities (intermodal facilities located within a few miles from port areas) have the advantage of being able to mix loads from multiple sources to single destination terminals. By combining the containers from multiple marine terminals, the railroads are able to generate more efficient blocks of cargo and have the density to build 8,000-foot long trains. For line haul productivity reasons, the railroads prefer a train length of about 8,000 feet. This figure is only constrained by the length of the passing tracks along the network. An 8,000-foot long container train typically carries 240 containers. If a single on-dock facility does not generate that

much volume, international containers landed there may go instead to a rail consolidation facility such as UP's Intermodal Container Transfer Facility (ICTF) or the BNSF's Hobart terminal.

The intermodal volume in the MCGMAP study area in the last four years, including on-dock, appears in Table 3. The table shows units by year. A unit is a container, regardless of size.

Table 3
MCGMAP Study Area Intermodal Volume in Units for 2001-2004

Year	Volume (Units)	Annual Growth Rate
2001	3,692,055	-
2002	3,894,137	5%
2003	4,251,982	9%
2004	4,673,128	10%

Sources: UP, BNSF Intermodal Data, 2005

The intermodal volume shown above includes both international and domestic container shipments. Nearly all growth was from an increase in port-related volume. The percent of San Pedro Bay port container throughput loaded at the on-dock facilities was 18 percent in 2004 and about 21 percent in 2005. In 2005, BNSF pushed more westbound trains to the docks (from Hobart) and ocean carrier Orient Lines commenced using an on-dock facility.

Transloaded Intermodal Cargo – An emerging market related to the intermodal market sector is the transloaded sector. In transloading, the goods are sometimes transferred immediately (cross-docked) or after the goods are handled/stored for short period of time in the warehouse to accommodate value-added services (e.g., bar codes or labels are added; hangers added to apparel; mixing of products to make loads for specific retail stores). Many of the large shippers of intermodal cargo (such as Wal-Mart and Target) transload cargo from ocean carrier containers to domestic containers, which are then transported via rail or long-haul truck to inland destinations.

This is a growing segment and has been the topic of research of late, with two recent studies providing some insight about the scale of this segment. The SCAG Port and Modal Elasticity Study estimates that 40 percent of all containers flowing through the San Pedro Bay ports are "shipments trans-loaded into other vehicles for movement outside the region plus marine containers trucked outside the region," but does not indicate what share is actually transloaded.[10] The 2004 Alameda Corridor Transportation Authority study estimated that 12 percent of all rail intermodal traffic to/from the study area is transload/cross dock, while 18 percent of the study area's port-related traffic trucked outside the study area is transload/cross dock.[11] This would imply that 30 percent of all of container traffic goes through some transload/cross-dock activity.

Automobiles - Private carriers estimate the value of automobiles distributed from railroad facilities in the study area to be about $25 billion annually, assuming an average retail price per unit of $25,000. The value of imported automobiles shipped out of the area from these facilities by rail is about $7.5 billion annually.

Domestically manufactured automobiles purchased in the study area are primarily distributed from UP's Mira Loma facility. This facility serves GM, Ford, Chrysler, and some foreign manufacturers with production plants in the U.S., such as Isuzu and Toyota. Annual volume at Mira Loma is about 900,000 units, transported on about 70,000 railcars.[12] Domestically manufactured Hondas are distributed throughout the study area from a BNSF facility in San Bernardino. This amounts to about 132,000 units annually. Honda uses a National City (San Diego County) loading facility for its imported automobiles.[13] The imported units are about 125,000 annually; 80 percent are transported through the study area to Eastern markets.[14]

Toyota recently opened an import facility at Benicia, California, to serve Northern California and markets east of California. Toyota is studying the potential for moving all of its U.S. manufactured cars for shipment to overseas markets to Benicia from POLB. This is because Toyota's lease at POLB expires in 2006, and the size of its terminal will be much smaller under a new lease. The new business plan of Toyota is being driven by the need of the POLA and POLB to support burgeoning container operations. Toyota's domestically produced automobiles are distributed from Mira Loma. Until recently, Toyota used POLB property to distribute all of its imported and domestically produced automobiles in California. Toyota will continue to serve Southern California markets from POLB.

Nissan imports through POLA and distributes both imports and domestically produced automobiles from its marine terminal there. It is possible that Nissan imports destined to Eastern points may eventually shift to another port because of competition for dock space, and the domestically produced product could potentially migrate to an inland rail facility. Whether this occurs or not depends on market forces that are difficult to predict with precision.

The Port of Hueneme is a key gateway for automobile imports. The port is currently seeking additional property to expand parking capacity in order to allow increased automotive shipping activity at the port.

Carload Traffic

In the rail industry, carload traffic refers to cargo moved in or on boxcars, gondolas, tank cars, flatcars, and other conventional railroad vehicles. Typical carload commodities include agricultural products such as grain and fertilizers, lumber, paper, scrap metal, coal, aggregates, chemicals, steel, machinery, and consumer products and food stuffs, among many other things. Trains carrying this traffic are sometimes called carload or manifest trains. With some exceptions, carload traffic is generally low-value, heavy, bulk products.

Carload traffic is a major component of the rail goods movement but it has decreased in importance over the years and now represents about a third of the rail goods movement in the study area. In absolute terms, carload traffic declined as merchandise, canned goods and time-sensitive traffic shifted to intermodal and as more manufacturing (which depended on rail as a key part of its logistical supply chain in the past) has moved overseas. Manufactured products from overseas now come to the U.S. in marine containers in increasing numbers and are delivered to consumers in intermodal transportation service. With increasing energy costs the demand for coal

and local energy sources has increased. Export grain and agricultural products have also grown placing increasing demand on rail networks for new unit train starts.

Consistently accurate data on carload values is not readily available. Nonetheless, approximately one third of the total number of freight unit trains generated throughout the study area is carload, the remainder consisting of intermodal trains. Carload trains, however, also include rail cars loaded with automobiles. Based on this, it is estimated that carload volumes actually represent less than a third of the overall rail market volume in the study area.

Intra-Regional Rail Traffic

A small amount of rail traffic has origin and termination points inside the study area. For example, some carload aggregates (gravel) move from Cabazon to a batch plant in Gardena. Gypsum from Plaster City (Imperial County) moves to a Santa Fe Springs wallboard manufacturing plant, and BNSF operates a unit train (a train handling carloads of a single commodity) of imported slab steel from the San Pedro Bay ports area to a rolling mill at Fontana. The Los Angeles County Sanitation District (LACSD) plans to commence operation of solid waste trains between the existing City of Industry transfer facility and the proposed Mesquite Regional Landfill (MRL) in Imperial County in 2009.[15] There is no intra-regional transport of intermodal or automobile traffic.

Inventory of Systems

In the study area the BNSF Railway and UP Railroad are the two major railroad systems that form a base network for goods movement. Rail freight volumes move to a lesser degree via publicly owned track and short lines. The following describes these systems and presents the train freight volumes on BNSF and UP mainlines.

Burlington Northern Santa Fe Railway

BNSF's east-west mainline is designated by the railroad as Transcon, a term reflecting its continent-crossing nature. The Transcon's western terminus is the Alameda Corridor near downtown Los Angeles.

The Transcon is the BNSF artery linking the Los Angeles Basin to all Midwestern, Southwestern and Eastern markets on the BNSF rail system. These markets include Kansas City, St. Louis, Chicago, Memphis, Dallas, Houston, New Orleans, Denver, El Paso, Albuquerque, and Phoenix. In the Cajon Pass segment of Transcon, BNSF operates 90 to 100 trains daily on a double track rail line (this will soon expand to a triple track). More than 95 percent of Transcon is double track.

The Central Valley north-south line links Transcon to the Bay Area and the Pacific Northwest. BNSF reaches the Central Valley first by its mainline running west from Barstow to Mojave, then through Tehachapi Pass via trackage rights on the UP before reaching BNSF Central Valley mainline track from Bakersfield. Trackage rights are granted by one railroad to another for the use

of its track. The granting railroad allows the grantee railroad use of its track, typically for a fee that covers the incremental cost triggered by the grantee's use of the track. The Bay Area terminus of the Transcon is in Richmond. The BNSF north of Stockton runs on UP via trackage rights to Keddie in the Sierra Nevada foothills, then on BNSF trackage to Portland and Seattle in the Pacific Northwest. BNSF's Pacific Northwest route is circuitous relative to the competing UP route. It is used for the transport of forest products and for re-positioning empty intermodal rail cars (cars that carry trailers and empty containers) to the Los Angeles Basin.

As noted, between Mojave and Bakersfield and through Tehachapi, BNSF operates on track owned by UP. This segment of track is highly congested with BNSF and UP traffic. All of the BNSF's intermodal trains from the Bay Area and Central Valley operate on this route. In addition, 25 miles of the segment lies on a 2.5 percent grade, a particularly difficult operating environment for railroads. Train volume is about 50 trains per day during busy parts of the week. Because of topography, building additional capacity by adding a second main track through the steep grade segment would be extremely expensive and difficult. This rail line constraint is a major reason why BNSF does not aggressively seek to haul more international containers through the Port of Oakland.

BNSF has been particularly aggressive in changing its intermodal business practices to absorb the surge of container traffic through the San Pedro Bay ports. In both 2003 and 2004, virtually all intermodal growth in the study area was on BNSF. The growth between 2002 and 2004 was about 780,000 container units. BNSF has adopted a strategy of operating 8,000-foot container trains, whereas it operated 5,000-foot to 6,000-foot trains in the past. This operational change has allowed BNSF to absorb all new business over the last two years without increasing train starts. This is a tremendous productivity achievement. In addition, BNSF has changed its business practices at Hobart Yard, where it established an appointment system. The system accelerates inventory turnover and reduces chassis storage. It also is converting container storage from a wheeled operation (container on chassis) to stacked operation (containers set one atop another, thus reducing space requirements for storage). These steps are innovative departures from the operation of most railroad intermodal facilities.

Union Pacific Railroad

UP has two lines running east-west from the Los Angeles Basin. One is the Sunset Corridor, which extends to El Paso, Texas, and beyond, and the other is the South-Central Line, which extends to Las Vegas, Nevada, and beyond. The two lines cross at Colton, at a point appropriately called Colton Crossing. The El Paso route is designated as the primary intermodal lane between the Los Angeles Basin and Eastern markets. The line connects the study area with locations such as Tucson, Phoenix, El Paso, San Antonio, Houston, New Orleans, Dallas, Memphis, Kansas City, St. Louis, and Chicago. About 40 percent of the line between the Los Angeles Basin and El Paso is double track (two parallel mainline tracks). UP operates up to 50 trains a day on the route. Constrained Sunset Corridor capacity is an issue, and UP currently operates several intermodal trains over its South-Central Line that it would otherwise route on the Sunset Corridor.

UP's two Los Angeles Basin lines, the Los Angeles Subdivision and the Alhambra Subdivision, discussed in the following section, are connected to the Sunset Corridor at Colton. The Los Angeles Subdivision segment of the mainline connects with the El Paso Line just east of Sunset Corridor at Colton Crossing via the BNSF Transcon between West Riverside and Colton[16]. The Alhambra Subdivision's eastern terminus is at West Colton Yard, the western terminus of the Sunset Corridor. UP's 50 daily trains on the Sunset Corridor are considered to be the maximum capacity on a mainline with passing and meeting sidings and a mix of train types. The sidings are comparatively short segments of track parallel to a mainline with switches at either end. This arrangement allows two trains approaching each other from opposite directions on a single track mainline to pass or meet each other.

The South-Central Line is another route to eastern markets. This line is the primary rail route to Salt Lake City and Denver from the Los Angeles Basin. In addition, the line is well situated to serve the upper Midwest. Though the South-Central Line connects to lines radiating into the Gulf Coast area, routing traffic this way would be circuitous; thus, the line is not used for such moves.

UP's Los Angeles Basin lines are connected to the South-Central Line in two ways. The Los Angeles Subdivision connects via trackage rights over the BNSF Transcon between West Riverside and Daggett (east of Barstow), where UP's mainline to Las Vegas begins. The Alhambra Subdivision connects via the UP's Mojave Subdivision main line from West Colton Yard northward over Cajon Pass trackage, via a connection to the BNSF Transcon near the top of the pass, and the Transcon then via BNSF trackage rights to Daggett. UP operates 20 to 25 trains each day on the South-Central Line.

UP has two north-south routes from the Los Angeles Basin. Running north from Los Angeles on the same track, the two routes diverge at Burbank. One goes north from Santa Clarita to Palmdale and on to Mojave, Tehachapi Pass, and the Central Valley. The other goes west to Oxnard and Santa Barbara. The route to Palmdale is designated the Santa Clarita Line, and the second is known as the Coast Line. Ownership of line from Los Angeles to Chatsworth is shared between UP and Metro; ownership of the line from Chatsworth to Moorpark is shared between UP and the Ventura County Transportation Commission (VCTC).

UP operates from Los Angeles to Palmdale on track owned by Metro. From Palmdale north to the Central Valley, UP operates on its own track. UP's Central Valley mainline continues to Sacramento. UP has its Mount Shasta Route to Portland and Seattle. The Los Angeles County-owned portion of this route between Los Angeles and Palmdale is maintained by the Southern California Regional Rail Authority (SCRRA), which sponsors Metrolink commuter train service between Lancaster and Los Angeles. On a typical day, UP routes four intermodal trains going between the Basin and the Pacific Northwest over the Santa Clarita Line.

The Coast Line links the Los Angeles Basin with the Bay Area. At San Jose, the route splits into two lines, one to Oakland and the other to San Francisco. The line to San Francisco is owned and maintained by the Peninsula Commute Joint Powers Board, which sponsors the Caltrain commuter rail service; the line to Oakland is owned by UP. In Oakland, the line connects to the historic Overland Route Donner Pass line to the Midwest and at Sacramento and Roseville to the

UP Shasta Route to the Pacific Northwest. The Coast Line is used sparingly for freight service. There is a great deal of interest in the Coast Line as a passenger train route between urban areas. In addition to local service, UP operates two conventional carload trains each day from Roseville to the Basin on the Coast Line. Opposite direction counterpart trains are operated between the Basin and Roseville. These trains avoid the UP's classification yard at West Colton and deliver cars directly to industrial distribution facilities situated in the Basin. UP also operates a Basin-to-Bay Area intermodal train each day on the line, and uses the line to re-position empty intermodal equipment from the Port of Oakland to the Basin. The southern segment of the Coast Line, from San Luis Obispo to Los Angeles, is part of the Los Angeles to San Diego (LOSSAN) Corridor.

Bridging a gap between the north end of the Santa Clarita Line and the west end of the Sunset Corridor is the Palmdale-Colton Cutoff. UP's Palmdale-Colton Cutoff (Mojave Subdivision) bridges the gap between Palmdale on the Santa Clarita Line and the west end of the Sunset Corridor at West Colton Yard. The line was constructed in the late 1960s to reroute trains around downtown Los Angeles. UP uses the Cutoff for carload traffic to/from the Bay Area, the Central Valley, and the Pacific Northwest. UP routes a Houston-bound intermodal service from the Port of Oakland over the Palmdale-Colton Cutoff to the Sunset Corridor. UP operates about 15 trains each day on the Palmdale-Colton Cutoff.

UP operates trains of less than 8,000 feet on its South-Central Line, as the siding lengths are not long enough to handle 8,000-foot trains. The Sunset Corridor has 8,000-foot sidings, and UP attempts to operate container trains of that length on that route.

UP has been less aggressive than BNSF in changing its intermodal business practices. For example, UP's operation is 100 percent wheeled. Also, UP has not reduced chassis storage at their facilities in any meaningful way. UP recently started a pilot program at facilities in the Midwest to encourage chassis pools with the goal of reducing on-site chassis storage.[17]

BNSF and UP Lines in the Los Angeles Basin

There are three east-west rail lines in the Los Angeles Basin. These lines provide connections between Los Angeles and the transcontinental rail system. International container traffic going to and from the POLA and POLB is routed over these lines. These lines are the BNSF Transcon west of San Bernardino, the UP Los Angeles Subdivision, and the UP Alhambra Subdivision. These lines are shown in Figure 9. A complete description of the configurations of the study area rail lines, including number of tracks, is included in the Inland Empire Railroad Main Line Study Final Report (Southern California Association of Governments, June 30, 2005).

The three Basin lines transport more than 98 percent of all Los Angeles and Long Beach port intermodal traffic (which accounts for about 52 percent of port container traffic in the United States). They also transport all automobile rail loads imported and exported through the Ports of Los Angeles, Long Beach, San Diego, and Port Hueneme. In addition, the lines transport carload traffic and connect to branch lines in the Basin.

The BNSF Transcon in the Basin runs from San Bernardino to downtown Los Angeles, where it connects to the triple track Alameda Corridor and thus to the POLA and POLB. UP's Los Angeles Subdivision runs from West Riverside to downtown Los Angeles, and the Alhambra Subdivision runs from Colton to downtown Los Angeles. Both lines connect to the Alameda Corridor. They also connect to the north-south rail routes for UP, the Coast and the Santa Clarita Lines. Metrolink operates its 91 Line service, its Inland Empire Orange County Line service, and its Orange County Line service on the BNSF Transcon. Amtrak's long distance Southwest Chief and the Amtrak Pacific Surfliners also operate on the Transcon.

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Figure 9
BNSF TRANSCON WEST OF SAN BERNARDINO, UP LOS ANGELES SUBDIVISION, AND UP ALHAMBRA LINES

524930/BASE - 3/1/06

As noted, the Los Angeles Subdivision connects to Transcon at West Riverside and the UP Las Vegas mainline at Daggett. Between West Riverside and Daggett, UP operates over the BNSF Transcon via trackage rights. The Alhambra Subdivision connects to the UP Las Vegas mainline via a combination of UP and BNSF trackage between Colton and Daggett. The Los Angeles Subdivision connects to the Sunset Corridor via the Transcon between West Riverside and Colton. The Alhambra Subdivision connects to the Sunset Corridor at West Colton and to the Colton Cutoff at West Colton. Amtrak's Sunset Limited runs on the Alhambra Subdivision, and Metrolink's Riverside Line service runs on the Los Angeles Subdivision.

UP's Los Angeles Basin operating plan is to route eastbound trains on the Los Angeles Subdivision and westbound trains on the Alhambra Subdivision.[18] Thus, trains from Los Angeles bound for the Sunset Corridor travel over the Los Angeles Subdivision to West Riverside, over the BNSF Transcon from West Riverside to Colton, and on to the Sunset Corridor at Colton. The UP Sunset Corridor and the BNSF Transcon cross each other at grade in Colton. There is a connection between the two lines there. This connection track makes the UP's strategy of directional flow of trains operationally feasible. UP's Alhambra Subdivision becomes the Sunset Corridor at Colton. The majority of rail traffic on the lines mentioned above comes from and goes to points outside the MCGMAP study area.

UP's north-south routes include the Coast Line and the Santa Clarita Line. Amtrak's long distance Coast Starlight, Amtrak Pacific Surfliners, and Metrolink's Ventura County Line service operate on the Coast Line. Metrolink's Antelope Valley Line operates on the Santa Clarita Line.

Publicly Owned Track

In the early 1990s, public agencies acquired track of both the former Southern Pacific Transportation Company (SP) and the Atchison, Topeka, and Santa Fe Railway (ATSF) as a prelude to the initiation of Metrolink commuter rail service. Much of this track is used by the Metrolink commuter rail service, operated by SCRRA. Sixty-four percent of Metrolink trains run on these lines, with the remainder using BNSF and UP lines. Metrolink dispatches about 100 freight trains daily using these lines.

These publicly owned lines include the Santa Clarita and Coast Lines. They also include lines running from Fullerton and Atwood to Orange, and thence to San Diego. These were former ATSF lines, now owned by Orange County Transportation Authority (OCTA). Metrolink's San Bernardino Line runs on a combination of former SP and ATSF lines now owned by Metro and the San Bernardino Associated Governments. Approximately five freight trains run on between the BNSF Transcon and San Diego today.

Another publicly owned track is the Alameda Corridor running from near downtown Los Angeles to the San Pedro Bay Port area. This line handles approximately 54 trains per day now.

Short Lines

There are four primary short line operators in the study area. A short line is a small railroad, generally connecting to the mainlines. Some are owned by public agencies, some controlled by large railroads like UP and BNSF, and others are independently owned and operated. All interchange traffic with the major railroads.

The largest short line in terms of miles, carload volume, and range of activity (addressed here) is Pacific Harbor Line (PHL), serving the POLA and POLB. The PHL franchise includes the distribution of all carload traffic in the Harbor District (track owned by the two ports) on behalf of UP and BNSF. PHL is paid a loaded per-car rate for this service. PHL also dispatches and maintains the Harbor District tracks. This expense is billed to the UP and BNSF proportional to their share of traffic. PHL also offers services to satisfy the on-dock switching needs of the railroads and marine terminals.

The Ventura County Railroad (VCRR) is located in Oxnard and connects Port Hueneme to UP at Oxnard. The track and rail property is owned, dispatched, and maintained by the port. VCRR moves automobile traffic between Port Hueneme and the UP at Oxnard.

The Arizona and California Railroad (ARZC) connects to the BNSF Transcon at Cadiz, California, and at Parker, Arizona, on the BNSF Phoenix Line. ARZC bridges traffic from Cadiz to Parker for BNSF. This traffic originates on BNSF in California and the Pacific Northwest. ARZC also operates a branch line into Blythe, California. The track over which the short line operates is leased from BNSF, but is maintained and dispatched by ARZC.

The Los Angeles Junction Railway (LAJ) operates in the cities of Commerce and Vernon. LAJ is a wholly owned subsidiary of BNSF. UP has access to all customers through LAJ. The track and property are owned by BNSF, but are maintained and dispatched by LAJ.

The Ventura County Transportation Commission (VCTC) is investigating the feasibility of reestablishing the eastern connection of the Santa Paula Branch Line to the SCRRA-owned Santa Clarita Line in Santa Clarita. VCTC purchased the Ventura County portion of the Santa Paula Branch in the mid 1990s from the former Southern Pacific Railroad. At the time of the purchase, the line terminated in Piru; the portion between Piru and Santa Clarita had been abandoned years earlier. Shippers on the Santa Paula Branch today are served by UP. Traffic consists of lumber and paper shipments. Service is three times per week. Freight service terminates in Santa Paula. The Fillmore & Western Railway operates the dinner train/tourist train service between Santa Paula, Fillmore, and Piru.

The VCTC study will look at the potential for using a reconnected Santa Paula Branch Line for both commuter service to Los Angeles and for freight rail traffic emanating from Port Hueneme. Port Hueneme-related freight traffic conceivably could use the line to reach the UP at Palmdale for running north to the Central Valley, the BNSF at Mojave for running north to the Central Valley as well as east to Midwestern destinations, and the UP Colton Cutoff at Palmdale for running east to the Gulf and Midwest. Also, UP could conceivably route Coast Line trains via this route. Amtrak could route Pacific Surfliners via this route as well.

Important aspects of short line operation are:

- PHL and ARZC are examples of UP and BNSF outsourcing work. The large railroads facilitated and structured the formation of job-specific entities to perform labor-intensive services. The creation of these short lines was not deemed to have a potentially adverse effect on competitive advantages.
- VCRR and LAJ were formed and operated by entrepreneurs outside the big rail companies. LAJ was subsequently purchased by BNSF, while VCRR has remained independent.
- The revenue of PHL and ARZC is based on a per-car allowance negotiated with UP and BNSF. VCRR and LAJ have rate making authority independent of BNSF and UP.
- All of the short lines are essentially switching carriers, performing work of high labor-intensity. They provide a specialty service to the large railroads by concentrating their resources on intra-city (and to a lesser degree intra-region) operating issues.
- None of the short lines has operating scopes beyond defined boundaries. For example, PHL only has authority to operate at the south end of the Alameda Corridor, and then only to facilitate an interchange of rail traffic to UP and BNSF.
- The short lines have no regional influence on goods movement issues and should be viewed as outsourcing entities of UP and BNSF.

BNSF and UP Train Volume

The markets which are served by BNSF and UP generate significant train volumes. The average east-west daily train count on BNSF during the late week period (Wednesday-Friday, the busiest days) is set forth in Table 4. Passenger trains include Metrolink commuter trains, Pacific Surfliner trains, and Amtrak long distance trains. Most of the passenger trains on BNSF Los Angeles Basin lines travel between Los Angeles and Fullerton.

Table 4
Average Daily Trains on BNSF East-West Mainline between Hobart Yard and Fullerton
Wednesday-Friday

Transcon	2003	2004	2005 (thru July)
Freight	47	49	48
Passenger	52	52	57
TOTAL	99	101	105

Sources: BNSF, 2005; and Metrolink, 2006

Table 5 shows the average east-west daily train counts on UP (Wednesday-Friday, the busiest days) at West Riverside on the Los Angeles Subdivision and South Fontana on the Alhambra Subdivision:

Table 5
Average Daily Trains on UP East-West Mainlines at Fontana on the Alhambra Subdivision and at West Riverside on the Los Angeles Subdivision
Wednesday-Friday

Los Angeles Subdivision	2003	2004	2005 (thru July)
Freight	22	24	23
Passenger	12	12	12
Total	34	36	35
Alhambra Subdivision	**2003**	**2004**	**2005 (thru July)**
Freight	41	44	43
Passenger	1	1	1
Total	42	45	44
Grand Total	76	81	79

Source: UP, 2005

As previously noted, UP operates trains directionally by using the Los Angeles Subdivision for eastbound trains and the Alhambra Subdivision for westbound trains. However, the asymmetry in the numbers above seems to contradict that operating strategy. The location of UP's carload classification yard at West Colton accounts for this difference; that is, westbound and eastbound trains operating in the Basin to and from the yard can only use the Alhambra Subdivision.

Rail Border Crossings

There are two rail border crossings in Southern California. One crossing is between San Ysidro and Tijuana, and the other is between Calexico and Mexicali. The former is part of a rail line originally built in the early part of the 20th century. The route stretches west from Plaster City and a connection with the UP there, then along and finally across the U.S./Mexican border to Tecate in Baja California, then to Tijuana, across the border again at San Ysidro, and then north to San Diego. The route goes through the scenic Carrizo Gorge in Baja California.

The portion of the rail line in Mexico is owned by the federal government. Under contract to the State of Baja California, Carrizo Gorge Railway (CZRY) operates a line between Tecate and Tijuana through its Mexican company, Ferrocarriles Peninsulares del Noroeste (FPN). Between Tijuana/San Ysidro and San Diego, the line is owned by San Diego Metropolitan Transit System (MTS). The operator is the San Diego and Imperial Valley Railroad (SDIY), a subsidiary of RailAmerica, Inc. Comparatively light freight traffic (about 500 total carloads per month) moves on the line between Tecate, Tijuana, and San Diego. Freight rail traffic between Tijuana and San

Diego moves during the late night and early morning period, on track that during most of the day is used by the San Diego Trolley light rail system. The traffic is interchanged with BNSF in downtown San Diego.

East of Tecate, on the U.S. side to Plaster City, the line is owned by MTS as well. This trackage is the so-called Desert Line. CZRY has operating rights over this line to Plaster City, and on the UP's El Centro Subdivision between Plaster City and Seeley; UP's El Centro Subdivision runs from Plaster City to El Centro and a connection with UP's Calexico Subdivision. CZRY receives a light traffic volume (about 30-50 carloads a month) from UP at Seeley for furtherance to Tecate.

There is a small amount of through traffic over the entire routing from Imperial County to San Diego. About 10 carloads a month of the traffic from the UP at Seeley to the CZRY ultimately reach downtown San Diego. This traffic is inbound to San Diego.

The crossing between Calexico in California and Mexicali in Baja California sees a higher traffic volume (about 160 cars per day, six days a week). On the U.S. side, the track belongs to UP. This track is part of the UP's Calexico Subdivision, which runs north to a junction with the UP's Sunset Corridor at Niland. On the Mexican side, the track belongs to the government, with trains operated by Ferrocarril Mexicano (Ferro-Mex).

Rail Processing Facilities

There are six primary types of rail traffic processing facilities found in the study area:

- On-dock Intermodal Facilities
- Near-dock Intermodal Facilities
- Off-dock Intermodal Facilities
- Carload Facilities and Support Yards
- Automobile Distribution Centers
- Bulk Transfer Facilities

The following section is a discussion of each of these types of facilities. All six types of rail traffic processing facilities are considered to be commercial because they generate railroad revenue. The major railroads and rail processing facilities in the MCGMAP study area are shown in Figure 10.

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Figure 10
MAJOR RAIL FACILITIES IN THE MCGMAP STUDY AREA

524930/BASE - 3/1/06

On-Dock Intermodal Facilities

There are nine on-dock intermodal facilities in the San Pedro Bay port area. On-dock facilities are located on container handling marine terminals, thus the term "on-dock." They are leased to terminal operators. Four of these are situated in the POLA, and five are in the POLB. On-dock rail facilities are constrained by a lack of space around docks, more so than near-dock and off-dock rail facilities. As a result, on-dock working track cannot be as long as the off-dock counterparts. The role of storage tracks in the proximity of on-dock loading facilities is to provide support and to increase turnover, and to provide a nearby place to store trains awaiting a working track at an on-dock facility. The POLB on-dock facilities generally lack outside storage tracks to support on-dock loading of rail cars. On the other hand, the POLA on-dock facilities have outside storage tracks. Over the last few years, on-dock rail lifts have significantly increased. In 2001, 15% of the total San Pedro Bay ports' throughput was handled on-dock. In 2005, approximately 21% of the total two-port throughput was handled on-dock.

The master plan of the POLB is to construct larger terminals by joining smaller terminals together and building storage tracks to support those facilities. The plan also involves adding two 8,000-foot arrival/departure tracks. Long-unit trains exacerbate the storage problem because arriving and departing trains often have to be stored temporarily before they can either enter a terminal or leave the port. The plan also includes expansion of the Pier B Street railroad yard to include new storage tracks and a small two-track intermodal container transfer facility.

Two major port tenants do not have on-dock intermodal facilities. They are Transpacific Container Service Corporation (TRAPAC) in the POLA and California United Terminals (CUT) in the POLB. All rail traffic generated by these terminals requires a truck dray to a railroad-operated off-dock or near-dock intermodal facility. The POLA plans to build an on-dock rail facility at TRAPAC by 2010.

Near-Dock Intermodal Facilities

UP's Intermodal Container Transfer Facility (ICTF) in Los Angeles (on the western border of Long Beach) is the only near-dock intermodal facility in the study area. In 2005, 650,000 intermodal container lifts were handled at ICTF.[19] ICTF also processes a small number of containers in which domestically manufactured products are transported. These units are international marine containers that the owner has marketed in the East for return haul after the box has been emptied of imported cargo. Approximately 40% of the westbound containers processed at the ports' near-dock facilities contain exports or goods from the Los Angeles basin markets.[20] The line haul revenue the ocean carrier receives from a shipper using this service offsets the cost of returning empty containers to the West Coast. Approximately 55% of the containers offloaded at POLA and POLB and loaded onto railcars make their return empty.[21] Near-dock facilities are also constrained by space, although not to the extent of on-dock facilities; as the majority of near-dock facilities are surrounded by development and any expansion requires a lengthy permitting and approval process.

Off-Dock Intermodal Facilities - BNSF

The Hobart Yard is situated in the City of Commerce, not far from downtown Los Angeles. The traffic split is 60 percent international (having a prior or subsequent move by ocean carrier) and 40 percent domestic. In 2005, Hobart had an intermodal volume of 1,350,000 units.[22] A few years ago, it was thought that Hobart had a capacity of 1,000,000 units annually. Adopting new business practices has increased capacity substantially. For example, BNSF implemented metered access (a form of appointment system) and reduced free storage time with a steep penalty if exceeded. It began stacking containers, a practice that is more expensive than a wheeled operation. BNSF is also limiting the storage of chassis at Hobart. The facility is the largest intermodal operation in the U.S. as measured by volume. The throughput per acre is more than 10,000 TEUs (Twenty Foot Equivalent Units) annually. A 20-foot container is one TEU, while one 40-foot container is two TEUs. For purposes of comparison, POLA and POLB throughput is about 4,700 TEUs per acre.[23]

The volume of BNSF's San Bernardino intermodal facility is 100 percent domestic, in that trailers and containers handled at the facility move only between points in North America.[24] The distance from the port area in part accounts for this. Ocean carriers can avoid a lengthy and costly truck haul of intermodal containers to San Bernardino by using on-dock or near-dock facilities. However, the earlier cited ACTA study estimated that 60 percent of all eastbound domestic containers transported from San Bernardino were filled with port cargo. This cargo had been taken out of the standard marine container and transloaded or warehoused before being transported to the San Bernardino facility in a domestic trailer or container.

Off-Dock Intermodal Facilities - UP

UP's East L.A. facility is situated in the Cities of Commerce and Montebello. It handles 450,000 intermodal lifts (container units)/year, 45 percent of which are international and 55 percent domestic.[25] Even though UP has a near-dock facility, East L.A. is a major processor of international containers. This is because East L.A. combines domestic and international containers into trains sized for small intermodal markets such as Salt Lake City and Denver (as compared to large intermodal markets like Chicago). UP recently changed its operation by processing more international containers at ICTF. Furthermore, UP states that it intends to move all international containers from East L.A. to ICTF by the end of 2006.

The Los Angeles Transportation Center (LATC) handles 250,000 container lifts per year, five percent international and 95 percent domestic.[26] This facility is UP's only intermodal facility in the study area that serves the Pacific Northwest with service to Portland and Seattle.

The City of Industry intermodal facility is situated within the City of Industry and is operated as a domestic container facility. Nearly 100 percent of the containers moving through this facility are domestic.[27] As at San Bernardino on BNSF, a high percentage of eastbound traffic originating at the City of Industry intermodal facility is transloaded international container traffic.

It is worth noting that UP has three off-dock intermodal facilities situated near each other: East L.A., LATC, and the City of Industry intermodal facility. This is because UP inherited two from the former Southern Pacific (SP) Railroad through its 1996 merger with that carrier. The SP owned

LATC and the City of Industry facilities. BNSF has better coverage of the L.A. Basin, as its intermodal facilities - Hobart Yard and San Bernardino - are situated 60 miles apart.

A summary of intermodal rail volumes associated with the San Pedro Bay ports is presented in Table 6. The POLA and POLB generated a total of 3.2 million intermodal container lifts in 2005. An additional 1.8 million domestic container lifts occurred in the study area in 2005, based on the shares of international and domestic volumes reported for the off-dock and near-dock facilities. Therefore it is estimated that the study area generated five million intermodal container lifts in 2005.

Table 6
San Pedro Bay Ports Direct Intermodal Rail Volumes 2003-2005
(Marine Containers per Year)

Facility Type	2003	2004	2005
On-Dock			
BNSF	591,280	781,715	977,945
UP	456,299	534,870	652,527
Total On-Dock	1,047,579	1,316,585	1,630,472
As % of Total Throughput	15.9%	18.1%	20.7%
Off-Dock (includes ICTF)			
BNSF	760,237	774,336	781,980
UP	777,534	771,562	757,598
Total Off-Dock	1,537,771	1,545,898	1,539,578
As % of Total Throughput	23.4%	21.2%	19.5%
Total On- & Off-Dock [i]	2,585,350	2,862,483	3,170,050
As % of Total Throughput	39.3%	39.3%	40.2%
Total Port Throughput [ii]	**6,576,147**	**7,278,496**	**7,885,801**

Sources: BNSF Railway and UP Railroad for on-dock and off-dock volumes, Ports of Los Angeles and Long Beach for total port throughput.
Notes:
[i] Direct intermodal (excludes transload)
[ii] Total port container throughput calculated by dividing TEUs by 1.80 TEUs/container.

Carload Facilities and Support Yards

The regional carload classification yard of UP is situated at West Colton (Bloomington), and that of BNSF at Barstow. In addition to these large classification yards, there are numerous industrial support yards situated in the MCGMAP study area. From the classification and support yards, local freight trains move rail cars to and from shippers.

Automobile Distribution Centers

Railroad automobile distribution centers in the MCGMAP study area are situated at Mira Loma (served by UP), at San Bernardino (served by BNSF), and at POLA, POLB and Port Hueneme (served by UP at Oxnard and a connection to the Ventura County Railroad, discussed in a subsequent section).

Bulk Transfer Facilities

UP has a 28-acre plastic pellet and resin distribution center at Santa Fe Springs. UP also has dedicated, smaller distribution facilities scattered throughout the Los Angeles Basin. Chemicals, steel, and lumber are commonly distributed from these facilities, as are plastics and resins. Most of these facilities are single-user-based facilities, where a trucking company leases property and track from the railroad to facilitate carriage of lading from rail cars to end product users.

BNSF has similar bulk distribution facilities. For example, BNSF is working closely with Excell, a large national logistics company, to develop a bulk distribution center on 100 acres of property in Fontana. This facility will distribute all bulk product types. As with UP, BNSF has numerous smaller, bulk commodity-oriented distribution facilities throughout the Los Angeles Basin situated on property owned or controlled by the railroad.

2.3 ROADWAYS

This section presents the existing conditions of the roadway facilities in the study area. It provides an inventory of the roadway system, summarizes traffic volumes, travel patterns, and time-of-day distribution for truck traffic, and examines the impacts of port traffic on the highways. Issues and constraints related to the existing conditions will be presented in Section 4.

According to SCAG's 2004 Regional Transportation Plan (RTP), the MCGMAP study area has more than 9,000 lane miles of freeways and more than 42,000 lane miles of arterials.[28] This network of public highways and arterials carries 99 percent of all vehicle trips, including bus, automobile, and truck trips; the remaining one percent of trips occurs on private facilities. Table 7 presents lane miles by facility type within the study area in the year 2000.

Currently, there are approximately 662 lane miles of the high occupancy vehicle (HOV) system in the study area. Most of the HOV system is open to vehicles with two or more occupants over the 24-hour day. The exceptions are the HOV lanes on I-10 (the El Monte Busway), which requires a vehicle occupancy of three or more persons during peak periods.

Table 7
MCGMAP Study Area Lane Miles by Facility Type, Year 2000

County	Mixed Flow	HOV	Major Arterial	Minor Arterials	Collector
Los Angeles	4265	370	8390	8498	2245
Orange	1435	202	3235	2943	303
Riverside	1320	38	1225	2754	2648
San Bernardino	1135	52	1797	3556	2765
Ventura	514	0	927	953	219
Regionwide	8669	662	15574	18704	8180

Source: Southern California Association of Governments (SCAG) Regional Transportation Plan¸2004, Appendix D, Highway and Arterial.

This amounts to over 54 million vehicle trips per day on the regional highway and arterial system. This system includes critical access routes to the ports, airports, warehouse and distribution centers, and rail intermodal facilities. The 2004 RTP reported that in the year 2000, total daily delay from congestion, for both personal travel and goods movement, was estimated at approximately 2.2 million person-hours throughout the study area. The impact of delay on the freight industry is significant, and can increase the hourly cost of carrying goods by 50 percent to 250 percent, from a base value of $25 to $200 per hour, depending on the commodity.[29]

Inventory of Systems

The study area's roadway system can be divided into three primary components: freeways, arterials, and local roads. The purpose of each of those components, in terms of goods movement, is summarized below:

- **Freeways** link the cities throughout California to the adjoining states and nations. For the purposes of this report, the term freeway refers to both Interstate Highways and State Highways. The freeways in the study area link the freight gateways (ports, intermodal facilities, etc.) to markets throughout the United States, Canada, and Mexico. Freeways provide the infrastructure to service the short-, medium-, and long-haul (or line-haul) portions of truck trips.
- **Arterials** serve as the link between freeways and local roads. The arterials in the study area provide the necessary connectivity for both personal and commercial transportation. According to the 2004 RTP, these facilities often act as alternatives to freeways. This is especially true in the case of short-haul trips between adjacent cities in the study area, as well as between major goods movement activity centers such as ports' intermodal yards and warehousing areas.
- **Local Roads** provide the final link between the freight gateways and the local markets. Local roads are commonly utilized to travel from the arterials to the warehouse and distribution facilities. The impacts of truck traffic can sometimes appear greater on local facilities due to limited size and capacity. The majority of truck trips on local roads are of

short length, representing the first or last stage in goods movement between distribution centers, markets, or both. Local roads could be used as detours when freeways fail due to non-recurrent congestion. For example, when I-710 shuts down, Long Beach Boulevard and Alameda Street (north-south arterials parallel to I-710) serve as alternate routes, and Washington Boulevard serves as a detour option for I-10.

Figure 11 shows the existing state highway system within the study area.

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS

Figure 11
EXISTING HIGHWAY SYSTEM WITHIN THE MCGMAP STUDY AREA

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Truck Traffic and Goods Movement

From a national standpoint, most heavy truck mileage is generated in the carriage of freight. Only about 10 percent of truck miles are generated for other reasons such as carrying household goods, garbage, and craftsmen's equipment. Truck traffic is concentrated on major routes connecting population centers, ports, border crossings, and other major hubs of activity.[30]

Trucks carry almost two-thirds of goods from Mexico and Canada to the United States. According to the Federal Highway Administration (FHWA), in 1998 trucks moved 71 percent of total (international and domestic) tonnage and 80 percent of the total (international and domestic) value of U.S. shipments.

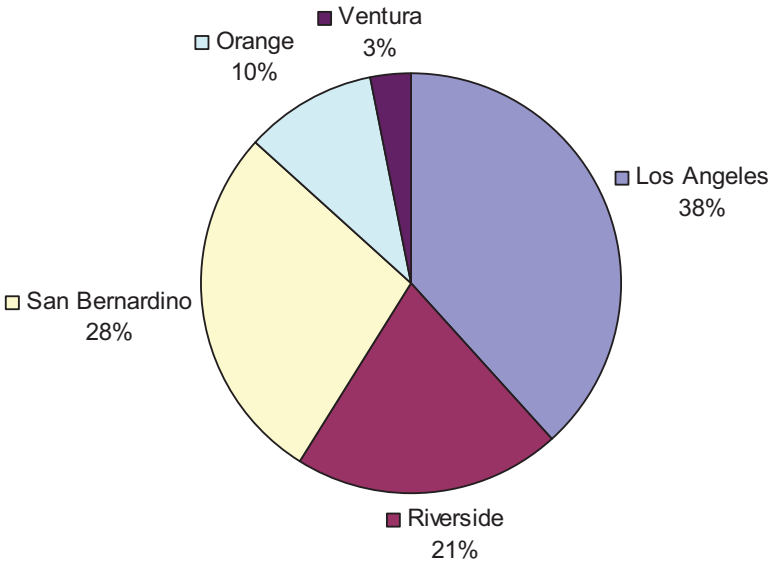
Figure 12
Nationwide Percentages of Truck Freight Shipments by Weight and Value

Source: Federal Highway Administration (FHWA), Freight Facts and Figures, 2004

Existing Volumes throughout the Study Area

The amount of truck travel varies by county in the study area. Figure 13 shows the distribution of truck travel by county, measured in vehicle miles of travel (VMT), as a percentage of total truck travel on the state highway system within the study area for 2003. Los Angeles County carried the highest percentage of truck travel at 38 percent, with San Bernardino and Riverside Counties carrying 28 percent and 21 percent, respectively. Together these three counties handled approximately 87 percent of all truck travel within the study area in 2003. The data presented on this chart are a function of the available lane miles of highway facilities available and the volume of trucks using those facilities. It clearly shows that a majority of the truck travel occurring within the study area is in Los Angeles, San Bernardino, and Riverside Counties.

Figure 13
2003 Percentage of Truck Vehicle Miles of Travel (VMT) on the State Highway System within the MCGMAP Study Area



Source: "Truck Miles of Travel: California State Highway System 1988-2003," California Department of Transportation (Caltrans) 2005

Further evaluation of truck volume data for the study area reveals that in addition to varying distribution of truck travel among counties, there is a variance in truck travel among the highway corridors in the study area. Tables 8a, 8b, and 8c show a summary of peak hour (morning and evening) and daily total traffic volumes and truck traffic volumes for the state highway segments of high, moderate, and low congestion within the study area. Congestion is determined based on average speed data, and categorized from high (21 mph to 34 mph), to moderate (35 mph to 44 mph) to low congestion (45 mph to 54 mph).

Table 8a
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of High Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
I-5	ORG	30.0	SR-55 to SR-57	S	12833	656	31.1	5%	N	10703	283	31.5	3%	344000	22016	6.4
I-5	ORG	33.1	SR-57 to LA County Line	S	11427	252	27.9	2%						260000	18200	7
I-10	LA	6.7	I-405 to I-110	W	8732	282	33.9	3%						264000	10639	4.03
I-10	LA	24.3	I-710 to I-605	W	7462	282	32	4%						22500	13658	6.07
I-110	LA	20.7	I-105 to I-10	N	8166	372	28.3	5%						292000	15388	5.27
I-215	RIV	38.3	I-10 to I-259						N	5206	393	33.3	8%	185000	20165	10.9
I-405	ORG	28.3	I-5 to SR-133	N	10958	288	21.6	3%						225000	9608	4.27
I-405	ORG	19.2	Beach Blvd to LA County Line	S	9294	363	30.2	4%						287000	9586	3.34
I-405	LA	14.9	I-110 to I-91	N	9178	309	26.2	3%						250000	11575	4.63
I-405	LA	44.3	US-101 to End	S	9503	309	26.2	3%	N	9311	209	30.2	2%	227000	8694	3.83
I-605	LA	11.0	SR-91 to I-105						N	7114	450	34.2	6%	247000	11436	4.63
I-605	LA	11.0	I-105 to I-5						N	7114	569	27.1	8%	267000	37700	14.12
I-605	LA	11.0	I-5 to SR-60	S	8377	889	33.1	11%	N	7114	814	33.6	11%	254000	35865	14.12
I-710	LA	25.2	I-5 to SR-60						S	4896	478	28.4	10%	133000	11385	8.56
SR-55	ORG	8.5	I-405 to I-5						N	3903	172	32.9	4%	257000	15163	5.9
SR-55	ORG	8.5	I-5 to SR-22	S	15037	565	24	4%						257000	15163	5.9
SR-57	ORG	15.6	I-5 / SR-22 to SR-91	S	9213	633	26.9	7%	N	12220	252	34.3	2%	300000	20400	6.8

Table 8a
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of High Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
SR-57	ORG	15.6	SR-91 to LA County Line	S	9213	466	28	5%	N	12220	280	31.5	2%	300000	20400	6.8
SR-60	LA	2.2	End to I-710	W	9013	247	28.5	3%						210000	10164	4.84
SR-60	LA	23.6	I-605 to SR-71						E	10955	424	32.6	4%	345000	27980	8.11
SR-91	LA	17.6	I-710 to I-605	W	9255	341	31.9	4%						273000	25280	9.26
SR-91	ORG	10.1	SR-241 to Riverside County Line						E	10261	241	23.5	2%	284000	13206	4.65
SR-91	RIV	6.4	Riverside County Line to I-15	W	7954	364	30.5	5%	E	8091	403	34.3	5%	250000	17000	6.8
US-101	LA	12.4	I-110 to SR-170	S	9581	263	32.1	3%	N	9766	172	23.6	2%	292000	7738	2.65
US-101	LA	19.9	SR-170 to I-405	S	10487	274	33.7	3%						216000	8510	3.94
SR-134	LA	12.1	SR-170 to I-5						E	8751	142	33.9	2%	213000	5708	2.68

Sources: (a) Caltrans, Traffic and Vehicle Data Systems Unit, 2004 Truck; (b) Caltrans, 2005 Peak Hour Volume Data; (c) Southern California Association of Governments (SCAG), 2005 PeMS Database v. 6.3

Table 8b
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of Moderate Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
I-5	ORG	30.0	SR-133 to SR-55	N	12251	469	43.5	4%						344000	22016	6.4

Table 8b
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of Moderate Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
I-5	ORG	33.1	SR-55 to SR-57	S	12833	839	40.5	7%	N	10703	383	42.5	4%	344000	22016	6.4
I-5	LA	15.33	I-605 to I-710	N	8818	414	44.8	5%	S	8481	452	42.3	5%	235000	20657	8.79
I-5	LA	15.33	I-710 to SR-60						S	8481	313	38.7	4%	264000	20117	7.62
I-5	LA	21.3	SR-60 to SR-143	S	9114	379	40.5	4%	N	9964	347	41.6	3%	291000	17984	6.18
I-5	LA	33.98	SR-143 to SR-118	S	7725	530	38.5	7%						192000	16397	8.54
I-10	LA	6.74	I-405 to I-110	W	8732	338	36.6	4%	E	9051	161	38.8	2%	264000	10639	4.03
I-10	LA	24.32	I-710 to I-605	W	7462	277	43.1	4%	E	6683	221	35.9	3%	225000	13658	6.07
I-10	LA	40.84	I-605 to SR-71	E	7389	362	40.9	5%						211000	16901	8.01
I-15	SBD	5.973	I-210 to I-215	S	8010	444	39.6	6%						168000	17304	10.3
I-105	LA	2.6	I-405 to I-110						E	8499	332	40.2	4%	197000	11209	5.69
I-105	LA	8.45	I-110 to I-710	W	8523	260	35.8	3%	E	7823	195	43.2	2%	207000	17367	8.39
I-105	LA	17	I-605 to End	W	7219	332	44	5%	E	6554	261	39.7	4%	196000	17346	8.85
I-110	LA	20	I-105 to I-10	N	8166	441	40.4	5%	S	9639	311	42.3	3%	292000	15388	5.27
I-110	LA	31.91	I-10 to End	S	1509	338	41.8	22%						46500	451	0.97
I-210	LA	23	SR-134 to I-605	W	4287	365	42.5	9%	E	4712	259	42.7	5%	140000	9478	6.77
I-210	LA	46	I-605 to SR-57	W	7795	383	38.2	5%	E	7107	272	43.7	4%	167000	6880	4.12
I-215	RIV	38	I-10 to I-259						N	5206	464	38.4	9%	185000	20165	10.9
I-405	ORG	6	I-5 to SR-133	N	10958	254	36	2%						225000	9608	4.27
I-405	ORG	16	SR-55 to Beach Blvd	S	9741	302	41.5	3%						276000	8280	3
I-405	ORG	19	Beach Blvd to LA County Line	S	9294	443	38.8	5%	S	8656	183	40.1	2%	287000	9586	3.34
I-405	LA	6.8	I-710 to I-110	N	11720	329	35.3	3%	S	10828	230	41.4	2%	290000	15805	5.45
I-405	LA	14.92	I-110 to SR-91	N	9178	371	40.2	4%						250000	11575	4.63
I-405	LA	28.3	SR-91 to I-105						S	8748	168	38.6	2%	294000	11878	4.04
I-405	LA	28.3	I-105 to I-10	N	10144	325	40.1	3%	S	8748	212	37.9	2%	294000	11878	4.04
I-405	LA	30.5	I-10 to US-101						N	10033	248	35.4	2%	288000	13018	4.52
I-405	LA	44.27	US-101 to End						N	9311	292	42.8	3%	227000	8694	3.83
I-605	LA	11	SR-91 to I-105	N	7658	491	40.2	6%	N	7114	568	44.3	8%	247000	11436	4.63
I-605	LA	11	I-105 to I-5	N	7658	493	38.4	6%	N	7114	322	37.9	5%	267000	37700	14.12
I-605	LA	11	I-5 to SR-60						N	7114	1026	38.6	14%	254000	35865	14.12
I-605	LA	22.92	SR-60 to I-10	S	6792	1001	38.9	15%	N	6053	774	41.2	13%	167000	19389	11.61
I-710	LA	19	I-105 to I-5	N	4418	956	43.7	22%						215000	36550	17
I-710	LA	25.21	I-5 to SR-60						N	5220	936	43.5	18%	133000	11385	8.56
SR-55	ORG	8.5	I-405 to I-5	S	15037	432	39.7	3%	S	14862	330	42.9	2%	240000	13920	5.8
SR-55	ORG	8	I-5 to SR-22	S	15037	722	36.2	5%						257000	15163	5.9
SR-55	ORG	8	SR-22 to end	S	15037	428	41.5	3%						257000	15163	5.9
SR-57	ORG	15.6	I-5 / SR-22 to SR-91	S	9213	809	43.6	9%	N	12220	484	40.7	4%	300000	20400	6.8
SR-57	ORG	20	SR-91 to LA County Line	S	9213	569	37.8	6%	N	12220	398	44.4	3%	300000	20400	6.8
SR-57	LA	3.1	LA County Line to I-10	S	7842	403	36.9	5%	N	7083	295	43.6	4%	199000	15741	7.91
SR-60	LA	2.22	End to I-710	W	9013	246	36.8	3%						210000	10164	4.84

Table 8b
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of Moderate Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
SR-60	LA	2.22	I-710 to I-605	E	5537	444	39.8	8%						210000	10164	4.84
SR-60	LA	23.556	I-605 to SR-71	E	4905	673	44.5	14%	E	10955	592	43.2	5%	345000	27980	8.11
SR-91	LA	2.08	End to I-710						E	2957	168	41.7	6%	65000	3062	4.71
SR-91	LA	17.57	I-710 to I-605	W	9393	410	35.10	4%	E	10171	423	43.2	4%	273000	25280	9.26
SR-91	LA	17.57	I-605 to LA County Line						W	10171	472	43.8	5%	273000	25280	9.26
SR-91	ORG	1.3	LA County Line to SR-57	E	8735	631	44.70	7%	W	7920	589	43.7	7%	235000	13607	5.79
SR-91	ORG	10.9	SR-241 to Riverside County Line						E	10261	342	37.4	3%	284000	13206	4.65
SR-91	RIV	6.36	Riverside County Line to I-15	W	7954	450	41.3	6%	E	8091	457	40.5	6%	250000	17000	6.8
US-101	LA	12.35	I-110 to SR-170	S	9581	219	36	2%	N	9766	209	40.2	2%	292000	7738	2.65
US-101	LA	12.4	SR-170 to SR-143	S	9581	324	40.6	3%	N	9766	186	42.6	2%	292000	7738	2.65
US-101	LA	19.99	SR-143 to I-405	S	10487	281	44.9	3%	N	10459	159	44.9	2%	247000	10275	4.16
SR-134	LA	12.09	SR-170 to I-5						E	8751	143	40	2%	213000	5708	2.68

Source: (a) Caltrans, The Traffic and Vehicle Data Systems Unit, 2004 Truck; (b) Caltrans, 2005 Peak Hour Volume Data; (c) SCAG, 2005 PeMS Database v. 6.3

Table 8c
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of Low Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
I-5	ORG	30	SR-133 to SR-55	N	12251	384	50.3	3%	N	10703	373	48.3	3%	344000	22016	6.4
I-5	ORG	30	SR-55 to SR-57						N	12862	544	51.4	4%	344000	22016	6.4
I-5	ORG	33.1	SR-57 to LA County Line	N	11427	322	47.4	3%	N	12713	109	46.5	1%	260000	18200	7
I-5	LA	15.33	LA County Line to I-605	N	8818	429	49.7	5%	S	8481	409	54.4	5%	235000	20657	8.79
I-5	LA	15.33	I-605 to I-710	N	8818	498	46.8	6%	S	8481	661	45.8	8%	234000	21060	9
I-5	LA	15.33	I-710 to SR-60	N	8818	479	46	5%	S	8481	553	47.7	7%	264000	20117	7.62
I-5	LA	21.3	SR-60 to SR-143	S	9114	539	49.4	6%	N	9964	584	52.5	6%	291000	17984	6.18

Table 8c
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of Low Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
I-5	LA	33.98	SR-143 to SR-118	S	7725	628	53.7	8%	N	5633	486	50.9	9%	192000	16397	8.54
I-5	LA	41	SR-118 to SR-14	N	3679	551	54.4	15%	N	5480	709	54.4	13%	136000	12036	8.85
I-10	LA	18.41	END to I-405						E	9051	67	50.3	1%	264000	10639	4.03
I-10	LA	6.7	I-405 to I-110	W	8732	204	53.5	2%	E	9051	221	53.5	2%	264000	10639	4.03
I-10	LA	6.7	I-5 to I-710	W	761	202	45.9	27%						223000	8028	3.6
I-10	LA	24.32	I-710 to I-605	W	7462	412	50	6%	E	6683	389	53.2	6%	225000	13658	6.07
I-10	LA	40.84	I-605 to SR-71	W	7389	410	51	6%	E	7824	369	50	5%	211000	16901	8.01
I-15	RIV	38.69	Ontario Ave to SR-91	N	6430	378	49.7	6%	N	6032	283	53.7	5%	178000	9986	5.61
I-15	RIV	51.47	SR-91 to SR-60	N	5981	394	47.4	7%	N	5392	468	53.5	9%	219000	17958	8.2
I-15	SBD	5.9	I-210 to I-215	N	3478	402	54	12%	N	7206	518	49	7%	168000	17304	10.3
I-105	LA	2.6	End to I-405	W	8728	336	50	4%	E	6868	236	54	3%	197000	11209	5.69
I-105	LA	4.75	I-405 to I-110	W	8943	278	49.8	3%	E	8499	243	51.3	3%	197000	11209	5.69
I-105	LA	8.45	I-110 to I-710	W	8523	369	53	4%	E	7823	273	45.2	3%	207000	17367	8.39
I-105	LA	17	I-710 to I-605	W	7219	417	52	6%	W	6554	308	48.2	5%	196000	17346	8.85
I-105	LA	17	I-605 to End	E	7219	398	45.5	6%	E	6554	460	45.9	7%	196000	17346	8.85
I-110	LA	20	I-105 to I-10	N	8166	465	46	6%	S	9639	249	53.5	3%	292000	15388	5.27
I-110	LA	31.91	I-10 to End	S	1509	481	50.9	32%	N	2328	292	53.2	13%	46500	451	0.97
I-210	LA	23	SR-134 to I-605	W	4287	432	47	10%	E	4712	362	50	8%	307000	16118	5.25
I-210	LA	46	I-605 to SR-57	W	7795	454	51.7	6%	E	7107	380	47.2	5%	167000	6880	4.12
I-215	RIV	35.76	Columbia Ave to I-10						N	4402	195	49.1	4%	108000	11016	10.2
I-405	ORG	6	I-5 to SR-133	N	10958	350	51	3%						225000	9608	4.27
I-405	ORG	6	SR-133 to SR-55						N	12130	208	50	2%	231001	13629	5.9
I-405	ORG	15.9	SR-55 to Beach Blvd	S	9741	387	51.5	4%	N	10345	214	53.8	2%	276000	8280	3
I-405	ORG	19.16	Beach Blvd to LA County Line	S	9294	349	54	4%	S	8656	248	50.7	3%	287000	9586	3.34
I-405	LA	47.6	LA County Line to I-710	S	6686	325	50.8	5%	N	5242	266	49.2	5%	142000	7995	5.63
I-405	LA	6.81	I-710 to I-110	N	11720	394	53.2	3%	S	10828	321	47	3%	290000	15805	5.45
I-405	LA	14.92	I-110 to SR-91	N	9178	440	50.2	5%	S	8928	251	45.5	3%	250000	11575	4.63
I-405	LA	28.3	SR-91 to I-105	N	10144	343	52	3%	S	8861	235	48.2	3%	294000	11878	4.04
I-405	LA	28.3	I-105 to I-10	N	10144	385	46.5	4%	N	9297	264	54.9	3%	294000	11878	4.04
I-405	LA	30.5	I-10 to US-101						N	10033	376	54.5	4%	288000	13018	4.52
I-405	LA	44.27	US-101 to End	S	9503	335	53.5	4%	N	9311	213	51.6	2%	227000	8694	3.83
I-605	LA	11	SR-91 to I-105	N	7658	582	53.4	8%	N	7114	330	50	5%	247000	11436	4.63
I-605	LA	11	I-105 to I-5	N	7658	608	52	8%						267000	37700	14.12
I-605	LA	11	I-5 to SR-60	S	8377	1142	49.4	14%	S	8594	595	53	7%	254000	35865	14.12
I-605	LA	22.92	SR-60 to I-10	S	6792	1054	50	16%	N	6053	977	52.8	16%	167000	19389	11.61
I-710	LA	14.4	I-405 to I-105	S	9912	839	54.8	8%	N	9032	721	47	8%	227000	38272	16.86
I-710	LA	19	I-105 to I-5	N	8078	848	50.8	10%	S	7893	1228	54.5	16%	215000	36550	17
I-710	LA	25.21	I-5 to SR-60	S	5605	729	46	13%	S	4896	668	50	25%	133000	11385	8.56
SR-55	ORG	2.77	SR-73 to I-405	N	4128	58	45.8	1%						54000	1944	3.6

Table 8c
MCGMAP Study Area Daily and Peak Period Truck and Vehicle Volumes
Year 2003 – Segments of Low Congestion

				AM Peak Hour					PM Peak Hour					Total ADT		
Route	County	Postmile (b)	Location	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck Percentage	Dir	Total Vehicle Volume (b)	Total Truck Volume (c)	Speed (c)	Truck percentage	Total ADT (a)	Total Truck (a)	Total Truck Percentage
SR-55	ORG	8.5	I-405 to I-5	S	15037	552	45.9	4%	S	14862	405	50	3%	240000	13920	5.8
SR-55	ORG	8.5	I-5 to SR-22	S	15037	500	50.2	3%	N	3903	225	46.5	6%	257000	15163	5.9
SR-55	ORG	8.5	SR-22 to end	S	15037	669	52.4	4%	N	3903	217	48.5	6%	257000	15163	5.9
SR-57	ORG	15.6	I-5 / SR-22 to SR-91	S	9213	802	53.1	9%	N	12220	228	54.5	2%	300000	20400	6.8
SR-57	ORG	15.6	SR-91 to LA County Line	S	7945	728	48.4	9%	N	7554	188	48.4	2%	300000	20400	6.8
SR-57	LA	3.1	LA County Line to I-10	S	7842	478	48.9	6%	N	7083	259	47	4%	199000	15741	7.91
SR-60	LA	2.22	End to I-710	W	9013	292	49.1	3%	E	4154	156	50.3	4%	210000	10164	4.84
SR-60	LA	10	I-710 to I-605	W	5537	553	47.3	10%	E	8501	303	47.4	4%	241000	16075	6.67
SR-60	LA	23.56	I-605 to SR-71	W	11870	699	54.6	6%	W	12142	640	53.9	5%	345000	27980	8.11
SR-60	LA	30.5	I-215 to End						W	2273	418	53	18%	44000	7172	16.3
SR-91	LA	2.08	End to I-710	W	2016	227	53.7	11%	E	2957	195	46.6	7%	65000	3062	4.71
SR-91	LA	17.57	I-710 to I-605	W	9255	409	46.60	4%	E	10171	352	50	3%	273000	25280	9.26
SR-91	LA	17.57	I-605 to LA County Line	E	9393	699	54.60	7%	W	10171	640	53.9	6%	273000	25280	9.26
SR-91	ORG	1.3	LA County Line to SR-57	E	8735	516	45.10	6%	E	8709	261	48.4	3%	235000	13607	5.79
SR-91	ORG		SR-57 to SR-241	W	10400	543	53.00		E	10261	214	47.5	2%	284000	13206	4.65
SR-91	ORG	10	SR-241 to Riverside County Line	W	10400	446	45.40	4%	E	10261	155	50	2%	284000	13206	4.65
SR-91	RIV	6.36	Riverside County Line to I-15	W	7954	547	51.2	7%	E	8091	534	53.7	7%	250000	17000	6.8
SR-91	RIV	7.45	I-15 to End	E	7381	306	53.9	4%	E	7903	363	54.6	5%	160000	8000	5
US-101	LA	12.35	I-110 to I-710	S	9581	312	48.8	3%	S	8580	338	54.5	4%	292000	7738	2.65
US-101	LA	12.35	SR-170 to SR-143	S	9581	341	54.7	4%	N	9766	217	47	2%	310000	8122	2.62
US-101	LA	19.99	SR-143 to I-405	S	10487	296	50.9	3%	S	10459	274	54	3%	212000	7929	3.74
SR-134	LA	12.09	SR-170 to I-5	W	6919	227	54.1	3%	W	7981	148	46.1	2%	213000	5708	2.68
SR-134	LA	12.09	I-5 to I-210	W	6919	226	49.1	3%						213000	5708	2.68

Source: (a) Caltrans, The Traffic and Vehicle Data Systems Unit, 2004 Truck; (b) Caltrans, 2005 Peak Hour Volume Data; (c) SCAG, 2005 PeMS Database v. 6.3

According to SCAG's Heavy Duty Truck Model, the estimated number of average daily truck trips on the roadway network in 2002 was 795,000, which equates to a total of 25,500,000 VMT.[31] SCAG's 2004 RTP states that almost all of the short-haul and a significant share of medium- and long-haul movement of goods occur by truck. Some examples of freeways with heavy truck volumes are:[32]

- In high congestion conditions, both I-710 and I-605 between I-5 and SR-60 in Los Angeles County carry more than 35,000 trucks, representing 14 percent of total daily traffic.
- I-605 between I-5 and SR-60 in Los Angeles County, with 11 percent truck traffic, represents the highest truck percentage in the both AM and PM peak hour at high congestion.
- I-710 southbound between I-5 and SR-60 in Los Angeles County, with 10 percent truck traffic, represents the second highest truck percentage in the PM peak hour under high congestion conditions.
- I-710 northbound between I-105 and I-5 in Los Angeles County, with 22 percent truck traffic, represents the highest truck percentage in AM peak hour under medium congestion conditions.
- I-10 westbound between I-5 and I-710 in Los Angeles County, with 27 percent truck traffic, represents a medium truck percentage in AM peak hour under low congestion conditions.

Additionally, the Subregional Freight Movement Truck Access Study of 2004 presented the following findings specifically related to truck volumes during the two-hour midday period carrying the highest volumes of trucks:[33]

- The heaviest one-way north-south truck volume is 1,918 trucks on I-15 northbound between I-10 and SR-60, with the second highest (1,778) southbound on the same segment.
- The heaviest one-way truck volume on any of the east-west freeways is 2,265 trucks eastbound on SR-60 approaching I-15, with the second heaviest (1,923) on the westbound SR-60 approach to I-15.
- The heaviest truck volume for a connector ramp is 910 trucks from southbound I-15 to westbound SR-60, with the second highest being 869 trucks on the corresponding reverse movement from eastbound SR-60 to northbound I-15.
- The second set of highest connector ramp truck volumes are 670 and 602 trucks, from northbound I-15 to eastbound I-10 and the reverse, from westbound I-10 to southbound I-15, respectively.

Truck Lanes

Dedicated truck lanes, along with truck climbing lanes, offer the potential to keep goods moving efficiently through the study area while mitigating congestion for passenger vehicles, improving safety, and lowering overall emissions. There is one existing set of truck lanes in the study area, located on northbound and southbound I-5 in Los Angeles County at the State Route 14 split. The purpose of these truck lanes is to separate slower-moving trucks from the faster general traffic

on the grade. After constructing the new I-5 alignment, the original alignment was used for the truck-only lanes. This truck-only facility has been in place for about 30 years.[34]

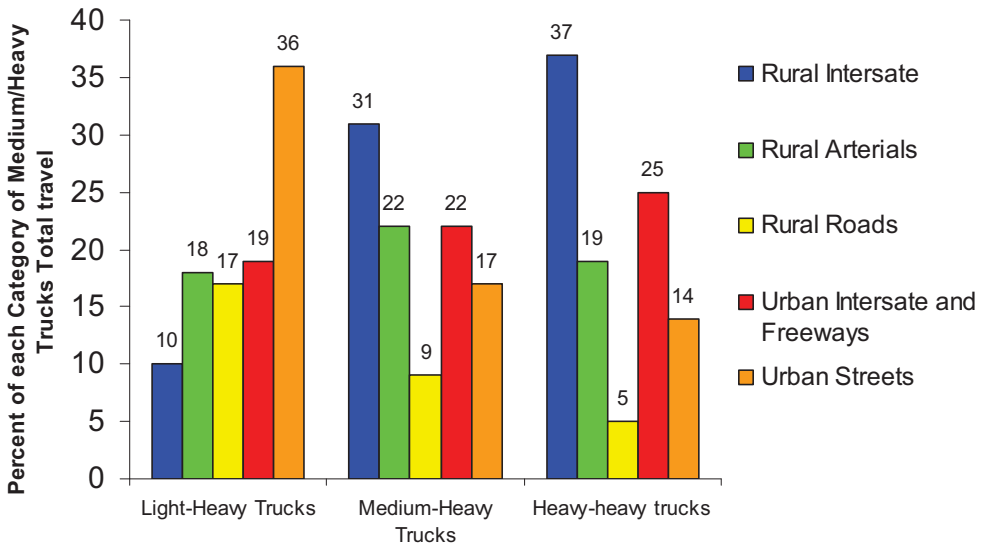
There is also a climbing lane on I-15. Additional climbing lanes are planned on SR-57 between Brea/Fullerton and the county line, and on SR-60 (in Riverside County).

Truck Activity by Truck Size

The most common single-unit trucks or light-heavy duty trucks (10,000 pounds or more) in the commercial fleet with three or more axles are dump trucks. They have from 2 to 4 axles. They are typically used in local and intrastate, short-haul operations. The most common commodities that they haul are construction materials, gravel, ready-mix cement, grain, milk, petroleum products, and garbage or waste. The six-axle trucks or heavy-heavy duty trucks (51,000-pound limit) are used for transportation of international containers loaded to the International Standards Organization (ISO) limit. They are used extensively for long and short hauls in all urban and rural areas to carry and distribute all types of materials, commodities, and goods.[35]

Figure 14 shows the travel distribution patterns of the three major subgroups of heavy duty trucks (light-, medium-, and heavy-heavy duty trucks). Heavy-heavy trucks accumulate 62 percent of their mileage on Interstates and similar roads, compared to 53 percent for medium-heavy trucks. On the other hand, light-heavy trucks accumulate 53 percent of their mileage on urban streets and rural roads, compared to 19 percent for heavy-heavy trucks and 26 percent for medium-heavy trucks. Therefore, the crash history for medium-heavy trucks is more heavily weighted and influenced by the greater risk exposure they experience on non-Interstate roads, compared to that of heavy-heavy trucks.

Figure 14
Percent of Trucks by Type and Facility Type



Source: Comprehensive Truck Size and Weight (CTS&W) Study, Volume 3, Chapter 8, U.S. Department of Transportation, August 2000

Table 9 presents a summary of daily truck VMT by truck size in the MCGMAP study area in the Year 2003. While Los Angeles County and Orange County have the highest light-heavy and medium-heavy truck VMT, San Bernardino and Riverside County carry the highest heavy-heavy truck VMT.

Table 9

2003 DAILY TRUCK AND TOTAL VEHICLE MILES OF TRAVEL BY DISTRICT AND COUNTY					
	District	Light -Heavy Trucks 2-axle	Medium Heavy Trucks 3 and 4 axles	Heavy-heavy Trucks multi-axle	Total
Los Angeles	7	2,564,937	998,559	3,433,882	6,997,378
Orange County	12	912,249	289,696	664,822	1,866,767
Riverside	8	1,167,186	389,918	2,202,485	3,759,589
San Bernardino	8	1,343,422	426,252	3,270,318	5,039,992
Ventura	7	270,384	105,797	193,433	569,614

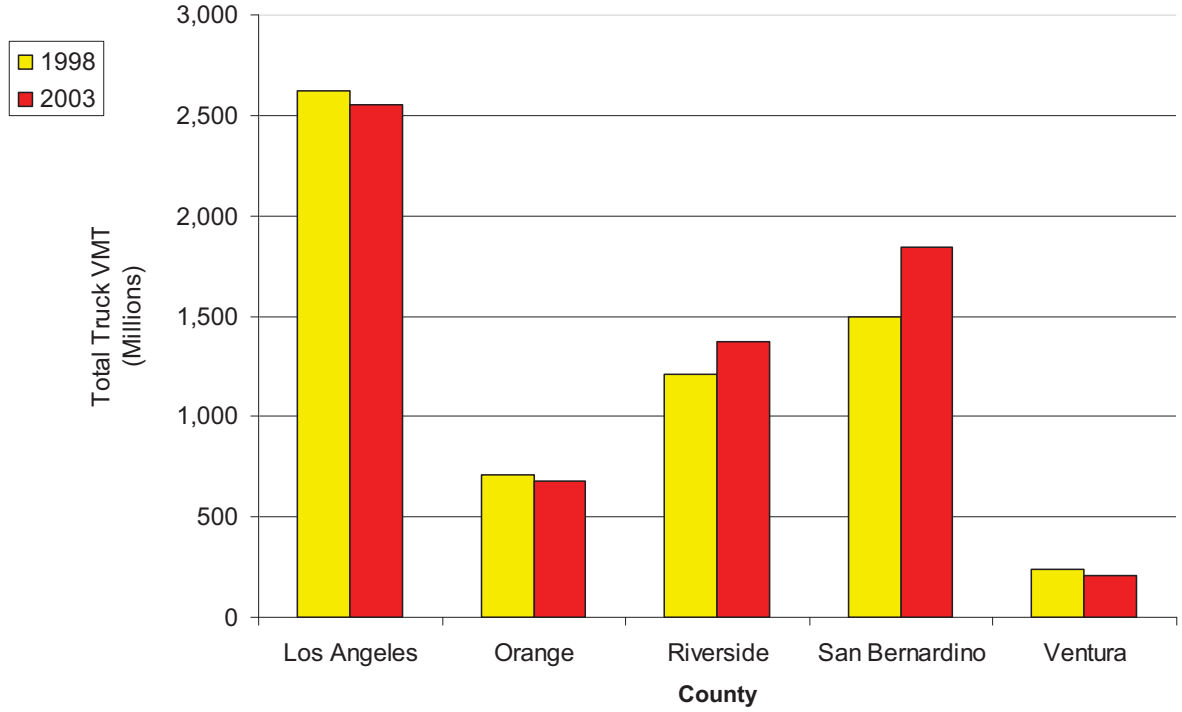
Source: Truck Miles of Travel: California State Highway System 1988-2003, Caltrans, 2005.

Historical Growth Trends for Truck Travel

Truck travel as measured in terms of VMT has grown in the study area. Total truck VMT grew from 5,610,532,550 in 1998 to 6,847,583,000 in 2003, an increase of 19 percent. Furthermore, the growth in truck VMT varied by county.[36] Figure 15 shows the change in miles of truck travel on the state highway system throughout the study area from 1998 to 2003. Truck VMT has increased substantially in Riverside and San Bernardino Counties, while experiencing a minor decrease in

Los Angeles, Ventura, and Orange Counties. The VMT for truck travel in Los Angeles County remains the highest in the study area.

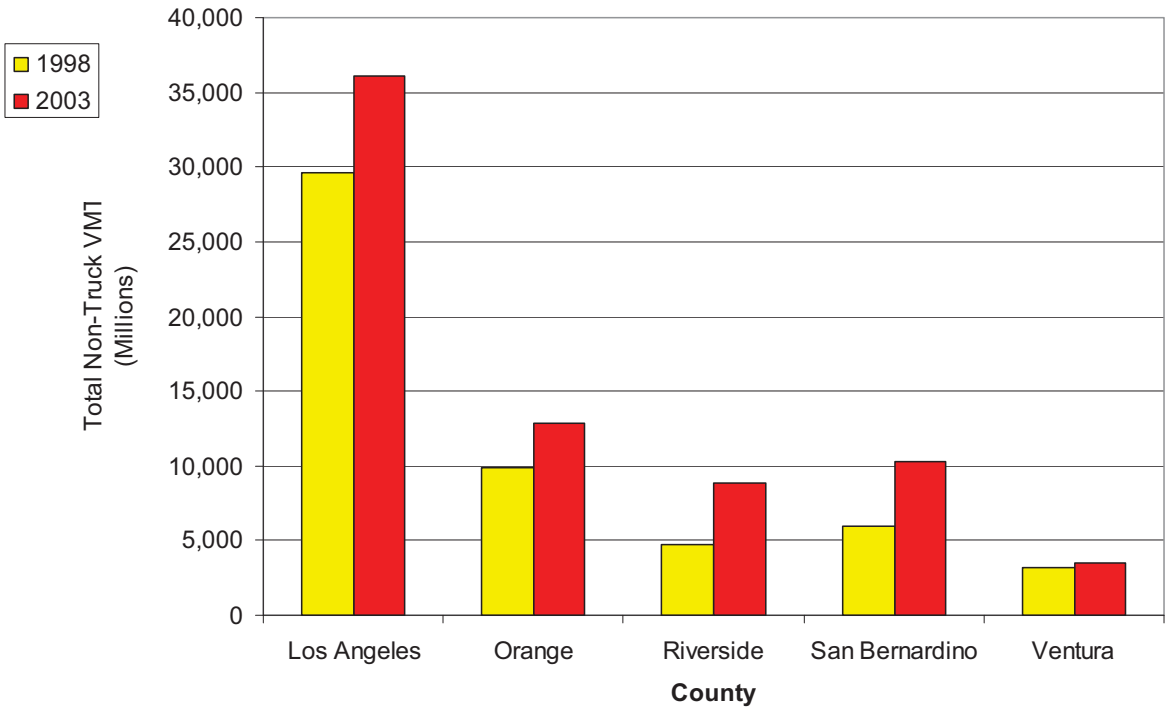
Figure 15
Truck Vehicle Miles of Travel (VMT) by County on the State Highway System within the MCGMAP Study Area
1998 and 2003



Source: "Truck Miles of Travel: California State Highway System 1988-2003," Caltrans, 2005

In this same five-year period, non-truck travel in the study area has also increased. Figure 16 displays the change in non-truck VMT between 1998 and 2003, indicating that non-truck VMT increased in all counties as well as in the study area as a whole. From 1998 through 2003, VMT grew by 21 percent in Los Angeles County, 30 percent in Orange County, and 11 percent in Ventura. VMT in Riverside and San Bernardino Counties grew by 87 and 73 percent respectively. Los Angeles County, with 36 millions VMT, has the highest VMT in the MCGMAP study area.

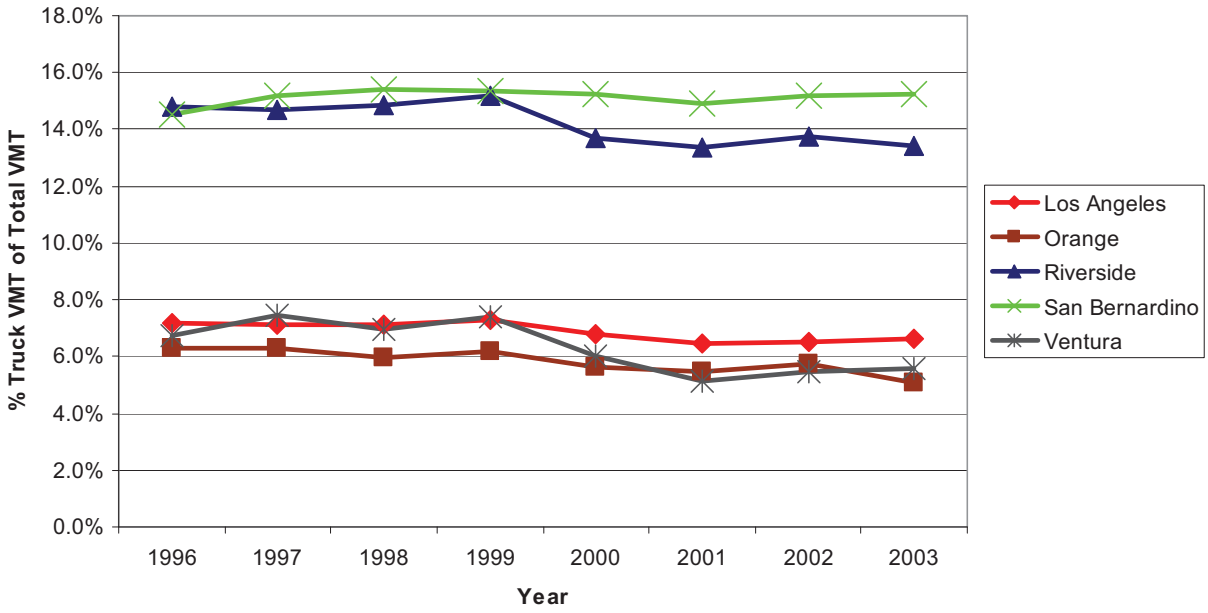
Figure 16
Non-Truck Vehicle Miles of Travel (VMT) on the State Highway System within the MCGMAP Study Area 1998 and 2003



Source: Truck Miles of Travel: California State Highway System 1988-2003, Caltrans, 2005

Based on the values in Figures 15 and 16 above showing truck VMT and non-truck VMT growth in the study area, it is apparent that non-truck VMT growth exceeds truck VMT growth in both percentage and in total numbers. The result is that the share of truck traffic on the highway system has remained relatively flat. Figure 17 displays the change in truck VMT as a percentage of total VMT from 1998 to 2003. Results indicated that Riverside and San Bernardino Counties, with heavy concentrations of industrial/warehousing activity, also have the highest concentration of heavy duty truck volumes and truck percentages on arterials. This data shows that although the share of truck VMT has declined slightly throughout the study area, it has remained relatively flat as a share of total VMT.

Figure 17
Historical Percentage of Truck Vehicle Miles of Travel (VMT) to Total VMT on the State Highway System within the MCGMAP Study Area 1998 to 2003



Source: Truck Miles of Travel: California State Highway System 1988-2003, Caltrans, 2005

Truck Travel Patterns

Thus far the analysis of existing conditions has identified the inventory of the highway system, the volumes throughout the system, and growth rates in truck traffic. This section will evaluate truck travel patterns in the system.

In 2002, SCAG completed a survey of truck traffic across directional screenlines in the study area. The study differentiated between three truck types: light-heavy duty (LHD) trucks, medium-heavy duty (MHD) trucks, and heavy-heavy duty (HHD) trucks. LHD trucks typically include two-axle and three-axle panel trucks (e.g., UPS, FedEx), utility service vehicles, and bobtails. MHD trucks typically include three-axle and some four-axle trucks such as bobtails with chassis and empty

flatbeds. HHD trucks typically include bobtails with containers, liquid bulk, full flatbeds, and other multi-axle units. Table 10 shows the truck AADT counts across 15 screenlines created for the 2002 SCAG Goods Movement Truck Count Study. Screenlines are imaginary lines across transportation study areas; they are placed to determine the magnitude of traffic crossing those imaginary lines in order to assess the impacts of travel. The screenline locations are shown in Figure 18. Table 10 presents truck counts by truck type, and is indicative of the directional movement of trucks within and through the study area.

Table 10
Truck Counts by Type across MCGMAP Study Area Screenlines

Screenline	County	Freeways	Description of Travel	Total Daily Trucks
1	Los Angeles	I-5, SR-2, U.S. 101, I-405	North – South	54,991
2	Los Angeles	I-10, SR-60, I-5, I-105, SR-91, I-405	East – West	144,883
3	Los Angeles	I-110, I-710, I-405	North – South	66,515
4	Orange	SR-57, SR-91, I-5, SR-22, I-405	Out of OC/Into OC	90,899
5	Orange	I-5, SR-57, SR-91, I-405	Out of S. LAC/Into S. LAC	91,934
6	San Bernardino	SR-91, I-10, SR-60	East – West	85,143
7	San Bernardino	I-215, I-15	North – South	57,680
8	Los Angeles	I-210, I-10, SR-60	East – West	80,167
9	Riverside/San Bern.	SR-60, SR-30, I-10, SR-74	East – West	25,058
10	Ventura	SR-118, U.S. 101, SR-126	East – West	20,617
11	Ventura	U.S. 101, SR-126, SR-118	East – West	17,220
12	Riverside	I-10, SR-111	Out of Imp. Co./Into Imp. Co.	14,647
13	San Bernardino	I-15, SR-138, SR-18	Out of SB Co./Into SB Co.	2,664
15	Riverside	I-15, SR-91, I-215	North – South	24,975

Source: SCAG Goods Movement Truck Count Study, 2002.

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Figure 18
SCREENLINE LOCATIONS

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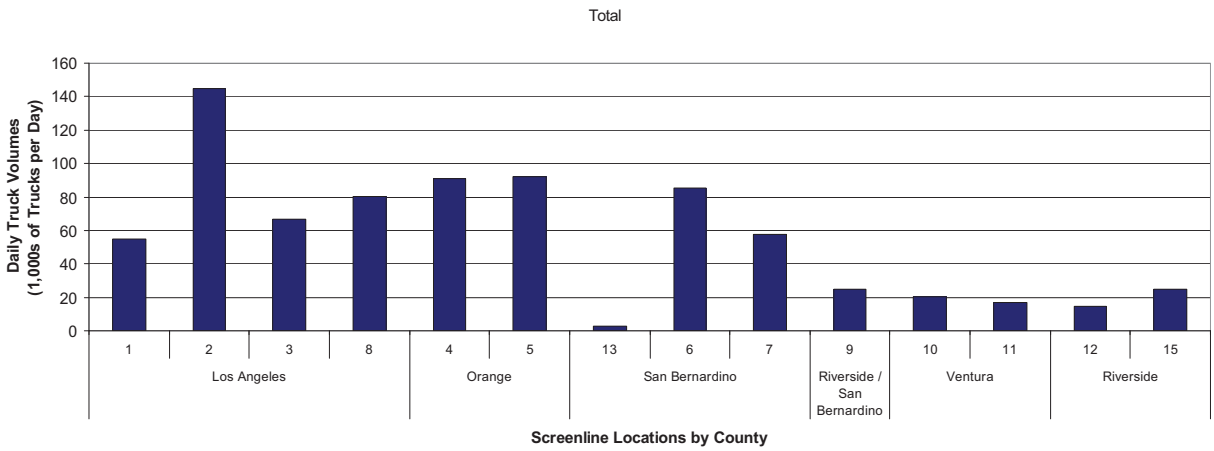
The data contained on Table 10 is also shown graphically in Figure 19.

Figure 19
Truck Counts by County across MCGMAP Study Area Screenlines



Source: SCAG Goods Movement Truck Count Study, 2002

As shown, the highest volume of daily truck traffic occurs in the eastbound and westbound directions in Los Angeles County. This includes truck movements along I-10, SR-60, and SR-91.

There are several key findings from the truck travel pattern analysis:

- Rapid growth in port-related truck freight from Los Angeles through San Bernardino and Riverside Counties increased truck volume in this region. Major freeway facilities providing the transportation capacity for this travel demand include I-10, I-15, SR-60, and SR-74.
- The most significant goods movement patterns in the study area are east-west within Los Angeles County, which translate to the following spin-off patterns:
    - Travel patterns to and through San Bernardino and Riverside Counties and other points eastward
    - Travel patterns to and from Orange County, and through Orange County to points in San Bernardino and Riverside Counties and points east, as well as north-south to San Diego County
- The second most significant travel patterns are north-south within Los Angeles County between the ports and intermodal yards and warehouse distribution centers.
- North-south travel patterns between San Bernardino and Riverside County are also significant, and include flow to and from Orange County and San Diego County as well as to and from points north.
- Travel patterns north-south between Los Angeles County, Ventura County, and Kern County are also significant.

- Major portions of the truck travel patterns are extremely congested during the PM peak period, particularly in Los Angeles and Orange Counties and the areas immediately to the east and west.

In the Southern California region, the SR-60, I-710, and I-15 freeways are heavily impacted by trucks now and will become more congested in the future. SCAG has been studying truck lanes and full truckways along I-710 (SCAG, I-710 Corridor Study, March 2005), SR 60 (SCAG, SR-60 Truck Lane Feasibility Study, February 2001) and I-15 (SCAG, I-15 Comprehensive Corridor Study, December 2005).[37]

The SR-60 corridor between I-710 and I-15 is one of the most heavily used freeways by trucks engaged in inter- and intra-regional goods movement, serving both port and domestic traffic. It is of major importance in the distribution of consumer goods, and facilitates international trade.

Truck origin and destination travel patterns on the SR-60 corridor were studied in 2001. The results are summarized as follows:

- Approximately 5 percent of the trucks using SR-60 either enter or exit the SR-60 corridor west of I-710
- 13 percent of the trucks arrive at SR-60 via I-710, including 9 percent to/from the south and 4 percent to/from the north
- I-605 contributes 13 percent to the SR-60 truck volume, including 7 percent to/from the south and 6 percent to/from the north
- Roughly 6 percent of the trucks on SR-60 enter or exit using SR-57, including 4 percent to/from the south and 2 percent to/from the north
- I-15 to the north of SR-60 carries 54 percent of all heavy duty trucks

The 1998 Caltrans congestion map divided the SR-60 corridor into three separate segments: from I-710 to I-605, from I-605 to SR-57 north, and from SR-57 north to I-15. Caltrans has identified level of service (LOS) F as acceptable for all segments of the corridor. In 1998, all three segments of SR-60 were already experiencing level of service worse than "F_0" ("F_2" and "F_3"). Note that LOS F is typically considered failing and the point at which demand far exceeds capacity. Caltrans has designated LOS F for the most congested freeway segments, in order to compare operational characteristics.

Table 11
Summary of Year 2001 Freeway Congestion on SR-60

	AM Period				PM Period			
Segments	Period of Congestion	Average Travel Time (minutes)	Average Speed (mph)	Level of Service	Period of Congestion	Average Travel Time (minutes)	Average Speed (mph)	Level of Service
I-710 to I-605	6:30 to 8:45	15	34	F_2	15:45 to 19:15	18	28	F_2
I-605 to SR-57	6:15 to 8:45	32	22	F_3	15:15 to 19:45	23	31	F_2
SR-57 to I-15	5:00 to 8:45	14	26	F_2	16:00 to 18:00	7	43	E

Source: SCAG, "SR-60 Truck Lane Feasibility Study," February 2001

The I-15 corridor stretches from the San Diego County line to the Mojave River crossing on the northern edge of the City of Victorville in San Bernardino County. I-15 is the primary freight corridor between Los Angeles (and western Mexico) and all states (and Canadian provinces) to the north and east. As seen in Table 12, the percent of all traffic consisting of heavy trucks was computed for daily traffic by direction for the AM and PM peak periods. Approximately 15 percent of trucks travel on a daily basis during the AM peak period in the northbound direction.

Table 12
Summary of I-15 Total ADT and Truck Percentages Year 2001

Travel Demand and Patronage on the year 2000	ADT	Truck Percentage
Average Daily Traffic		
I-15 NB & SB TOTAL (vehicles per day)		
Trucks Only	14,854	
Total	88,951	**0.17**
AM Peak Period (6-9 AM) Traffic - NB ONLY		
Trucks Only	824	
Total	5,386	**0.15**
AM Peak Period (6-9 AM) Traffic - SB ONLY		
Trucks Only	1,103	
Total	10,046	**0.11**
PM Peak Period (3-7 PM) Traffic - NB ONLY		
Trucks Only	1,407	
Total	12,774	**0.11**
PM Peak Period (3-7 PM) Traffic - SB ONLY		
Trucks Only	1,162	

Source: SCAG, I-15 Comprehensive Corridor Study, December 2005

A study on the I-15 corridor was completed in 2005. The results are summarized below:

- Average daily traffic on I-15 at SR-138 is currently between 110,000 and 120,000 vehicles; the AM peak period is between 6:00 AM and 8:00 AM, while the PM peak period is between 3:00 PM and 6:00 PM.
- The PM peak period is 10 percent to 15 percent higher than the average weekday peak. This creates a longer period of congestion and an extended peak, particularly in the northbound direction on a Friday evening and in the southbound direction on a Sunday afternoon.
- Over 13 percent of the weekday traffic on I-15 is trucks, with the share of trucks increasing to over 16 percent during the midday hours.
- The I-15 truck climbing lane between SR-138 and the Cajon Summit increases northbound capacity to five lanes on this segment of the freeway.

The I-710 corridor is the principal transportation connection between East Los Angeles and the ports of Long Beach and Los Angeles. It plays an important role in the regional, statewide, and national transportation system. A large number of trucks use I-710 to travel between the ports and inland destinations (warehouses, distribution centers, and intermodal transfer yards).

A major corridor study of I-710 was completed in 2005. The results are summarized below:

- I-710 experiences an accident rate that is well above the statewide average for freeways of this type.
- 50 percent of trucks leaving the POLA and POLB ferry containers to an intermodal rail yard facility via I-710 for transshipment to other parts of the U.S. outside of Southern California.
- The I-710 freeway carries heavy truck volumes over its entire length. Total truck traffic south of I-405 is currently over 20,000 truck trips per day, or 20 percent of all traffic.
- There is a significant lack of storage on many of the off-ramps throughout the corridor.
- Several segments along I-710 are constructed with non-standard lane widths, which reduce speed, motorist comfort level, and overall capacity.
- The shoulders provided are narrow in width, and in some segments no shoulders are provided at all.
- The weaving distance is significantly constrained by both the spacing of the interchanges and ramp configurations. This negatively impacts the mainline freeway capacity and safety.
- Near Long Beach, trucks make up nearly twenty percent of the traffic stream during the day, compared with an average daily truck percentage of 6 to 13 percent on similar freeways in Los Angles County.

Near Long Beach, trucks make up nearly 20 percent of the traffic stream during the day, compared with an average daily truck percentage of 6 to 13 percent on similar freeways in Los Angeles County. Table 13 presents a summary of truck percentages along I-710.

Table 13
I-710 Total AADT and Total Trucks Year 2004

Locations	AADT Total	Total Trucks	Total Truck %
BEGIN ROUTE, LONG BEACH FREEWAY	54000	7679	14.22
LONG BEACH, JCT. RTE. 1, PACIFIC COAST H	153000	21757	14.22
JCT. RTE. 405	178000	26130	14.68
DEL AMO BOULEVARD INTERCHANGE	179000	26653	14.89
LONG BEACH, JCT. RTE. 91, ARTESIA FREEWA	218000	37888	17.38
JCT. RTE. 105	227000	38272	16.86
FIRESTONE BLVD	215000	36550	17
COMMERCE, JCT. RTE. 5, SANTA ANA FREEWAY	225000	32895	14.62
JCT. RTE. 60	191000	11385	12.18
MONTEREY PARK, JCT. RTE. 10, SAN BERNARD	42500	2423	5.7
PASADENA, JCT. RTES. 134 AND 210	69000	1497	2.17

Source: Caltrans, 2004 Truck Volumes

The I-10 corridor is one of the top 25 highway freight bottlenecks in the U.S.[38] The I-10 corridor is more than 2,600 miles long, of which approximately 1,900 miles are rural and 721 are urban. Inter-regional trade between the I-10 corridor region and the rest of the United States generates significant economic benefits in terms of jobs, earnings, and economic output. Inter-regional trade

produced $305.5 billion in spending within the I-10 region (55.6 percent), while $243.8 billion (44.4 percent) occurred in the other regions of the country. Some 2.25 million jobs in the I-10 region and 1.87 million jobs in the rest of the United States are supported by inter-regional freight movements which utilize the I-10 corridor. The jobs supported by I-10 inter-regional trade generated $75.3 million and nearly $59 million in earnings in the I-10 region and the rest of the United States, respectively.

The National I-10 Freight Corridor Study presented the following results in 2003:

- Hypothetically, a significant improvement on deficient mileage (segments of highway with unacceptable levels of service (LOS)) could be achieved by removing all truck traffic from the corridor. The modeling exercise predicted that average car speeds would jump by over 8 percent, and as much as 32 percent during peak hours.
- Average truck speed on rural interstate sections during the peak hour is 58.6 mph and on urban interstate sections is 26.1 mph.
- The corridor currently has approximately 400 miles operating at an unacceptable LOS, with nearly two-thirds of the deficient mileage classified as urban.
- The total I-10 corridor is more than 2,500 miles long. Two-thirds of these miles are rural. However, the number of trucks traveling on urban roadway each day is 42% higher than rural roadways.

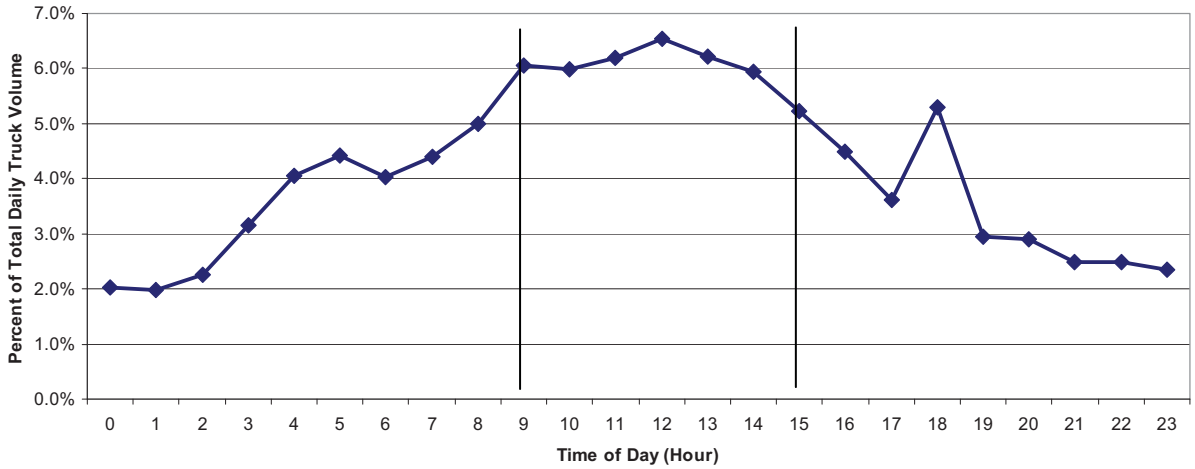
Time of Day Distribution of Truck Travel

The purpose of this section is to evaluate the hourly distribution of truck traffic throughout an average day. A common assertion is that truck traffic creates a significant conflict with commuter traffic and consumes peak hour traffic capacity, thereby contributing to delay for the average traveler going to or from work. Existing screenline data has been used for this analysis.

As part of the 2002 SCAG Goods Movement Truck Count Study,[39] hourly truck count data were obtained along selected screenlines. These screenline locations are shown in Figure 18 above. The hourly truck count data provide insight into the distribution of truck travel into and out of the study area over a 24-hour period. The screenlines are located near the northern, southern, and eastern edges of the study area. The data are useful for identifying the hourly distribution of truck travel coming in or going out of the study area throughout the day.

Figure 20 displays the hourly distribution of total truck traffic for eastbound and westbound movements across a screenline across I-10, SR-60, and SR-91 to the west of I-15. This location provides information about truck flows into and out of the study area from the east. Summing the hourly distribution percentages in Figure 20 shows that approximately 37 percent of all daily truck travel occurs after 9:00 AM and before 3:00 PM (between commuter peak periods), while approximately 31 percent of all daily truck travel occurs between 7:00 PM and 6:00 AM (night hours). The remaining 32 percent of total daily truck travel occurs between the hours of 6:00 AM to 9:00 AM and 3:00 PM to 7:00 PM (peak commuter travel hours). Therefore, more than two-thirds of all daily truck travel to and from points east of the study area occurs during off-peak times.

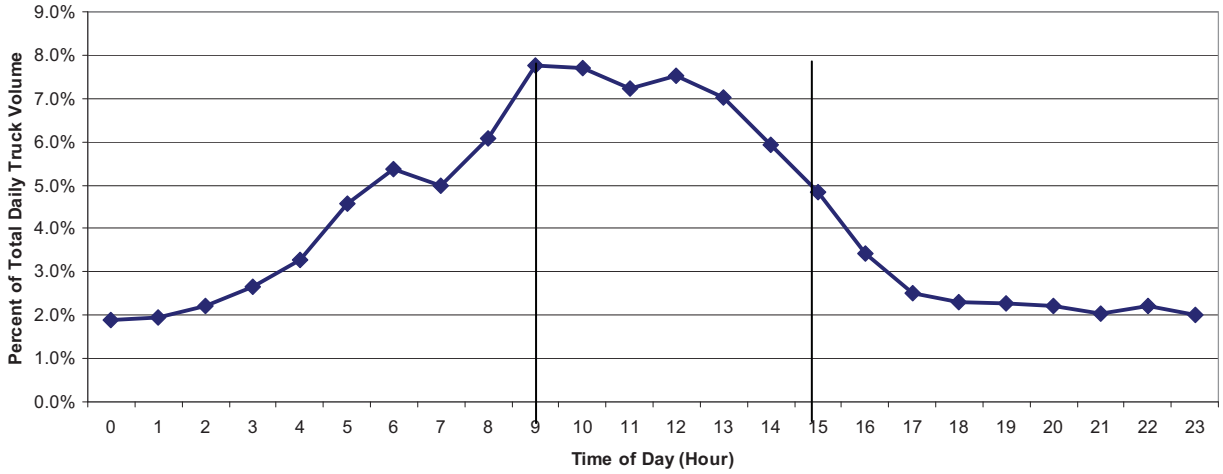
Figure 20
Hourly Distribution of East-West Truck Traffic in the Eastern Part of Study Area



Source: SCAG Goods Movement Truck Count Study, 2002

For information on the movement of trucks into and out of the study area from the south, an east-west screenline along I-5 and I-405 near Fountain Valley in Orange County was used. Summing the hourly distribution percentages in Figure 21 shows that approximately 43 percent of all daily truck travel occurs between the commuter peak travel periods, while approximately 30 percent of all daily truck travel occurs during night hours. Nearly 75 percent of all daily truck travel to and from points south of the study area occurs during off-peak times. The remaining 27 percent of total daily truck travel occurs during commuter travel peak hours.

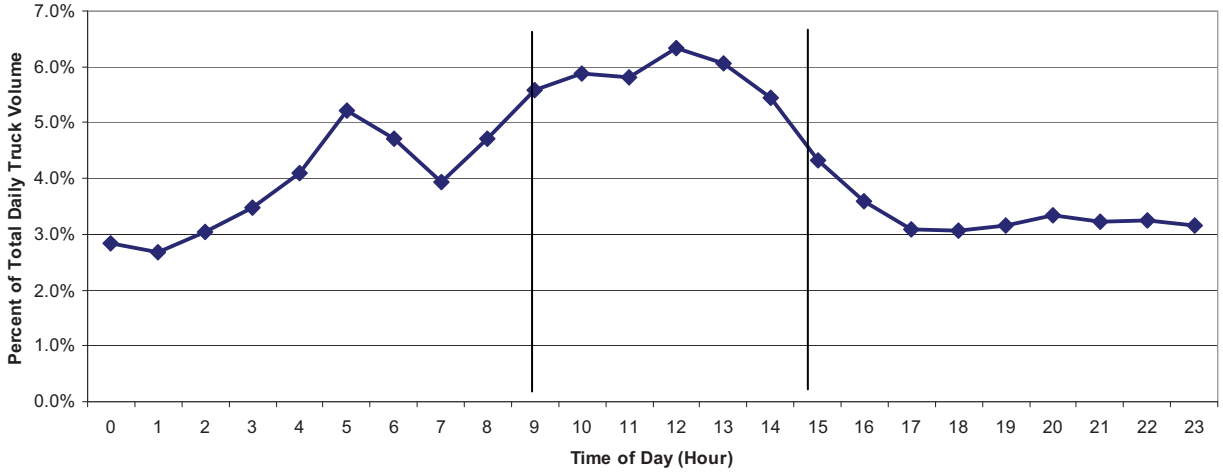
Figure 21
Hourly Distribution of North-South Truck Traffic - Southern Parts of Study Area



Source: SCAG Goods Movement Truck Count Study, 2002

For information on the movement of trucks into and out of the study area from the north, an east-west screenline consisting of I-5 and I-405 south of U.S. 101 in Los Angeles County was used (Figure 22). Approximately 35 percent of all daily truck travel occurs between commuter peak travel periods, while approximately 37 percent of all daily truck travel occurs at night; i.e., nearly 75 percent of total daily truck traffic occurs during off-peak periods of the day. Approximately 27 percent of total daily truck travel occurs during the peak commuter periods.

Figure 22
Hourly Distribution of North-South Truck Traffic - Northern Parts of Study Area



Source: SCAG Goods Movement Truck Count Study, 2002.

The key finding from these data is that while there is substantial truck and commuter traffic interaction during traditional commuter travel periods, the bulk of truck traffic does not occur during these periods, and tends to peak during the midday hours. Approximately two thirds of truck travel occurs during the off-peak hours. The amount of truck traffic that occurs during peak commuter periods is almost equivalent to the share of truck traffic that occurs during night hours. It should be noted that these data were collected before the advent of PierPass, the extended gate hour program at the ports, which began in July of 2005.

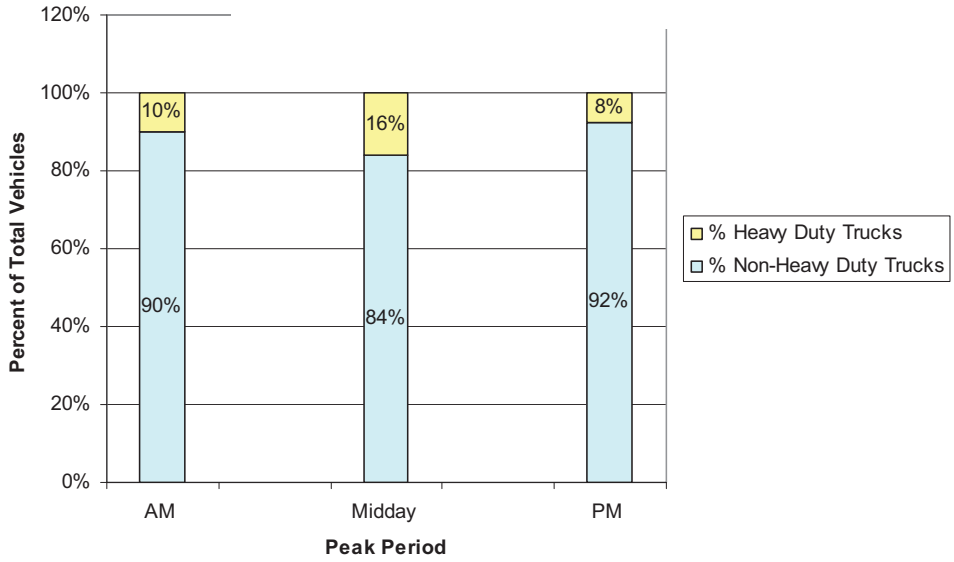
Time of Day in Relation to Non-Truck Traffic

Since hourly truck traffic distribution patterns do not exactly match commuter travel patterns, it is important to evaluate the degree to which they do interact. An analysis of the distribution of both truck traffic and non-truck traffic during three peak periods of the day was developed using data from the SCAG Subregional Freight Movement Truck Access Study.

Figure 23 illustrates the peak period percentages of truck traffic as compared to non-truck traffic on a portion of I-15 between I-10 and SR-60. This segment of I-15 currently carries the heaviest two-way truck volumes in western San Bernardino and Riverside Counties.[40] The peak periods presented in Figure 23 correspond to the following hours of the day:

- AM: 6:00 AM to 8:00 AM
- Midday: 11:00 AM to 1:00 PM
- PM: 4:00 PM to 6:00 PM

Figure 23
2003 Peak Period Truck Percentages as
Share of Total Traffic Volume on I-15 between I-10 and SR-60



Source: SCAG Subregional Freight Movement Truck Access Study, July 2004

The most revealing finding from this data is that truck travel represents a small share of overall travel, regardless of the time of day. During the AM peak period, truck traffic represents 10 percent of overall traffic, compared to eight percent during the PM peak. Even during the midday peak, when truck traffic is at its highest, the share of truck traffic is 16 percent of total traffic.

Port-Related Truck Travel

Near the ports within the MCGMAP study area, the freeway facilities carry large numbers and percentages of truck traffic going to or from the port facilities. The further the freeways are from the ports, the less port-related truck activity occurs on study area roadways. This is not to say that truck traffic is reduced at points further from the ports; for example, previous discussion in this section shows high volumes of truck travel in areas removed from the ports such as in Riverside and San Bernardino Counties. The roadway facilities further from the ports carry goods to distribution warehouses and rail yards within the study area, and serve not only direct port truck trips, but also trips associated with transloaded goods on the second or third link of the goods movement chain.[41]

In 2004, the POLA commissioned the Baseline Transportation Study to identify the existing truck traffic volumes to and from the port.[42] The study yielded useful data to identify the specific port-related truck traffic on roadways within the study area. The study defines port-related trucks as container trucks traveling to and from the San Pedro Bay port facilities). The data from the 2004 POLA study were analyzed in conjunction with Caltrans truck count data for the same roadway segments to identify the percentage of port-related trucks compared to the total truck volumes on study area roadways. The results of this analysis are shown in Table 14.

There are two key observations to be made from this data.

- I-710 is the primary and dominant corridor for port-specific traffic.
- The further north from the ports, the lower the amount of port-related traffic. While total truck traffic shows no significant trend in volumes or as a share of total vehicle traffic, the share of port-specific truck traffic declines sharply in terms of its share of total truck traffic further away from the ports.

These results would indicate that a significant share of truck traffic on I-710, as well as on the other roadways, quickly peels off the main system on their way to/from intermodal yards and warehouse distribution centers. The transload business also is a major contributor to this pattern.

The 2004 POLA study states that a significant decrease in container truck activity was noted on the I-710 and I-110 freeways during the 2004 port congestion; however, less of a reduction was noted on SR-60 and SR-91,[43] likely due to the fact that those facilities used by large shippers of intermodal cargo (such as Wal-Mart and Target) transload cargo transported with the trucks to inland destinations.

Table 14
Comparison of Port Truck Volumes to Total Daily Truck Volumes on Study Area Roadways, Year 2003

Highways	Segments	Total Daily Vehicle Volume	Total Daily Truck Volume	Daily Port Truck Volume	Total Trucks as % of Total Vehicle Volume	Port Trucks as % of Total Truck Volume
I-110	PCH to Sepulveda	148,000	9,900	7,810	6.7%	78.9%
	Sepulveda to I-405	226,000	11,900	7,335	5.3%	61.6%
	I-405 to SR-91	266,000	23,900	6,015	9.0%	25.2%
	SR-91 to I-105	247,000	17,800	4,680	7.2%	26.3%
	I-105 to I-10	324,000	15,900	2,485	4.9%	15.6%
I-710	PCH to Willow	146,000	25,400	23,900	17.4%	94.1%
	Willow to I-405	161,000	27,100	23,235	16.8%	85.7%
	I-405 to SR-91	186,000	31,400	20,045	16.9%	63.8%
	SR-91 to I-105	227,000	38,300	15,315	16.9%	40.0%
	I-105 to I-5	237,000	34,600	11,685	14.6%	33.8%
	I-5 to SR-60	199,000	24,200	1,025	12.2%	4.2%
	SR-60 to I-10	132,000	11,300	845	8.6%	7.5%
I-405	I-605 to I-710	289,000	15,700	1,875	5.4%	11.9%
	I-710 to I-110	283,000	15,400	2,965	5.4%	19.3%
	I-110 to SR-91	270,000	14,600	1,960	5.4%	13.4%
	SR-91 to I-105	294,000	12,100	1,810	4.1%	15.0%
	I-105 to I-10	310,000	12,800	1,590	4.1%	12.4%
SR-91	SR-57 to I-5	250,000	21,800	1,135	8.7%	5.2%
	I-5 to I-605	283,000	39,900	1,470	14.1%	3.7%
	I-605 to I-710	263,000	37,100	2,870	14.1%	7.7%
	I-710 to I-110	212,000	13,700	1,385	6.5%	10.1%
	I-110 to I-405	67,000	1,500	195	2.2%	13.0%
I-105	I-605 to I-710	212,000	18,800	2,800	8.9%	14.9%
	I-710 to I-110	231,000	14,700	1,605	6.4%	10.9%
	I-110 to I-405	243,000	13,800	390	5.7%	2.8%
I-5	SR-57 to SR-91	223,000	21,400	225	9.6%	1.1%
	SR-91 to I-605	199,000	18,600	160	9.3%	0.9%
	I-605 to I-710	249,000	23,200	195	9.3%	0.8%
	I-710 to SR-60	267,000	20,600	1,800	7.7%	8.7%
	SR-60 to I-10	247,000	20,400	710	8.3%	3.5%
SR-60	SR-57 to I-605	265,000	23,200	1,560	8.8%	6.7%
I-10	SR-57 to I-605	259,000	18,100	1,775	7.0%	9.8%
	I-605 to I-710	234,000	14,200	585	6.1%	4.1%
	I-710 to I-5	254,000	9,000	190	3.5%	2.1%
	SR-60 to I-110	284,000	21,600	300	7.6%	1.4%

Table 14
Comparison of Port Truck Volumes to Total Daily Truck Volumes on Study Area Roadways, Year 2003

Highways	Segments	Total Daily Vehicle Volume	Total Daily Truck Volume	Daily Port Truck Volume	Total Trucks as % of Total Vehicle Volume	Port Trucks as % of Total Truck Volume
I-605	I-405 to SR-91	245,000	11,300	20	4.6%	0.2%
	I-105 to I-5	297,000	41,900	4,100	14.1%	9.8%
	I-5 to SR-60	265,000	37,400	3,825	14.1%	10.2%
	SR-60 to I-10	224,000	26,800	1,815	12.0%	6.8%
SR-57	I-5 to SR-91	276,000	18,800	10	6.8%	0.1%
	SR-91 to SR-60	296,000	23,400	135	7.9%	0.6%
	SR-60 to I-10	139,000	8,100	40	5.8%	0.5%

Sources: "Baseline Transportation Study," Port of Los Angeles, 2004, p. 39; Caltrans Truck Volumes 2004 (Year 2003 Data)

2.4 PORTS

This section presents the existing conditions at the various airports and seaports in the study area. Figure 24 shows the locations of regional seaports and airports.

The section on airports provides a breakdown of the air cargo business sector, summarizes the level of air cargo activities, and provides an inventory of the air cargo system. The section on seaports provides an overview of the study area's port facilities as well as the types and volumes of cargo handled by the ports. Section 4 – Constraints, Issues, and Problems discusses the specific issues related to the existing ports operations in the study area.

ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates

Figure 24
PORTS IN THE MCGMAP STUDY AREA

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Air Cargo and Cargo Airports

Although there are ten airports in the study area, 95 percent of air cargo activity is centered at Los Angeles International (LAX), Ontario International (ONT), and Santa Ana (SNA). These airports serve as national and international cargo gateways from and to the study area. Long Beach (LGB), Burbank (BUR), and John Wayne Orange County Airport (SNA) account for the remaining five percent of the study area's air cargo activity.

The air transport of goods is critical to the future growth of the economy of the study area. In recent years, air cargo has been the fastest growing segment of the goods movement industry in the United States, placing increasing demands both on airports and ground transportation to and from airports. Section 4 – Constraints, Issues and Problems of the Tech Memo summarizes the specific issues related to the existing air cargo operations in the study area.

The Overall Air Freight Structure

The air freight industry is classified into five major types of carriers:

- **Integrated Air Cargo Carriers** – These include Federal Express (FedEx), UPS, DHL, Airborne, Emery, and BAX. What makes them unique is that they provide door-to-door service via any combination of modes (air, truck, and rail intermodal). One company, UPS, uses rail intermodal as a substitute for trucking on some of its extensive line-hauls. These integrated air cargo carriers control the reliability of service by owning some of the ground transport operations as well as the air lift capacity, exercising control through ownership. They also use information technology to exercise control. FedEx and UPS are the dominant companies in domestic integrated business, but both companies operate internationally, operating a network of hub airports for processing freight. DHL specializes in international freight and dominates that market, while providing less extensive service domestically through fewer service options.
- **Non-integrated (Cargo-only) Carriers** – This sector does not provide an integrated door-to-door service, but provides only line-haul service for the airport to airport portion, typically international. Shippers, freight forwarders, cargo handling companies, and other carriers buy lift capacity from them. Carriers like Cargolux, Nippon, and Evergreen International Aviation provide scheduled service to major markets, which can be utilized by shippers or freight forwarders as needed. Other firms in this segment, such as Atlas and Gemini, provide outsourcing, carrying contracted freight for freight forwarders and other airlines.
- **Passenger Belly** – Most international flights between major cities use wide-body aircraft which have enough space in the "belly" below the passenger level to carry all the passenger baggage as well as commercial cargo. The bulk of international air cargo (70 to 80 percent) is carried by passenger belly service because of the pricing advantage offered by the extra belly space. The largest airline cargo carriers in this sector in the study area are Lufthansa, Korean Air, Singapore Airlines, Air France, Japan Airlines, British Airways, Cathay Pacific, KLM, United Airlines, Northwest Airlines, and American Airlines. However, all-cargo

carriers are rapidly gaining market share on international routes. At LAX, 66 percent of international air cargo is handled by all-cargo carriers (integrated and non-integrated), with just 34 percent being passenger belly freight.

- **Postal Services** – While most of the mail shipped in the U.S. travels in ground vehicles, some does travel by air. While the U.S. Postal Service (USPS) typically provides overnight mail services, it does not operate its own airline; mail is carried in the belly of domestic passenger aircraft and under contract with other air cargo carriers. Although it is the largest transportation organization in the world, it handles only a modest share of the air freight shipped in the U.S. (about 10 percent of weight[44]).
- **Freight Forwarders** – While freight forwarders do not operate as carriers, they contribute significantly because they handle and manage the shipment of air cargo on behalf of shippers, particularly international shipments. They buy air lift capacity from passenger belly space as well as cargo-only carriers. In another class, some freight forwarders specialize in very urgent "next-flight-out" service. Here the emphasis is on domestic shipments for which next-day service is inadequate. This class of forwarder has developed partnerships with airlines and couriers for door-to-door service, especially within the United States. Examples include UPS' Sonic Air subsidiary, FedEx "SameDay" service, and "NextJet."

Air Cargo Activities in the Study Area

The study area has five commercial airports that handle air cargo: LAX, ONT, BUR, LGB, and SNA. Table 15 shows air cargo flows at these five airports. It is important to note that there are other commercial airports in the study area including San Bernardino International Airport (SBD) and Palmdale Regional Airport (PMD).

The bulk of the air cargo service providers are located at LAX. In 2005, according to the data presented in Table 15, LAX handled over 75 percent of the study area's air cargo, followed by ONT with 20 percent, with the remaining five percent shared among BUR, LGB, and SNA.

Table 15
Air Cargo Activity 2003-2005 MCGMAP Study Area Airports
Tons of Air Cargo

Airport	2003	2004	2005	2005 Market Share
Los Angeles (LAX)	2,022,076	2,115,314	2,137,188	75.2%
Ontario (ONT)	571,992	605,211	575,369	20.2%
Long Beach (LGB)	56,081	57,050	54,298	1.9%
Bob Hope (BUR)	47,634	49,633	52,867	1.9%
John Wayne (SNA)	15,816	20,796	24,103	0.8%
Total	**2,713,599**	**2,848,004**	**2,843,825**	**100.0%**

Source: SCAG Region Aviation Activity Report, 2003-2005

Note that both March GlobalPort (RIV) and Southern California Logistics Airport (VCV) are two airports in the study area that are both aggressively trying to attract air cargo. RIV was successful in attracting a DHL west coast hub in late 2005, and VCV has attracted sporadic ad-hoc charter cargo. However, to date these airports have not reported any significant air cargo volumes. This will change in 2006 for RIV with the first full year of service for the newly introduced DHL hub.

The leading reason for the concentration at LAX is the broad range of service options and flights available to service providers. As a whole, air cargo carriers and service providers tend to gravitate toward airports that offer the broadest range of flights and destination options. Air cargo is a time- sensitive business, and service providers want the flexibility to choose between a variety of different flight options to meet customer service and pricing needs. LAX offers the greatest variety of flights and destinations, making it a preferred location for service providers. Of course, other factors such as infrastructure to support cargo operations, including air freight terminals, runways for larger aircraft, freight forwarders, trucking companies, customs, and Department of Agriculture inspections are also important.

There is additional research suggesting that LAX is the most centrally located (and fully functioning) airport relative to the study area's population and employment. The research also shows that it is easier to retain employees at LAX due to its accessibility and location.[45] Nonetheless, the fundamental market driver for the concentration of goods movement activities at LAX is the broad variety of flight options and destinations available to air cargo service providers.

ONT ranks as the second largest air cargo operation in the study area because UPS operates its West Coast hub there. In fact, UPS is the largest air cargo handler at that airport, where it accounts for 78 percent of the airport's freight traffic (not counting mail). Other airports in the study area (BUR, LGB, and SNA) have limited freight service, principally FedEx and UPS flights to domestic hub airports.

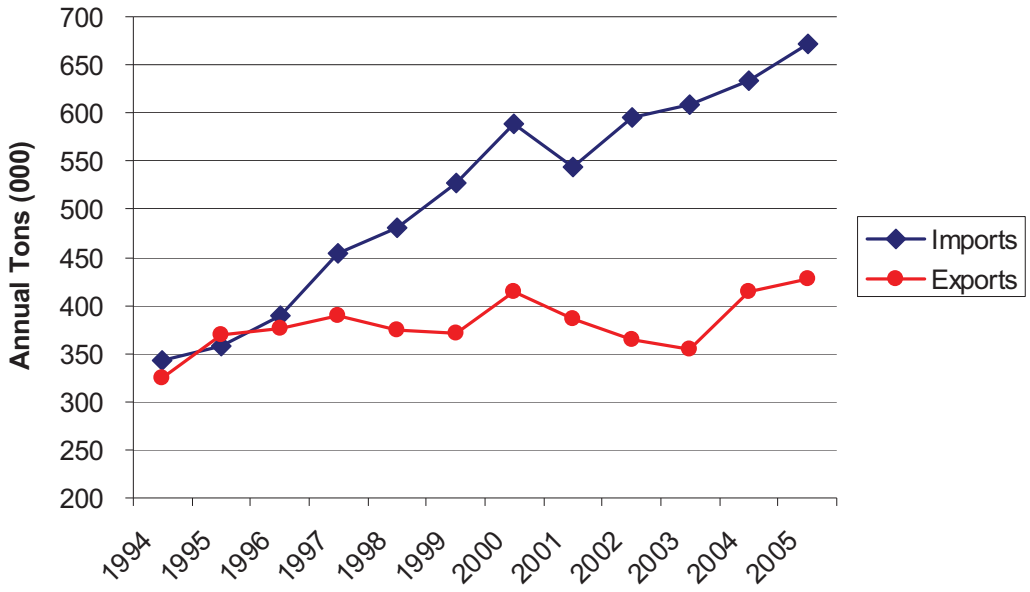
Inventory of Air Cargo Systems

The following is a discussion of existing air cargo systems at the study area's air cargo airports.

Los Angeles International Airport - LAX is the world's sixth busiest in air cargo tonnage, handling nearly 2.14 million tons in 2004. LAX handled about 70 percent of the passengers, 75 percent of the air cargo, and 95 percent of the international passengers and cargo traffic in the five-county MCGMAP study area in 2004.

LAX is a key transportation center for one of the world's most dynamic economies. Los Angeles World Airports (LAWA) notes that international trade is valued at $200 billion, with LAX alone responsible for more than $69 billion in exports and imports.[46] Between 2000 and 2005, the tonnage of international air freight passing through LAX rose 9.3 percent; imports grew by 13.9 percent, while exports grew by 2.8 percent.[47] Figure 25 shows the historical trends in air freight imports and exports at LAX.

Figure 25
Air Freight Imports and Exports via Los Angeles International Airport
(1994- 2005)



Source: LAWA international freight statistics, 1994-2005

The total land area of LAX is 3,651 acres, which contain the Central Terminal Area, airfield, air cargo facilities, and ancillary support facilities. The cargo complexes at LAX total over 2.1 million SF.

The 3,651 acres of airport property are within the City of Los Angeles, and the area constitutes a large industrial district. The airport consists of the following cargo-specific facilities and uses:

- Four runways
- Four million SF of passenger terminal space, including nine terminals and 163 aircraft gates
- 170 acres of cargo ramp and 2 million SF of building space concentrated in three cargo complexes
- Approximately 50 trucking firms operate terminals within two miles of the airport perimeter (While most freight forwarders handle air cargo through LAX, many also arrange rail or truck movement.)

LAX is owned and operated by Los Angeles World Airports (LAWA), a Los Angeles City department that oversees LAX, ONT, PMD, and VNY.

Ontario International Airport - ONT is located in San Bernardino County. It is the center of a rapidly developing freight movement system that includes the airport, two railroads, four major

freeways (I-10, I-15, SR 60, and SR 83), and an expanding network of freight forwarders. ONT currently consists of 1,463 acres, about a third of which are available for future development. The site is well-suited for the development of air cargo and supporting facilities, considering its proximity to both airfield access ways and public roadways that lead to major interstate highways.

The airport is one of four owned and operated by LAWA. The airport consists of the following cargo specific facilities and uses:

- Two parallel runways
- 96,000 SF of cargo building and office space to support all-cargo, airline belly cargo, and air mail
- 12 major U.S. air freight carriers including Air Transport International, Airborne Express, Ameriflight, DHL, Empire Airways, Evergreen, Express Net, Federal Express, Kalitta Air, West Air, Union Flights, and UPS

The West Coast hub for UPS utilizes ONT as its base of operation, with facilities located both on and adjacent to airport property. It currently processes approximately 70 percent of all cargo at the airport. The USPS also utilizes hangar space to process all first class mail passing through ONT. The other air freighter carriers maintain operating facilities along the south edge of the airport.

UPS also has a 156-acre West Coast Distribution Center adjacent to the airport with access to the ONT airfield. Property is available for development or redevelopment between and adjacent to the existing terminals and to their west for additional passenger terminal and cargo facilities. Developable property is also available on the south side of the airport.

Long Beach Airport - LGB is situated in Los Angeles County and handled 54,300 tons of air cargo in 2005. It is served by FedEx, Airborne Express, and UPS. The airport has four smaller runways between 4,200 and 6,200 feet and one primary runway at 10,000 feet. The airport occupies 1,166 acres.

Bob Hope Airport in Burbank - BUR is the closest airport to downtown Los Angeles. The airport handled nearly 52,900 tons of cargo in 2005, 42 percent of which was inbound and 58 percent of which was outbound. The airport consists of a 6,900-foot and a 5,800-foot runway.

John Wayne Airport/Orange County Airport - SNA is owned and operated by the County of Orange. It is the only commercial service airport in Orange County, located approximately 35 miles south of Los Angeles, between the cities of Costa Mesa, Irvine, Newport Beach, and Santa Ana. Two runways serve commercial and private aircraft: a 5,700-foot main runway and a 2,887-foot general aviation runway. In the year 2005, the total air cargo handled was 24,103 tons.

Potential MCGMAP Air Cargo Airports

Five additional airports in the MCGMAP study area have the potential to handle the study area's air cargo demands. As previously mentioned, March GlobalPort is poised to grow rapidly with the addition of a DHL regional hub, and Southern California Logistics Airport is aggressively

expanding its cargo capabilities for large-scale international air cargo operations. The study area's remaining three airports (PMD, SBD, and VNY) currently do not report air cargo activity.

March GlobalPort - A new air cargo operation in the study area is the March GlobalPort at March Air Reserve Base (RIV) in Riverside County, where DHL has signed a 16-year operating agreement with the base to run a new cargo distribution system with a domestic focus. March GlobalPort consists of a 13,300-foot runway and more than 350 acres of runway-accessible property available for development. DHL started with six flights a day and is currently flying eight planes per day. Their plan is to eventually have 12 planes per day, and several of those flights are planned to be international flights.

Southern California Logistics Airport - Another emerging air cargo complex is the Southern California Logistics Airport (VCV) located in Victorville (San Bernardino County), which has facilities for air cargo, rail intermodal, trucking, and warehousing operations, as well as planned industrial space. Overall, VCV has developed a master plan for more than 64 million SF of commercial space. It consists of two intercontinental runways: a 15,050-foot runway, allowing the heaviest aircraft direct, non-stop access to any destination in the world, and a 10,000-foot runway.[48]

Palmdale Regional Airport - PMD is located in the Antelope Valley, in the northeast portion of the city of Palmdale, on a 60-acre site at United States Air Force Plant 42. The airport is owned and operated by LAWA under a joint-use agreement with the U.S. Air Force. The airport has three runways. The airport features a modern 9,000 SF terminal capable of handling up to 300,000 passengers annually. PMD has no commercial service at this time and no reported cargo activity.

San Bernardino International Airport - SBD is a commercial airport supported by a 10,000 foot runway. SBD currently reports sporadic charter cargo flights from Custom Air Transport, HeavyLift, and Kitty Hawk. However, there are no available cargo statistics for SBD.

Van Nuys Airport - VNY is located in the heart of the San Fernando Valley and averages nearly one-half million takeoffs and landings annually, with 454,753 total operations in 2004. It is one of the four airports owned and operated by LAWA. Van Nuys Airport covers 725 acres and has two runways. VNY is a general aviation airport and has no commercial passenger service or reported air cargo activity.

Ocean Cargo and Seaports

The study area is served by the San Pedro Bay ports (POLA and POLB) and by the Port of Hueneme. One-third of all waterborne freight container traffic at U.S. ports is handled by the ports in the study area, while approximately 77 percent of the freight coming into these ports is headed for destinations outside the study area.[49] Nearly $200 billion in trade passing through the ports in 2000 supported a national total of two million jobs, which paid over $61 billion in income.[50]

Inventory of Port Systems

Existing conditions, port operations, the type of cargo handled, and port volumes are described in this section.

Port of Los Angeles - POLA handled cargo worth $189.6 billion in CY 2005. Top trading partners (by cargo value) in CY 2004 were China, Japan, Taiwan, South Korea, and Thailand. As shown in Table 16, the POLA handled over 162 million metric revenue tons (MRT) in FY 2005 (based on 1,000 kilograms or one cubic meter).[51] The port handled 169 million metric revenue tons in CY 2005.

Table 16
Port of Los Angeles Tonnage FY 2005
Metric Revenue Tons (1000s)

Container/Gen. Cargo	144,998
Liquid Bulk	12,798
Dry Bulk	4,313
Total	162,109

Source: Port of Los Angeles, Annual Financial Statements, 2005, p. 16

Leading containerized exports (in CY 2004) at the POLA include paper products, fabric (including raw cotton), pet and animal feed, synthetic resins, and fruits and vegetables. Leading containerized imports (in CY 2004) at the POLA include furniture, apparel, toys and sporting goods, vehicles and vehicle parts, and electronic products.

The POLA comprises 4,200 acres of land and has eight container terminals (1,686 acres) and four dockside intermodal rail yards. In addition, the port has eight liquid bulk terminals, one automobile terminal, three break bulk terminals, and three dry bulk terminals. Table 17 lists the terminal details. The port also has a cruise terminal with two terminal buildings and three berths. Cruise traffic amounted to 1.2 million passengers in CY 2005.

Table 17
Port of Los Angeles Terminal Details

Pier & Berth	Cargo Type	Terminal Operator	Terminal Area	Handling Facilities
195-199	Automobile	Distribution & Auto Service, Inc. (DAS)	129 acres	Extensive rail yard for loading and unloading of auto racks
100	Container	China Shipping Holding Company, Inc.	75 acres	Four post-Panamax cranes with 100' gauge; rail and gate shared with Yang Ming Terminal
121-131	Container	Marine Terminals Corp. (MTC)	186 acres	Eight post-Panamax cranes with 50'-gauge and 40-long-ton main hoist capacity; tophandlers; sidehandlers; forklifts; UTRs; bombcarts; on-dock rail facility
136-139	Container	Trans Pacific Container Service Corp. (TraPac)	173 acres	11 post-Panamax cranes with 100'-gauge and 10-long-ton main hoist capacity
206-209	Container	To Be Determined	86 acres	Four cranes (three 50'-gauge and one 34'-gauge)
212-225	Container	Yusen Terminals, Inc.	185 acres	Four super-post-Panamax with 100'-gauge and 60-long-ton main hoist capacity
226-236	Container	Seaside Terminal Services	205 acres	Eight post-Panamax-plus cranes with 100' gauge and 50-long-ton main hoist capacity
302-305	Container	Eagle Marine	292 acres	On-dock rail service accommodates up to 64 five-platform double-stack railcars
401-406	Container	APM Terminals	484 acres	12 super post-Panamax 100'-gauge cranes; on-dock rail service designed for 12 loading tracks
165-166	Dry Bulk	U.S. Borax, Inc.	7 acres	Transfers cargo to vessels at a rate up to 1000 metric tons an hour
210-211	Dry Bulk	Hugo Neu	22 acres	Metal shear and shredder on site, near-dock rail facilities

Table 17
Port of Los Angeles Terminal Details

Pier & Berth	Cargo Type	Terminal Operator	Terminal Area	Handling Facilities
301	Dry Bulk	Los Angeles Export Terminal, Inc.	120 acres	1,000' bulkloading wharf; rail access for product delivery
70-71	Liquid Bulk	Westway Terminal Co.	14 acres	Tankers can be loaded or unloaded with chemicals, petrochemicals, petroleum products, and vegetable oils
118-119	Liquid Bulk	Kinder Morgan	16 acres	The facility can accommodate either one large tanker or two smaller vessels and/or barges simultaneously
148-151	Liquid Bulk	ConocoPhillips	20 acres	Onsite storage tanks
163	Liquid Bulk	Kaneb	12 acres	Various types of commodities handled include cement, crude, petroleum, oils, fuels, blendstocks, refinery feedstocks, oxygenates, distillates, chemicals, petrochemicals
164	Liquid Bulk	Ultramar	13 acres	Product cap of 926,000 bbls, importing intermediate refining feedstocks to support the Ultramar Refinery operation nearby
167-169	Liquid Bulk	Equilon Enterprises	12 acres	11 storage tanks with total cap. of 530,000 bbls adjacent to the berths
187-191	Liquid Bulk	Vopak	19 acres	83 storage tanks with total cap of 2,500,000 bbls including lube oil, diesel fuel, caustic soda, and vegetable oils; bulk cement distribution facility with 86,000 sq. ft. warehouse

Table 17
Port of Los Angeles Terminal Details

Pier & Berth	Cargo Type	Terminal Operator	Terminal Area	Handling Facilities
238-240C	Liquid Bulk	Exxon Mobil	20 acres	Tankers, barges, and tugs transporting crude oil and finished and semi-finished petroleum products
45-53	Breakbulk	Pasha	24	Breakbulk steel, on-dock rail access
54-55	Breakbulk	Stevedoring Services of America (SSA)	12	Transit shed capacity of 211,290 sq. ft.
174-181	Breakbulk	Pasha	40	Covered on-dock warehouses, transit shed capacity of 235,00 sq. ft., specialized on-dock rail service for steel.

Source: www.portoflosangeles.org

Port of Long Beach - POLB comprises 3,230 acres of land with seven container terminals (1,284 acres) and five dockside intermodal rail terminals. The port also has seven dry bulk terminals, seven liquid bulk terminals, ten break-bulk terminals, and one automobile terminal. Carnival Lines, under a lease with the City of Long Beach, operates a cruise terminal within the Harbor District.

As shown in Table 18, the POLB handled over 159 million metric revenue tons (MRT) in calendar year 2005. The cargo passing through POLB in 2005 was valued at about $100 billion. Top ten trading partners with the POLB are China, South Korea, Japan, Hong Kong, Malaysia, Ecuador, Mexico, Indonesia, Taiwan, and Thailand. Combined these nations accounted for about 98.5 million metric revenue tons, or 62% of the port's total tonnage in 2005.

Table 18
Port of Long Beach Tonnage CY 2005
Metric Revenue Tons (1000s)

	Inbound (Imports)	Outbound (Exports)	Total
Container Cargo	89,415	25,171	114,587
Liquid Bulk	30,269	4,407	34,676
Dry Bulk	2,956	4,210	7,167
Break bulk/Neo-bulk[i]	1,950	812	2,762
Total	124,591	34,601	159,192

Source: Port of Long Beach, Annual Report, 2005, p. 20
[i] Includes steel, vehicles, and lumber

Leading exports by tonnage at POLB include petroleum, chemicals, wastepaper, petroleum coke, scrap metal, plastics, foods, electronics, steel, cotton, and machinery.

Leading imports by tonnage at the POLB include petroleum, electronics, plastics, furniture, clothing, machinery, rubber, cement, chinaware, and hardware.

With a main channel depth of 76 feet and berth water depths exceeding 48 feet (except at Pier C), the POLB can already accommodate large vessels. During the year 2004, eleven 8,000-TEU vessels called at the port. Table 19 presents a summary of the terminals at the POLB.

Table 19
Port of Long Beach
Terminal Summary

Pier & Berth	Cargo Type	Terminal Operator	Terminal Area
A 88-96	Container	SSA Terminals	170 acres
C 60-62	Container	SSA Marine - MatsonTerminal	58 acres + Satellite yards (Matson Auto Service) 11 acres
E24-26	Container	California United Terminals	108 acres
F6-10	Container	Long Beach Container Terminal, Inc.	102 acres
G226-230, J232-236	Container	International Transportation Service, Inc.	246 acres

Table 19
Port of Long Beach
Terminal Summary

Pier & Berth	Cargo Type	Terminal Operator	Terminal Area
J243-247, J266-270	Container	SSA Marine	256 acres
T132-140	Container	Total Terminals International, LLC	351 acres
B82-83	Automobiles	Toyota Logistics Services, Inc.	151 acres
D28-31, D34	Break bulk General; Steel, b.bulk gen. (D34)	California United Terminals	15.6 acres
D50-54	Newsprint	Catalyst Paper	6.9 acres
F204-205	General Break bulk, Steel	Cooper/T. Smith Stevedoring Co., Inc.	21.5 acres
F206-207	Steel, Project Cargo, Machinery, Automobiles	SSA Marine	22 acres
T118	Scrap Metal	Pacific Coast Recycling, LLC	18.9 acres
T122 (T115-116)	Lumber	Weyerhaeuser Co.	17.7 acres
T122	Lumber	Weyerhaeuser Co.	17.24 acres
B82	Bulk Gypsum	New NGC, Inc.	18.4 acres
D32-33	Bulk Cement	Cemex USA	1 acre
D46	Bulk Gypsum	G-P Gypsum Corp.	9 acres
F208	Bulk Cement	Mitsubishi Cement Corp.	4 acres

Table 19
Port of Long Beach
Terminal Summary

Pier & Berth	Cargo Type	Terminal Operator	Terminal Area
F210	Bulk Salt	Morton Salt	5 acres
F211	Petroleum Coke, Bulk Sulfur, Bulk Organic Compost	Koch Carbon, LLC	7 acres
G212-215	Petroleum Coke, Coal, Potash, Borax, Soda Ash, Concentrates, Prilled Sulfur	Metropolitan Stevedore Co.	23 acres
B76-80	Gasoline, Gasoline Blending Stocks, Diesel, Naptha Jet Fuel, Nonenes, Tetramers, Fuel Oils, Carbon Black, Crude Oil	BP Pipelines North America, Inc.	18 acres
B82-83	Gasoline, Gasoline Blending Stocks, Diesel, Toulene, MTBE, and Lube Oil	Petro Diamond Terminal Co.	6 acres
B84-87	Crude Oil, Petroleum Products, Bunker Fuel	Shell Oil Products U.S.	11 acres
D30-31	Tallow, Vegetable Oils	Baker Commodities, Inc.	1 acre
F209 & F211	Petroleum Products, Bunker Fuel	Chernoil Marine Terminal	5 acres
S 101	Miscellaneous Bulk Liquid Chemicals	Dow Chemicals U.S.A	10 acres

Table 19
Port of Long Beach
Terminal Summary

Pier & Berth	Cargo Type	Terminal Operator	Terminal Area
T121	Crude Oil, Petroleum Products	BP Pipelines North America, Inc.	4 acres

Source: Port of Long Beach, 2006 Facilities Guide.

Port of Hueneme - The Port of Hueneme is 60 miles north of Los Angeles in Ventura County. The Port of Hueneme handled over one million MRT of cargo in 2003. As shown in Table 20, the port's principal commodities include automobiles, bananas, wood pulp, fresh fruit, general cargo, offshore oil support, and fish.

Table 20
Port of Hueneme Cargo Volumes 2002 and 2003
(Metric Revenue Tons)

Cargo Type	2002	2003
Automobiles	235,102	219,170
Bananas	395,157	434,092
Wood Pulp	39,200	35,500
Fresh Fruit	116,929	144,506
General Cargo	98,050	159,354
Offshore Oil	79,763	88,689
Fish	23,660	14,177
Total	**987,861**	**1,095,488**

Source: Port of Hueneme, *Naval Base Ventura County: Strategic Commercial Development Plan*, December 1, 2003

Handling over 219,000 MRT of automobiles, the Port of Hueneme is one of the load centers for the import and export of automobiles. It currently imports well-known brands such as BMW, Mini Cooper, Rolls Royce, Jaguar, Land Rover, Mazda, Mitsubishi, Saab, Suzuki, and Volvo. In contrast, POLA handled 884,000 MRT of motor vehicles in FY 2004, and the POLB handled 438,000 MRT of motor vehicles in CY 2004.

The infrastructure at the Port of Hueneme includes two commercial wharves:

- **Wharf 1 -** Three berths totaling 1,800 linear feet with a depth of 35 feet are located at the south side of Channel "A" and adjacent to the inner end of the entrance channel. Wharf 1 serves general cargo, fresh fruit, and vegetables. In addition, vessel fueling and liquid bulk operations are performed at Wharf 1.
- **Wharf 2 -** Two berths totaling 1,450 linear feet with a depth of 35 feet are located at the north side of Channel "A." Wharf 2 serves heavy equipment shipments, automobiles, wood pulp, and general cargo. Support vessels used in local offshore oil industry also use both wharves for mooring and supply operations.

On Wharf 1, there are two on-dock refrigerated facilities that support palletized agricultural imports and exports. Del Monte, LauritzenCool, Sunkist, and the Noboa Group (the largest banana producer in Ecuador) all have facilities at the Port of Hueneme. In addition, Hydro-Agri operates a three-acre bulk liquid fertilizer terminal on the South Terminal of the Port of Hueneme. The port serves Aracruz Cellulose in importing wood pulp. The port also handles a wide variety of project cargoes.

The Oxnard Harbor District is also the grantee for U.S. Foreign Trade Zone (FTZ) #205, which handled over one billion dollars in cargo value in 2002. FTZ #205 is the first zone established along the California Central Coast. The FTZs are secure areas that are physically within the U.S., but are considered outside of U.S. Customs. The Board of Harbor Commissioners of the City of Los Angeles is the grantee for FTZ # 202. The Board of Harbor Commissioners of the Port of Long Beach is the grantee for FTZ # 50 Long Beach.

Overview of Containerized Trade

Container traffic is a critical issue for this study, because of its magnitude, rapid growth, and its impact on the study area.

In CY 2005, the San Pedro Bay ports handled 14.2 million TEUs of containerized cargo, accounting for 34 percent of U.S. containerized trade (43 percent of imports and 23 percent of exports), handling an average of about 39,000 TEUs a day. Combined they represent the largest port complex in the United States and the fifth largest in the world. Table 21 shows the top ports (in container throughput) in North America and the world in 2005. Total U.S. containerized trade in CY 2005 was 41.96 million TEUs.

Table 21
2005 Top Ports in North America and the World (millions of TEUs Annually)

Top North American Ports		Top World Ports	
Port	**TEUs**	**Port**	**TEUs**
1. **Los Angeles**	7.48	1. Singapore	23.19
2. **Long Beach**	6.71	2. Hong Kong	22.43
3. NY/NJ	4.79	3. Shanghai	18.08
4. Oakland	2.27	4. Shenzhen	16.20
5. Seattle	2.09	**Los Angeles/Long Beach Combined**	14.19
6. Tacoma	2.07	5. Busan	11.84
7. Charleston	1.99	6. Kaohsiung	9.47
8. Hampton Roads	1.98	7. Rotterdam	9.30
9. Savannah	1.90	8. **Los Angeles**	7.48
10. Vancouver	1.77	9. Hamburg	8.05
11. San Juan	1.73	10. Dubai	7.62
12. Houston	1.58	11. **Long Beach**	6.71
13. Montreal	1.26	12. Antwerp	6.49

Source: Containerization International and North American Port Container Traffic, American Association of Port Authorities, 2005

As shown in Table 22, containerized traffic through the POLA and POLB has grown dramatically over the last two decades, fueled in part by the phenomenal rise of China as a manufacturing and export center. Between 1985 and 2005, container throughput grew by a factor of 6.32, or at an average compound annual rate of 9.7 percent.

Table 22
Growth in Containerized Cargo at the San Pedro Bay Ports, CY 1985 - 2005
(1000s of TEUs Annually)

Year	Los Angeles	Long Beach	Total
1985	1,104	1,141	2,245
1986	1,330	1,394	2,724
1987	1,580	1,460	3,040
1988	1,652	1,540	3,192
1989	2,057	1,575	3,632
1990	2,116	1,598	3,714
1991	2,039	1,768	3,807
1992	2,289	1,829	4,118
1993	2,319	2,079	4,398
1994	2,519	2,574	5,093
1995	2,555	2,844	5,399
1996	2,683	3,067	5,750
1997	2,960	3,505	6,465
1998	3,378	4,098	7,476
1999	3,829	4,408	8,237
2000	4,879	4,601	9,480
2001	5,184	4,463	9,647
2002	6,106	4,524	10,630
2003	7,179	4,658	11,837
2004	7,321	5,779	13,100
2005	7,484	6,710	14,194

Source: US/Canada Container Traffic in TEUs; American Association of Port Authorities, 2005

There is a significant imbalance in the direction of containerized trade. As shown in Table 23, imports dominate exports by a significant margin. In CY 2005, loaded imports accounted for 75 percent of all loaded containers. In addition to the fact that exports are the lesser volume, a large share of the exported containers is empty. While only accounting for approximately a third of all TEUs, nearly two-thirds of container exports are empty.

Table 23
Loads and Empties by Direction, San Pedro Bay Ports, 2005
(1000s of TEUs Annually)

	Port of Los Angeles	Port of Long Beach	Total
Imports (Inbound)			
Loads	3,881	3,346	7,227
Empties	75	134	209
Total	3,956	3,480	7,436
% Empty	1.9%	3.8%	2.8%
Exports (Outbound)			
Loads	1,171	1,221	2,392
Empties	2,357	2,009	4,366
Total	3,528	3,230	6,758
% Empty	66.8%	62.2%	64.6%
Imports + Exports			
Loads	5,052	4,567	9,619
Empties	2,432	2,142	4,574
Total	7,484	6,710	14,194
% Empty	32.5%	31.9%	32.2%

Sources: Port of Los Angeles; Port of Long Beach

This section of the report summarizes how the modal system works as a whole and its role in integration across supply chains. It is intended to provide insight into the system's progress toward improving efficiencies and lowering costs through integration.

3.1 OVERVIEW OF THE SUPPLY CHAIN

In 2005 the nation's business logistics costs were $1,183 billion. This is an increase from 8.8% in 2004 to 9.5% of our nominal Gross Domestic Product in 2005. This is an increase of $156 billion over 2004. Domestic freight transportation grew 20% during the last decade.

A supply chain, logistics network, or supply network is a coordinated system of organizations, people, activities, information and resources involved in moving a product or service in a physical or virtual manner from supplier to customer. The entities of a supply chain typically consist of manufacturers, service providers, distributors, sales channels (e.g. retail, ecommerce) and consumers (end customers). Supply chain activities transform raw materials and components into a finished product that is delivered to the end customer. There are a variety of business models that address the upstream and downstream sides of making a product and delivering it to market.

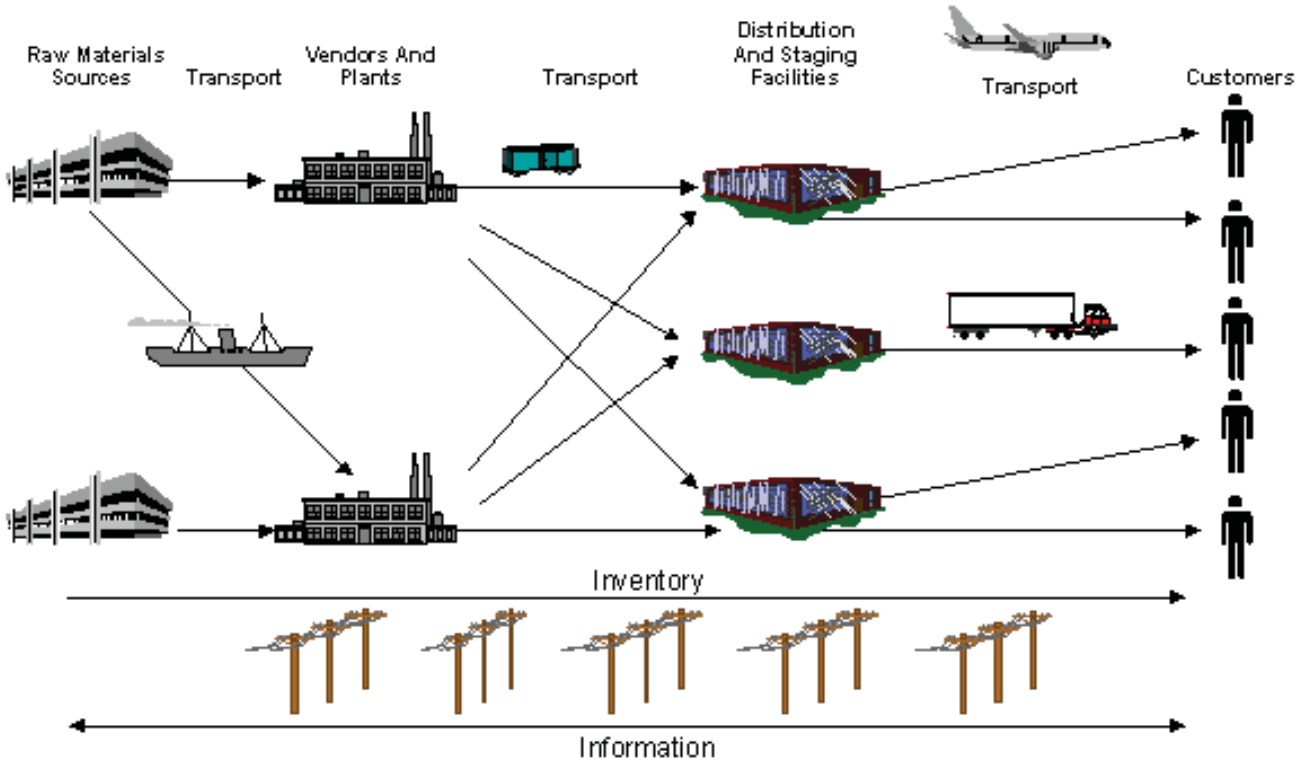
The primary objective of supply chain management is to fulfill customer demands through the most efficient use of resources, including distribution capacity, inventory and labor. Supply chains vary by industry and product. Generally, supply chains can be grouped into the following six (6) categories:

1. Extraction Industry: This would include forest products, grain and coal shipment. The needs of this set of supply chain users include low unit transportation costs and high-asset utilization.
2. Manufacturing Industry: This group of users would be characterized by companies who run continuous process manufacturing facilities. They typically have few sites and have highly specialized equipment. Chemical and plastic companies typify this supply chain category. The needs of this group of users include low unit cost transportation and a high degree of service reliability.
3. Make to Stock Industry: This user group typically has many sites, a complex set of inbound and outbound product flows and uses roughly equal parts of labor and machinery. Industry examples may include lumber and paper shippers, auto assembly plants and heavy machinery manufacturers. Supply chain requirements include consistent and reliable service.
4. Make to Order Industry: Supply chains for this industry group are typified by few sites with limited flows of inbound and outbound materials. This group is technologically advanced. Examples might include airplane manufactures or the defense industry. Supply chain needs include reliability of service and speed of delivery.
5. Distribution Industry: This group has many nodes, lots of transactions and product flows in various quantities. Many shipments are small and rely on the use of a number of vehicles. Examples in this category include small package carriers, specialty electronics and

after market parts distributors. Supply chain needs include predictability and reliability of service.

6. Retailing Industry: This includes all retail sales products. There are a large number of shipping destinations and product flows in various quantities both inbound and outbound. There are many sophisticated risk management strategies in place to assure a highly reliable supply chain. Products are often shipped and inventoried based on supply chain velocity. These supply chains tend to be the longest and most far reaching. Some retailers require vendors of fast moving or high cost products to stock product in end cap displays. This group drives transportation flexibility, agility and the ability to respond to forecast changes quickly. Examples include computer makers, discount retailers and grocery stores. Supply chain needs include velocity and flexibility of service.

An example of the supply chain is shown below:



Supply chain visibility is the top concern of most companies involved in global supply chain activities because of the long lead times required between the time an order is placed and the time it lands on U.S. soil. Forecasts are critical, yet the longer the forecast is out from the actual date of consumption the greater the variability. With the goal of end-to-end supply chain visibility in reality today nearly seventy five percent of firms lack enterprise automation for the entire process.

Companies typically track the following shipping events:

- Order acknowledgement matches purchase order
- Raw material arrival at supplier

- Projected production plans
- Supplier production process events
- Advanced shipment notice matches purchase order
- Carrier pick-up of goods
- Customs clearance
- In-transit status at the shipment level of detail
- In-transit status at the order level of detail
- Electronic proof of delivery

From the typical shipper's perspective, lowering transportation costs and improving reliability across the supply is a critical and constant focus. Significant investments in processes, technologies, and assets have made the supply chain as a whole increasingly productive and cost-efficient. Evidence of this lies in the fact that the cost of logistics as a share of Gross Domestic Product (GDP) have been cut in half over the past two decades, from 16.2 percent to 8.7 percent.[1] Logistics costs include inventory carrying costs, administrative costs, transportation costs, and information costs associated with customer service.

However, while both transportation and inventory costs have dropped as a share of GDP, inventory costs have dropped at a significantly higher rate. As a result, transportation costs as a share of total logistics costs have actually increased from around 45 percent to 63 percent over the past two decades.[2] Therefore, transportation costs are the largest "target" in terms of further lowering overall logistics costs.

The Aberdeen Group has benchmarked global supply chain trends for more than 20,000 enterprises. In their work they have found that large companies' international supply chains are only 50% as automated as their domestic supply chains. Eight-seven percent of the large enterprises and 64% of all respondents say their company's staffing for managing global supply chain and trade compliance process is inadequate. More than 82% of companies are concerned about supply chain resiliency to disruptions, but only 11% are actively managing this risk. Nine out of ten companies reported to the Aberdeen Group that their global supply chain technology was inadequate to provide corporate finance with the timely information it requires. Top areas of budget discrepancy include transportation expense, raw materials, supplier changes, taxes and tariffs, fees, inventory costs and network service cost.

3.2 INTEGRATION ACROSS THE SUPPLY CHAIN

The MCGMAP study area has the largest goods movement system in North America. However, each mode operates largely as an independent entity. As a result, the modes are not organized at a level that easily permits integration across the entire supply chain.

While the goods themselves move from mode to mode, the carriers and service providers typically do not have the ability to influence the reliability and quality of service of the entire supply chain. Carriers, as explained below, do not typically venture into total logistics services and, if they do, it

is generally to gain pricing control and competitive advantage rather than to make door-to-door supply chain improvements.[3]

The following is a discussion of how the carriers and modes work within the overall system, and their role in overall supply chain integration.

Ocean Carriers

Ocean carriers are a major influence on the system, since they carry ocean freight the longest distance and have the freight in their custody for the longest time period. Carriers have partnered with each other to provide more frequent departures and deliveries to popular markets. Ocean carriers provide multiple pricing offerings; some bundle ocean transportation with land side deliveries.

This is done in one of three ways:

- **Inland-point Intermodal Service -** The ocean carrier arranges transfer of marine container from vessel to rail and rail line haul movement, all under one rate.
- **Transportation to the Port Gate with a Container Mounted on a Chassis -** The customer separately arranges for a marine container to be transported from port gate to destination distribution center via long-haul truck or dray.
- **Transportation to Inland Warehouses -** Dray from port gate to warehouse may be arranged by line or by customer. The customer contracts with a Third Party Logistics (3PL) firm, sometimes a subsidiary of the ocean carrier or the Non-Vessel Owning Common Carriers (NVOCC), to provide deconsolidation and transloading into domestic trailers or containers.

These examples are not attempts at managing the supply chain as whole. Instead, they are measures implemented to maintain or gain market share. While some ocean carriers have in the past offered landside transport in an effort to differentiate themselves from their competitors, the synergies between shipping line and inland operations are not strong. Managing inland market areas, container balance and a chassis fleet is a large task for an offshore transportation company. Ocean carriers rarely make money on the land component, and are known to subsidize some inland segments in an effort to land accounts. Total door-to-door supply chain management and integration is not a top priority for ocean carriers. In fact, there is a desire to return to basic port-to-port offerings, and to aggressively price any activities that are not within the line's control.[4]

Railroads

The main market emphasis for the railroads in the study area is the intermodal business, including container traffic through the ports. The railroads wholesale their intermodal train capacity directly to the marine lines or rely on third party intermodal marketers for the domestic and transload business segments. The railroads are focused on managing their intermodal yards and the shipping lanes they operate. The drayage part of the business (pick-up and delivery of containers to and from the terminal) is typically arranged by the intermodal marketing companies. An intermodal

shipment consists of several trip segments (or legs). The line-haul is the long haul rail portion of the trip between the originating and terminating intermodal yards. On either end of the line-haul is the local dray to and from the actual shipper or receiver of the goods.

Trucking

The truck mode plays a significant role in moving goods door-to-door between shippers and receivers, as well as transferring goods from one mode to another (for example, between a port and an intermodal yard). It has the greatest ability to provide fully integrated door-to-door service, but only for shipments that stay within the mode (or carrier). However, this is rarely the case for line-haul segments on other modes such as rail intermodal. As trucking costs increase and as drivers are becoming increasingly hard to find, more motor carriers are using intermodal as a line haul substitute in long haul corridors. The railroads are encouraging the truckers to bring their trailers and assets to the intermodal industry. Trucking companies historically have had the most responsive and informed customer service associates. This combination of great customer service with lower cost long haul and line haul service is developing into a broad based partnership for many former competitors.

Air Cargo Industry

Air cargo is the only example where cargo movements are controlled as part of an integrated supply chain system. The major air cargo and express companies are referred to as integrated carriers for that reason. The service they provide is essentially integrated and controlled door-to-door. The leaders in this arena manage the whole process by owning the ground transport operations as well as the air lift capacity, exercising control through ownership (for example FedEx and UPS). Air cargo and express providers use current technology to exercise control□bar codes, hand-held scanners, global positioning systems (GPS), and mobile communications. Those integrated carriers that do not own ground or air lift capacity outsource the capacity to a specialist. Nonetheless, they still exercise door-to-door control by using information technology to integrate across the entire chain. The air cargo industry companies work with partners to ensure compatibility of information systems. Because of the type of service this industry provides (time-definite reliability at a premium price), it is a prerequisite to integrate across the entire chain. Their pricing structure can afford a more complicated system that cuts across the supply chain.

Shippers

Shippers tend to focus on their core competencies and outsource transportation elements of their operations. Sometimes this is done to gain access to lower cost transportation rates, through volume purchasing efforts of the 3PL. Sometimes this is done to purchase customs expertise and other trade-related documentation preparation. However, some top tier retail chains (such as Wal-Mart and Target) and major industries (such as aviation and automotive manufacturers) exercise more control over their specific supply chains. They tend to own private truck fleets, operate private warehouse distribution systems and exercise more influence over service levels and performance. However, this level of influence is isolated to a few top tier companies. For the most part, shippers buy the most affordable and reliable transport service and rely on the service

providers to ensure the delivery is made. On the receiving end, safe and on-time delivery matters more than how the shipment got delivered. While shippers and receivers use information technology to track the status of their goods, they have limited ability to exercise control over the supply chain (with the exception of the top tier firms).

Goods movement in the study area is becoming more internationalized as shippers globalize their supply chains by partnering with and/or taking ownership of overseas resources. This has not led to modal integration, however, because while customers (the shippers) are participating in globalization, modal operators in the study area are generally not doing so. Network isolation is a prime reason for this. Carriers tend to focus on their specific networks, which are generally geographically constrained. For example, U.S. rail carriers focus primarily on their domestic rail networks and services, and limit overseas efforts to marketing and sales. The same is true for motor carriers. In addition, network ownership becomes more complex as it crosses international boundaries. Carriers and service providers generally have not internationalized operations, and internationalization has not resulted in supply chain integration across the modes.

Third Party Logistics Providers

Another key component in the study area is the 3PL provider. Shippers that use 3PLs rely on them to make a large portion of the decisions around shipments such as mode choice, routing, transit times, pricing, staging, etc. However, 3PLs are largely non-asset based and therefore primarily control the information management and carrier monitoring aspects of the supply chain operations. Many shippers tend to rely on more than one 3PL service provider to manage different aspects of their supply chains. For example, one 3PL may manage purchased transportation while another may be a freight payment or warehousing expert.

Technology in the Supply Chain

The ability to monitor, manage, and deliver reliable service from shipper to receiver is at the heart of supply chain optimization. Given that the study area's modal system does not function as an integrated whole, the overwhelming method of control is through information sharing, management, and technology innovations. Technology and information are used to unite systems and to maintain synergy. Service control systems in the study area and elsewhere are built around computers, databases, enterprise resource planning (ERP) and supply chain management (SCM) software and tools, bar codes, hand-held scanners, GPS, and mobile communications. Shippers and receivers use data and technology to track shipments, and to monitor the flow, cost, and routing of shipments in conjunction with production schedules, inventory levels, replenishment strategies, and sales.

However, each shipper or receiver relies on current technology and data to serve their goals. These types of approaches tend to stay within the modes and the service providers. The level of data and information shared is specific to the respective user's goals and objectives. Devices and techniques that function across all the modes are relatively new and these systems are often proprietary.

Coordinated Logistics

As recently as three decades ago, the concept of "total logistics" management emerged as "a holistic approach" to designing physical supply and distribution programs. Shippers, it was reasoned, could improve the efficiency and effectiveness of their networks by making internal trade-offs between faster and more reliable transportation alternatives and lower inventory levels."[5] From the shippers' perspective, total logistics management is the ultimate approach for achieving the cost savings and efficiencies they strive for. Because of the limited modal integration that has occurred in the industry to date, shippers are getting "coordinated logistics" at best. With the rapid evolution of information technology over this period, the modes have achieved significant efficiencies, specifically by exploring cross-modal operations. For example, some of the truck load carriers in the motor carrier industry have developed service alliances with the rail intermodal carriers in order to substitute some truck load capacity with line-haul rail capacity. However, the purpose and goal is not to achieve across-the-board supply chain integration, but rather to gain pricing advantages and to gain better asset utilization. These carriers focus their own truck assets on the routes that give them the best returns, and use the rail intermodal line haul services on the lower-yielding, price-competitive long-haul lanes.

The benefit to shippers is that in addition to lower shipping costs, they receive a certain degree of coordinated logistics. By utilizing a cross-modal approach to improve its services for the shipper, the trucking carrier must coordinate with the line-haul rail intermodal carrier to ensure a quality level of service. For example, the motor carrier will need to arrange for a dray company to pick up and deliver the shipment at the other end of the line-haul.

3.3 MEASURING THE PERFORMANCE OF THE INTERMODAL SYSTEM

It has been said that you cannot manage what you cannot measure. The performance of the supply chain as a whole depends on the performance of each mode within the system. The supply chain is only as strong or reliable as the weakest link. The supply chain is adversely affected when throughput and productivity decline at the intermodal and port terminals or when speeds along the line-haul segments decline. Despite these realities, the performance of the supply chain as a whole is not monitored by the public infrastructure providers (federal, state, and local transportation agencies).

Performance Optimization within the Modes

While the study area's intermodal system is essentially not integrated, the operators with each mode typically have a set of performance measures that they monitor. The following are examples of existing performance rates or performance targets in various components of the supply chain.

Common Performance Measures at Marine Terminals:

- Terminal Productivity (average performance at POLA and POLB in CY 2005) – 4,700 TEUs per acre per year[6]
- Container Dwell Times[7] (limits imposed on shippers):
  - Imports – four days
  - Exports – six days
- Container Drayage Trip Time (average performance) – 4.6 hours[8]
  - Total Truck Turn Time[9] at Port – 2.6 hours[10] (2-3 hours)[11]
    - 48 percent of local dray trip is spent waiting to get in and out of the port[12]
    - AB 2650[13] (performance target) – 30 minutes[14]
    - In Terminal Time to Load/Unload – 35 minutes[15]
  - Drive time – 2 hours[16]

Common Performance Measures at Intermodal Rail Terminals:

- Container Dwell Times (performance targets):
  - Inbound – within 24 hours[17]
  - Outbound – within 24 hours[18]
  - Service Disruptions – two to three days[19]
- In Terminal Truck Turn Times (average performance) – 15-30 minutes[20]
- Total Truck Turn Time (average performance) – 30-40 minutes[21]
- Land Bridge Transit Times (average performance):[22]
  - Los Angeles/Long Beach to Chicago – five to seven days[23]
  - Los Angeles/Long Beach to New York – seven to nine days

Common Performance Measures at Distribution Centers and Warehouses:

- Inventory Dwell Times[24] (average performance):
  - Good – 12 plus turns per year
  - Average – seven to eight turns per year
- In Terminal Truck Turn Times[25](average performance):
  - Palletized/Stretched Wrapped – 45-60 minutes[26]
  - Loose Cartons/Floor Loaded (500 to <900 cartons): 1.5-2 hours
  - Loose Cartons/Floor Loaded (>1000 cartons): 3.5-4.5 hours
- Total Truck Turn Time – same as internal turns[27]

Lack of Industry Standards for Performance

The previously listed industry performance summaries are essentially the range within which they typically perform. These are not necessarily industry-wide standards. The absence of standards obviously presents a challenge for improving the modal system's performance. Moreover, without a base performance target, there is no effective means of estimating delay across the supply chain.

The Importance of Performance Measures

Performance measures are important for:

- Setting targets or goals for increased throughput, reliability and velocity.
- Communicating performance to their customers.
- Measuring impacts on the economy and the environment.
- Providing public and private investors in the system information needed to justify infrastructure or operational improvements.

For example, the POLA and POLB recently developed new capacity estimates for 2030 based on expected increases in acreage and productivity. To achieve the estimated capacity of 42.5 million TEUs in 2030, the port container terminals will have to increase their average productivity from 4,700 TEUs per acre per year to over 10,000 TEUs per acre per year. This can be accomplished by a combination of technology (optical character recognition readers at all gates and RFID tags on all trucks), 24-hour operations, reduced free time, grounded operations (stacked containers instead of wheeled operations), modified labor rules (allowing trains to move into terminals while trains on adjacent tracks are being loaded or unloaded), spreading out vessel sailings more evenly over the week, chassis pools, universal appointment systems, and other operating practices. It is not possible to precisely break down the contribution of each strategy to improved terminal productivity. Better planning, coordination, and communication among the shipping lines, terminal operators, trucking companies, and railroads will help. One promising example of better coordination is the proposed BNSF On-Dock Business Exchange, a web-based planning tool that provides a seven-day advanced notice to the railroads of the number of containers to be imported at each terminal and by destination. This would greatly improve the railroad's planning for rail equipment and reduce unnecessary delays to shipments.

System Performance Monitoring

While individual modal performance may be monitored, there are limited instances where technology and information is used as a tool to monitor the performance of the entire modal system. While shippers and receivers do not generally monitor the performance of the system as a whole, they do track the performance of their own specific supply chain. Therefore, they have good data about their specific shipments, including location, volume, type, and other information they need to make decisions about the allocation of their inventory and stock. Carriers typically track data on the operational aspects of the system; i.e., where the bottlenecks and delays are, what the average speeds are, the velocity of the system, and then allocate assets (trucks, chassis, container slots, etc.).

Systematic intermodal performance is important to intermodal marketing companies and 3PLs, and they tend to know the strengths and weaknesses of each carrier in the network. Customers evaluate these intermediaries on their transportation network savvy and ability to meet shipper specified performance standards. An example is the practice of taking full advantage of free storage time at a marine terminal that may benefit their customer (by saving storage costs and by providing flexibility in the supply chain). However, on a macro basis, this practice undermines the

terminal's capacity. Boxes and containers stored on terminal take up valuable space. In general, ports and terminal operators that need more capacity try to reduce average storage time (or dwell time). In fact, the Ports of Los Angeles and Long Beach recently reduced the free time for imports from five days to four days. Reducing this buffer puts additional pressure on freight forwarders, Customs brokers and transport carriers. In the past supply chains were managed to meet standard delivery times. With a reduction in buffer times between mode changes, carrier on-time performance becomes more critical. If scarce trucking resources are going to be dispatched against an expected vessel or carrier arrival and the load is not ready for pick up – for a customs hold, for example – the driver is set up for dry run, which creates extra truck trips in many cases.

Carriers use information and technology to manage assets, gain pricing advantage, and to improve operational efficiencies. Marine terminal operators use sophisticated terminal operating systems (TOS) to coordinate all facility operations, equipment assignments, vessel and train service, and gate functions, or position detection systems (PDS) that monitor and manage the location of containers. The marine terminal operator's core focus is on terminal performance and not the overall system's performance. For example, truck queue times at marine terminals are typically not factored into the turn time performance measures used by terminals. These measures focus only on the time trucks are in the yard and ignore queue times outside the gate. As shown by the performance data presented earlier in this section, approximately half of the time it takes for a truck to make a local delivery is spent at the port either waiting, loading, or unloading. Approximately one quarter of this wait time is monitored and reflected in the truck turn measure used by the terminals. The rest of the wait time is not monitored or managed. This is another example in which performance, while monitored and managed, is focused internally and not system-wide.

The local trucking industry is beginning to deploy GPS-based technologies to help improve trucker efficiencies and operations.[28] The carriers will be able to identify information about shipments and the location of trucks, and drivers can receive changed instructions in transit. These technology deployments are an effort to improve the efficiency and competitiveness of the trucking operators themselves – to provide a better product or service to their customers in order to sustain and/or grow market share – as opposed to improving the efficiency of the overall supply chain.

Because so much of the information needed for an overall system performance measurement is held by private companies, it is nearly impossible to create an integrated generic performance guideline. Instead, in today's highly competitive logistics industry, companies compete with their supply chains. In this environment each carrier makes the best effort to optimize and market its own performance in an effort to secure customers and gain competitive advantage. System-wide performance measures would likely help to identify opportunities for improving the system's performance, but given private industries' competitive structure, industry collaboration on transportation performance data is unlikely.

This section identifies the existing constraints, issues, and problems facing the movement of goods in the study area. The forecast assessment will be conducted in Task 4 - Assessment of Future Freight Demand, and any constraints, issues, and problems stemming from the forecasts of future conditions will be presented in the Task 4 technical memorandum. An evaluation of alternative strategies to address these concerns will be conducted in Tasks 6 and 7.

The section is organized around the following topics:

- Community concerns about air quality, congestion, and land use
- Port and airport capacity and throughput
- Highway congestion and delay
- Truck access and turnaround at facilities
- Mainline rail capacity
- Rail intermodal yard capacity
- Grade crossings (delay and safety)
- Highway safety and truck accidents
- Security
- Availability of funding
- Changes in regional shipping and transfer modes
- Migration of land uses and development
- System-wide goods movement data and information
- The disparate nature of the goods movement system.

This section includes a limited discussion of the impact of goods movement on the environment and the economy. These key impacts will be addressed in more detail as part of Task 5 - Evaluate the Community, Environmental, and Economic Impacts of Freight Movement Generators and Facilities.

4.1 COMMUNITY CONCERNS ABOUT AIR QUALITY, CONGESTION, AND LAND USE

A significant constraint on the existing goods movement system is community and political concern about air quality, congestion and land use. These concerns can slow the development and expansion of significant goods movement projects. It is well documented that goods movement is a major contributor to air quality degradation in the air basin, particularly with regard to diesel emissions, and has contributed to the region's inability to attain ambient air quality standards.

Over time, the focus on types of impacts associated with air pollution has changed. For much of the 20th century, concerns were generally about the visual impacts -- the Los Angeles area has a reputation as the smog capital of the nation. In recent years, as the visual nature of air pollution was reduced, public concern shifted to the health effects associated with various pollutants. While the environmental regulatory framework has always focused on the health-based standards, the

availability of new scientific knowledge on previously unregulated and largely unstudied emissions such as ultra-fine particles from diesel emissions has increased the focus on health effects. Research conducted by the Keck School of Medicine at USC indicates that the combination of gases and fine particles in transportation exhaust (especially diesel fuels) affects lung function and contributes to arterial thickening, birth defects, and low birth weights. Data also indicate that the closer one lives to pollution sources (e.g., the ports, intermodal yards, or major transportation arteries), the higher the risk. As examples, the increased incidences of cancer and of asthma in children are shown to be affected by proximity to pollution sources. The widespread dissemination of this information in the media has raised awareness of these issues and increased concern within affected neighborhoods.

The following examples of impacts demonstrate the implications of not addressing community concerns.

Port Development

The MCGMAP study area ports face their biggest constraint in community concern over the health impacts of continued port growth. The primary concern is diesel emissions, a known carcinogen, although noise and aesthetics are also problems for the communities. Community concern has grown as the movement of freight through the ports has grown, with increased operation of trucks, trains, and ocean vessels.

As a result, community and environmental groups have forced a significant slowdown in port development in recent years. The proposed Pier J expansion was halted after concerns were raised about the environmental document for that project. At the POLA, improvements to the China Shipping Terminal were significantly delayed because of a lawsuit brought against the POLA by the Natural Resources Defense Council (NRDC). This litigation resulted in a $50 million settlement, which included mitigations for emissions impacts.

The community concerns about pollution do not just impact future port development. The concerns are also about the ports' current operations. Community pressure is instrumental in the ports' effort to reduce emissions of current operations. The ports have responded to these environmental concerns. To address air quality problems, the POLA and POLB recently released a joint Clean Air Action Plan (CAAP) to expand upon existing emission reduction strategies, such as Alternative Maritime Power (AMP) and Vessel Speed Reduction (VSPR), and develop new emissions reductions strategies, such as increased use of alternative fuels. The plan focuses primarily on two main goals, (1) to reduce port-related air emissions in the interest of public health, and (2) to disconnect cargo growth with emissions increases.

At the Port of Hueneme, community and political opposition to the proposed expansion into the adjacent naval base has grown. With its "Strategic Commercial Development Plan," the port hopes to acquire 677 acres of Navy land (out of a total 1,600 acres) to accommodate growing demand, particularly for automobile imports and automobile processing. The port asserts this can be done without jeopardizing the Navy's mission and without impacting Navy-related civilian and military employment. Another recent conflict near the port has been a proposal for new housing along Hueneme Road, which is the principal truck route to the Port of Hueneme. The California Coastal

Commission approved the new housing project, but in the long term this development could make it harder for the port to realize its growth objectives.

Highway Capacity Expansion

A well-documented example of community concerns with a goods movement-related highway project is the planned expansion of I-710 (toward the ports). Communities rose up in opposition to the original plans for the expansion of I-710, primarily because of the anticipated displacement of residents' homes along the proposed alignment. In 2005, however, consensus was reached by all I-710 corridor cities, the Gateway Cities Council of Governments and Metro on a hybrid alternative that minimized right-of-way impacts. Still, concerns over the health impacts of diesel emissions threaten the viability of the I-710 improvements and all other goods movement projects. This is an important commuter corridor and an important connection between the San Pedro Bay ports and points inland. Its expansion has been identified as an important step toward accommodating present and future levels of passenger and truck traffic.

The I-710 is an example of how community concerns and local participation have required a more comprehensive approach to infrastructure development. Under the leadership of Metro, the Gateway Cities Council of Governments, and Caltrans, the I-710 Corridor Project is proceeding at a pace at which the community can analyze and influence the decisions made. There is general consensus that improvements are needed to the primary truck and commuter corridor from the ports to distribution yards and other east-west corridors. If the project does not proceed there will be further denigration of air quality and decreased safety as port-related truck traffic increases on an outmoded freeway.

In order to achieve the expansion of this corridor, as well as any other major goods movement corridors, including improvements in highway truck capacity east of Los Angeles, the community's environmental and health concerns must be addressed.

Warehouse Expansion

Another critical issue is the migration of warehousing and distribution to the eastern reaches of the study area (see 4.12 Migration of Land Uses and Development). The addition of warehousing and distribution facilities throughout the Inland Empire[1] and the increase in truck traffic east of downtown Los Angeles (on freeways and city streets) has triggered community concern about safety, noise, congestion, and intrusion of truck traffic near homes and schools. Communities and economic development agencies are all looking for new employers and growth opportunities which will lead to more jobs. Zoning and land use policies are determined by the city, or county depending on the local governance. Conflict arises when inland areas, hoping to attract and land "Big Box" retailers and distribution centers offer incentives and packages for new development. This development often is done with careful consideration for local access, curb, gutter and utility costs, but often without consideration for the multi-jurisdictional nature of the freight and highway networks that connect the new site with the global supply chain. Many areas of the country are experiencing these same conflicts, where the pursuit of new jobs often comes with many unanswered freight network infrastructure and capacity questions.

There is also a growing conflict between land available for warehouse development and other uses. Industrial and residential real estate developers are competing for the same land. Residential developers in many areas are driving up the price of land, making it costly to locate warehouse and distribution facilities. In areas where there is a rapid growth in warehouses, the increased demand for warehouse workers has pushed costs up and encouraged employee turnover, which is a serious problem for warehouse operations. Labor is an important consideration for new logistics facilities.

Air Cargo Expansion

Airport development is accompanied by a number of uncertainties, including strong community opposition, environmental concerns, and state regulations. For example, there are a number of specific issues related to the proposed modernization of LAX, including its effects on air quality, noise, and traffic.

The idea of locating cargo capacity at other airports has long been discussed and studied and has met with challenges, including:

Expansion at Palmdale Regional Airport - The 2004 SCAG RTP Regional Aviation Plan proposes a new master plan for PMD that could play a significant role in the ways airports and airlines do business today. Many of the proposed changes would require modifications in federal regulations regarding the ways airports can set fees and spend money.

Expansion at Ontario International Airport - ONT has limited international facilities and faces air-quality constraints, limiting it as an option if LAX makes passenger and cargo trade-offs or limits operations**.** To relieve pressures at LAX, the California Air Resources Board (CARB) would need to relax its air quality ceiling at ONT. Congestion stemming from the lack of ground facilities threatens domestic and international trade moving through the region and the quality of life for people who live there. Again, in order to expand air cargo capacity as well as passenger capacity, the community and environmental concerns must be addressed, regardless of the location of such expansions.

Rail Expansion

In addition to its impact on ports, highways, and airports, community concern also affects the expansion of rail capacity. The BNSF is working with the POLA to develop the Southern California International Gateway (SCIG), scheduled to open in 2009. BNSF estimates that the lift volume will be between 1.0 million and 1.5 million container units annually. The project is intended to move the international containers now handled at the Hobart facility to SCIG.

The project is in the early stages of development, currently focused on activities surrounding the completion of an Environmental Impact Report (EIR). There are unique environmental proposals for this project, such as BNSF's willingness to use "green" technology and a proposed reduction in truck vehicle miles. "Green" technology would include electric cranes, liquid petroleum gas (LPG) fueled hostling trucks and hybrid switch engines, while a reduction in truck vehicle miles would lower congestion and emissions. However, communities around the selected site, including the Cities of Los Angeles, Long Beach, and Carson, have raised concern about the increase of truck traffic on the local roadways and intrusion on the neighborhoods and schools.

If the project does not move forward, it will further exacerbate the shortage in intermodal lift capacity and will increase truck vehicle miles traveled, congestion, and emissions, especially since the existing Hobart facility is further from the ports. It will also diminish the likelihood of other similar projects such as the UP's plans to expand ICTF's capacity from 800,000 units to 1.65 million annually. UP is in the early stages of formulating an EIR document for this expansion. UP also plans to increase the capacity of the City of Industry intermodal facility from approximately 300,000 to 650,000 units annually. This facility will be used to support domestic intermodal operations.

4.2 PORT AND AIRPORT CAPACITY AND THROUGHPUT

In addition to community concerns about the environment, there are physical and operational elements that impact the existing capacity and throughput at the ports and airports.

Container Terminal Throughput Capacity

Terminal capacity is a function of several physical factors, including the number and length of berths, terminal acreage, and the availability of equipment (e.g., cranes). In addition, there are operational aspects such as container stacking and storage practices, container dwell time, hours of service, technology (e.g., information systems, optical character recognition systems, RFID), and labor productivity, all of which effectively increase throughput without necessarily requiring physical expansion.

The POLA and POLB recently developed new capacity estimates for 2030 based on expected increases in acreage and productivity. To achieve the estimated capacity of 42.5 million TEUs in 2030, the port container terminals will have to increase their average productivity from 4,700 TEUs per acre per year[2] to over 10,000 TEUs per acre per year[3]. This can be accomplished by a combination of technology (optical character recognition readers at all gates and RFID tags on all trucks), 24-hour operations, reduced free time, grounded operations (stacked containers instead of wheeled operations), modified labor rules (allowing trains to move into terminals while trains on adjacent tracks are being loaded or unloaded), spreading out vessel sailings more evenly over the week, chassis pools, universal appointment systems, and other operating practices. It is not possible to precisely break down the contribution of each strategy to improved terminal productivity. Better planning, coordination, and communication among the shipping lines, terminal operators, trucking companies, and railroads will help. One promising example of better coordination is the proposed BNSF On-Dock Business Exchange, a web-based planning tool that provides a seven-day advanced notice to the railroads of the number of containers to be imported at each terminal and by destination. This would greatly improve the railroad's planning for rail equipment and reduce unnecessary delays to shipments.

Competition for Port Terminal Capacity

Recently, containerized cargo has received the most attention in goods movement planning, but capacity for commodities like petroleum liquid bulk terminals is a growing concern at the SPB ports.

The ports accept crude oil imports for local refineries, and California has become a substantial net importer of refined fuels. California imports 10 percent of its gasoline and diesel fuel and 25 percent of its jet fuel. The concern is that demand is outstripping petroleum storage capacity, and the need to accommodate containerized cargo is crowding out the petroleum facilities.

Limited storage capacity leaves the region vulnerable to a supply squeeze, especially when a refinery goes off-line for repairs or because of a fire. According to the Western States Petroleum Association, "if we can't process imports and exports through our own ports because we don't allow product to move, the end result could be a significant reduction of energy available to California consumers."[4]

The tradeoffs between trade-related priorities and other priorities add to the overall complexity surrounding the expansion of the terminals, and illustrate the fact that decisions about goods movement cannot be made in a vacuum. The demand for terminal space at the ports is not limited to containers vs. petroleum liquid bulk, but to a diversity of land use requirements that the ports must address; e.g., dry bulk, breakbulk, automobiles, commercial fishing activities, institutional/educational, shipyards and light manufacturing, water-oriented commercial and office space, cruise ships, marinas, and other support infrastructure such as utilities and surface transportation, public open space, and visitor-serving recreational uses.

Importers are aggressively seeking to diversify gateways to include other West Coast ports and locations on the Gulf of Mexico and eastern U.S. coasts. Many states along the eastern seaboard are actively recruiting importers and manufacturers alike with enticements of low cost land, no inventory taxes, shovel ready certified sites, job training programs and other infrastructure incentives.

Limited Air Cargo Capacity at Existing Airports

The primary issue for the Los Angeles World Airport (LAWA) authority is finding space to process all of the cargo that moves through its facilities, specifically at LAX and ONT. Delays during peak periods continue to mount at LAX, mainly because of a shortage of ramp space, on-airport warehouse space, and peak-period lift capacity. A lack of warehouse and terminal capacity has often resulted in congestion and delays at existing cargo terminals, specifically the joint use facilities which are operated by a third party, as opposed to individual cargo terminals controlled by a single carrier. In addition, older cargo facilities that do not accommodate modern cargo handling operations often add to congestion and delay.

For these airports (LAX specifically) a core issue stems from land use priorities arising from both passenger and cargo service demand. Airports with highly prescribed demand for both passenger and cargo services often experience competition for space. Though freight cargo facilities at LAX are currently separated from passenger facilities, the potential competition for space does exist.

This type of competition for space affects all aspects of on-airport capacity planning, including runway space, taxiways, apron space (to park aircraft), cargo handling facilities and terminals, and competition for parking and roadways at the airports.

Cargo-Only Airports - Emerging trends point to the development of cargo airports, including the fact that increasing amounts of cargo are transported by cargo freighters. It is now physically possible to substantially separate cargo operations from passenger operations in order to relieve capacity-constrained passenger airports. The announcement by DHL to open an air cargo operation at the GlobalPort at March AFB, as well as the fact that three quarters of the air cargo volume at ONT belongs to UPS, indicates that cargo-only operations in the region have potential. A challenge is the shortage of land to accommodate the extensive warehousing, manufacturing, and intermodal facilities that are associated with state-of-the-art cargo-only airports.

The Reality of Market Forces - The issue of airport expansion, as it relates to air cargo, is also impacted by specific market forces. This is especially true in the context of locating or expanding cargo capacity at other airports in the study area, including cargo-only airports. As stated in Section 2, there are many factors that influence the location of air cargo operations (air freight terminals, runways for larger aircraft, freight forwarders, trucking companies, customs, and Department of Agriculture inspections). However, the core factor is availability and range of flight options and destinations, particularly to other major cities in the U.S. and worldwide, both passenger and freight. Relocation of air cargo capacity to another airport is only feasible for all-cargo carriers if freight forwarders supporting their operations relocate as well. Those freight forwarders who are reliant on passenger belly space may be reluctant to split operations when all options are currently available at a single airport (e.g., LAX). However, long-term trends suggest that as air cargo lift is increasingly accommodated by pure freighters in both the domestic and international market, the need for belly space will decrease in importance, particularly in heavily trafficked U.S.-to-Pacific Rim trade routes.

The successful addition of air cargo capacity in the study area hinges on several factors, one of which is the ability of the airports to work together in partnership.

4.3 HIGHWAY CONGESTION AND DELAY

The SCAG 2004 RTP reported that in the year 2000 total daily delay due to congestion in the study area was estimated at 2.2 million person-hours. Although person hours of delay is a metric used for assessing automobile congestion, it is not a good measure for freight in that it does not account for the hours that goods spend in delay. At most, this measure accounts for the cost of the persons accompanying the goods in the trucks sitting in delay. It is more common to account for the cost of goods in delay by measuring the inventory carrying cost. The impact of delay on the freight industry is significant, since it can increase the hourly cost of carrying goods by 50 to 250 percent, from a base value of $25 to $200 per hour, depending on the commodity.[5]

Table 24 shows a summary of total daily truck volumes by direction along freeways in the study area, as well as the percentage of daily truck volumes traveling during congested periods. The volumes shown represent the sum of all daily volumes from subsections along each freeway; therefore, these volumes represent the cumulative truck volumes along the entire freeway segment identified.

Congested periods are defined as those hours when the observed average speed on any particular freeway segment, as provided by the Freeway Performance Measurement System (PeMS), Version 6.3, drops below 55 mph. The PeMS is an archive transportation data management system. It

collects data in real-time, stores and processes this data, and provides a number of web pages that engineers can use to analyze the performance of the freeway system. This project is conducted by the Department of Electrical Engineering and Computer Sciences at the University of California, at Berkeley, with the cooperation of the California Department of Transportation, California Partners for Advanced Transit and Highways, and Berkeley Transportation Systems. Speeds below the 55 mph (general) speed limit for trucks are considered to be an indication of delay, based on the premise that trucks generally try to travel at or above speed limit.

Approximately 18 percent of all trucks, which equates to 240,000 trucks per day, traveling daily on the freeways within the MCGMAP study area are affected by delay. The impacts of delay on trucks are study area-wide. The Ports Transportation Study[6] revealed that 65 percent of container terminal truck trips have origins and destinations within twenty miles of the ports, and area bounded by SR-60 on the north, I-110 on the west, and the I-605 on the east. From the data shown in Table 24, the effect of delay on trucks clearly reaches beyond these boundaries.

Trucks are larger and accelerate more slowly than passenger cars, and thus have greater impacts on traffic flow than passenger cars. In terms of size, trucks may be equivalent to about two passenger cars, but on hilly or mountainous terrain and in congested traffic, their effect on traffic flow is much greater and may be equivalent to 15 or more passenger cars.[7] Larger and heavier trucks affect traffic basically in two ways: because of their size, weight, and operating characteristics, such trucks will increase delay on traffic flow and, in most cases, increase the number and severity of crashes.

While traffic congestion has broad implications across many aspects of the goods movement system (as well as on aspects unrelated to goods movement), the following are illustrations of how it impacts two goods movement sectors (air cargo and warehousing/distribution).

The California Statewide Goods Movement Action Plan[8] identified 12 prospective infrastructure projects within the Los Angeles/Inland Empire Corridor region that could improve the capacity and performance of the goods movement corridor. Many of these projects have received extensive review at the local or regional levels by Metropolitan Planning Organizations (MPOs) or Regional Transportation Planning Authorities (RTPAs) and are included in Regional Transportation Plans (RTPs).[9] These prospective projects were identified at the local level based on known deficiencies in operations, capacity, or performance at the following four (4) specific freeway and roadway locations:

- Alameda Corridor, SR-47, Shuyler Heim Bridge
- I-710 Corridor
- Gerald Desmond Bridge
- I-5, from SR-14 to Calgrove Blvd

Table 24
Total Daily Truck Volumes in Congestion on Study Area Freeways
Year 2004

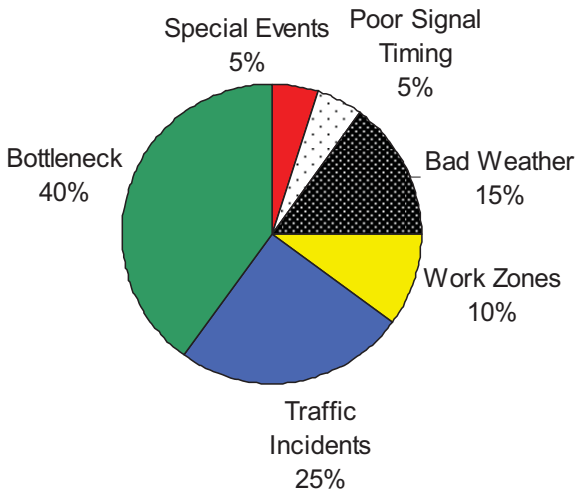
Freeway	Direction	From / To	Total Daily Truck Volume	Daily Truck Volume In Congestion	% Daily Truck Volume In Congestion
I-5	NB	Orange County Line to SR-14	101,575	20,552	20.2%
	SB	Orange County Line to SR-14	100,925	19,295	19.1%
I-10	EB	Terminus to I-15	49,165	5,442	11.1%
	WB	Terminus to I-15	55,566	5,467	9.8%
I-15	NB	Ontario Ave to I-215	34,110	5,921	17.4%
	SB	Ontario Ave to I-215	32,674	449	1.4%
I-105	EB	Terminus to I-405	33,989	7,471	22.0%
	WB	Terminus to I-405	34,524	6,598	19.1%
I-110	NB	SR-47 to Terminus	30,270	6,358	21.0%
	SB	I-405 to Terminus	32,352	5,520	17.1%
I-210	EB	SR-134 to I-15	37,518	2,793	7.4%
	WB	SR-134 to I-15	34,633	3,077	8.9%
I-215	NB	Columbia Ave to I-259	14,159	1,826	12.9%
	SB	Columbia Ave to I-259	13,604	0	0.0%
I-405	NB	I-5 to Terminus	75,979	13,659	18.0%
	SB	I-5 to Terminus	72,329	10,419	14.4%
I-605	NB	LA County Line to I-210	76,814	19,491	25.4%
	SB	LA County Line to I-210	76,814	20,032	26.1%
I-710	NB	I-405 to SR-60	57,799	9,510	16.5%
	SB	I-405 to SR-60	51,256	10,464	20.4%
SR-2	EB	I-5 to Terminus	2,869	0	0.0%
	WB	I-5 to Terminus	2,869	0	0.0%
SR-22	EB	Orange County Line to SR-55	1,490	82	5.5%
	WB	Orange County Line to SR-55	1,682	0	0.0%
SR-55	NB	SR-73 to Terminus	25,300	3,545	14.0%
	SB	SR-73 to Terminus	25,980	5,385	20.7%
SR-57	NB	I-5 / SR-22 to I-210	31,000	5,897	19.0%
	SB	I-5 / SR-22 to I-210	33,091	11,194	33.8%
SR-60	EB	Terminus to Terminus	47,448	7,343	15.5%
	WB	Terminus to Terminus	49,796	10,462	21.0%
SR-91	EB	Terminus to Terminus	71,365	11,480	16.1%
	WB	Terminus to Terminus	75,147	13,509	18.0%
US-101	NB	I-110 to I-405	17,000	3,268	19.2%
	SB	I-110 to I-405	16,429	5,928	36.1%
SR-134	EB	SR-170 to I-210	9,222	431	4.7%
	WB	SR-170 to I-210	9,598	1,016	10.6%
Total All MCGMAP Study Area Freeways			**1,436,342**	**253,888**	**17.7%**

Source: PeMs V. 6.3, Caltrans Traffic Volumes 2004

Highway Bottlenecks

Increased freight flows have had significant impacts on metropolitan areas. Traffic at major freight generators (ports, airports, rail yards, warehouse/distribution nodes) has greatly increased, adding to congestion and impacting surrounding neighborhoods. As shown in Figure 26, about 40 percent of the congestion is estimated to be caused by bottlenecks, recurring congestion at locations where the volume of traffic routinely exceeds the capacity of the roadway, resulting in stop-and-go traffic flow and long backups. The balance, about 60 percent of delay, is estimated to be caused by non-recurring congestion such as construction work zones, crashes, breakdowns, extreme weather conditions, and suboptimal traffic controls.

Figure 26
Typical Sources of Congestion



Source: "Traffic Congestion and Reliability: Linking Solutions to Problems," prepared by Cambridge Systematics, Inc. for the Federal Highway Administration, Office of Operations, Washington, D.C., July 2004

There are four major types of bottlenecks: interchange, steep-grade, signalized-intersection, and lane-drop bottlenecks. Interchange bottlenecks account for the most truck hours of delay, estimated at about 124 million hours annually in 2004.[10] The Transportation Research Board (TRB) and the Federal Highway Administration (FHWA) estimate a delay cost of $32.15 per hour, and most of these costs are passed along to shippers and consumers.

The FHWA estimates that increases in travel time cost shippers and carriers an additional $25 to $200 per hour, depending on the product carried. Table 25 lists the top 6 interchange bottlenecks in the study area, ranked by annual hours of delay for all size of trucks. The impact of the highway truck bottlenecks is measured by total truck hours of delay and the tonnage and value of the commodities in the trucks. Each location on the table was identified using information from the

Highway Performance Monitoring System (HPMS) database and state department of transportation maps. Note that annual hours of delay for all trucks is the number of hours of delay accruing annually to all trucks delayed by congestion at the bottleneck. (e.g., Daily Minutes of Delay per Vehicle multiplied by 2004 AADTT for All Trucks). Because the underlying HPMS data do not detail traffic counts by time of day, the actual number of trucks exposed to peak-period congestion is unknown, and therefore the reported truck hours of delay shown here provide good index to the relative impacts of the bottlenecks, but are not reliable absolute numbers. Annual Average Daily Truck Traffic (AADT), or the number of trucks of all sizes traveling the critically congested roadway each day, was provided from the FHWA Freight Analysis Framework database, based on HPMS data and state department of transportation vehicle counts, extrapolated to 2004.

Table 25
Top 6 Bottleneck Locations in the MCGMAP Study Area Year 2004

Bottleneck			All Vehicles		All Trucks			Daily Minutes of Delay All Trucks
Location	Route No.	No. of Lanes	AADT	Daily Minutes of Delay per Vehicle	AADT	Percent of ALL Vehicles	Annual Hours of Delay All Trucks	
San Bernardino Fwy	10	8	268,700	7.2	34,900	13%	1,552,800	71
SR-134 @ SR 2	134	8	247,900	8.3	29,600	12%	1,489,400	68
Long Beach Fwy	710	8	246,100	8.3	27,500	11%	1,380,300	63
SR-60 @I-605 Interchange	60	8	233,000	8.3	26,100	11%	1,314,200	60
I-405 @ I-605 Interchange	405	10	331,700	9.8	20,900	6%	1,245,500	57
San Gabriel River Freeway	91	10	295,700	8.1	24,100	8%	1,194,300	55

Source: "An Initial Assessment of Freight Bottlenecks on Highways," Federal Highway Administration, October 2005

I-10, with the highest truck hours in delay, carries 488,700 freight tonnages. The annual cost associated with interchange bottlenecks is more than $4 million on I-10. Other freeways in the study area such as SR-134, I-710, SR-60, I-405, and SR-91 carry between 381,100 to 477,500 annual tons of goods. The high cost of congestion means increased supply costs for manufacturers, higher import prices, a higher cost of living for consumers, and a less productive and competitive economy.

Impact of Highway Congestion on Air Cargo Industry

As noted above, 18 percent of all truck volumes on the freeways within the study area travel during congested periods. This has an impact on the goods movement sector as a whole. Highway congestion results in delay for trucks and vans carrying air cargo to and from airports. Air cargo is a time-sensitive business, and air cargo schedules cannot tolerate delay. The implications of delay include the following:

Increase in Shuttle Services - Cargo carriers substitute ground delivery vehicles with small commuter planes to shuttle cargo into airport handling centers from outlying areas (typically served by truck), bypassing ground congestion. This increases the cost of air cargo service and also increases congestion at air cargo facilities on the airport, including runways and taxiways.

Delay in Line-Haul Departures - Delay of on-ground deliveries to airport cargo handling facilities may delay the line-haul flight departures that connect to the central airport hubs, risking on-time arrival for the sorting that occurs at the central hub. Air cargo service providers have a very small window during which they are able to handle the sorting and matching of loads at the central hubs before flights have to depart for early morning arrival. The implication to the air cargo provider is a reduction in service quality (on-time delivery). Customers expect packages to arrive on time.

Impact on Warehousing, Distribution, and Logistics Industry

Increased traffic congestion presents a broad range of impacts to the warehousing and distribution business, including increased costs, reliability of service, and erosion in market reach. As pointed out earlier in this Tech Memo, warehouse and distribution centers are generally defined by the type of market area they serve, specifically local (within 75 miles), Pacific Southwest (250 miles), and regional (450 miles). Increased delay due to traffic congestion limits the effective market reach. The implication is that service providers find it more difficult to provide reliable service to the outer reaches of the specific market service areas, forcing them to either abandon services to customers that are on the fringe, to reposition assets, or add new assets (build satellite terminals). The resulting implications are additional cost and eroded service levels. Increased traffic congestion also has similar implications for the growing transload business sector.

Highway Maintenance

Another issue affecting the goods movement system is highway maintenance and operation. The larger and older the system becomes, the more expensive it is to maintain and operate.

Road damage caused by heavy trucks is a key issue. According to the American Association of State Highway and Transportation Officials (AASHTO), the maintenance cost impact related to axle weight increases at a gradual rate up to 10,000 pounds and rapidly increases above 16,000 pounds. It also concluded that pavement damage increases exponentially as axle weight increases, and that the passage of an 80,000 pound, five-axle tractor-trailer has about the same impact on highway deterioration as that of 9,600 automobiles.

The average urban motorist in the U.S. pays $400 annually in additional vehicle operating costs as a result of driving on roads in need of repair. Poor road maintenance contributes to accelerated vehicle deterioration, increased frequency of needed maintenance, and increased fuel consumption.[11] However, trucks and cars each pay about 80 percent to 90 percent of their total road costs.[12]

In addition, the study area has a disproportionately higher share of trucks carrying goods to and from outside of the study area, further adding to the controversy.

4.4 TRUCK ACCESS AND TURNAROUND AT FACILITIES

The performance measures outlined in Section 3 of this Tech Memo summarized truck turn times and wait times at ports, intermodal yards, and warehouses. Trucks at the ports spend a significant time queuing and waiting for their appointments, accounting for up to half of the total round trip time. While delay also occurs on the highway system, the most significant part of delay is currently associated with wait times at the ports. The cost of this delay is transferred to industry (carriers and shippers/receivers) and ultimately to the consumer.

4.5 MAINLINE RAIL CAPACITY

Primarily as a result of growth in the intermodal container market, mostly due to growth in Asian imports, mainlines east of Los Angeles are reaching their capacity. The average train trip is delayed by over 30 minutes between Los Angeles and Colton.[13] The two main railroads operating in the study area frequently point to several capacity issues:

- Both the UP and the BNSF report capacity constraints in the Cajon Pass. BNSF is constructing a third main track between San Bernardino and the pass summit at a cost of more than $100 million. This project will be completed in 2008.
- The BNSF has stated that its Transcon line will be at capacity between Commerce and Fullerton by 2010 if a third track is not constructed.
- BNSF views the next project requiring funding to be the Colton Crossing grade separation of the Transcon and the UP El Paso Line.
- BNSF believes that its next priority is a third track between Riverside and Porphyry (Corona).
- BNSF estimates that the number of trains operating between West Riverside and Colton (a Transcon segment shared with the UP) will increase by 37 percent by 2010. This is based on assumptions about port-related intermodal growth.
- UP intends to install double track on the entire Sunset Corridor from Colton Crossing to El Paso in the next few years to resolve capacity constraints on this line.[14]

Inadequate mainline capacity results in reduced system velocity, which in turn results in increased backlog at intermodal yards and classification yards. Service disruptions can have a dramatic effect on system performance. For example, Hurricane Katrina reduced velocity on the UP system, resulting in increased dwell times for the intermodal containers at the ICTF from a typical 24 hours to a high of 4 days. These backups cause delay in the delivery of time-sensitive shipments as well as a domino effect reaching other staging areas such as the ports.

Capacity constraints on the mainlines are the result of growth in passenger rail traffic as well as freight rail traffic. For example, the UP is considering plans to reroute Metrolink's Riverside-Los

Angeles commuter train service to the Alhambra Line west of Pomona.[15] This operational change would reroute commuter trains off the Los Angeles Subdivision between Pomona and downtown Los Angeles. The UP also plans to build additional capacity on the Alhambra Line east of Pomona to facilitate a crossover of UP freight trains from the Los Angeles Subdivision to the Alhambra Line.

These plans could eliminate numerous UP freight train movements operating between West Riverside and Colton on the Transcon. In addition, the commuter train route would be largely free of freight trains, making the schedule of both passenger trains and freights trains more predictable. However, these capital projects are not currently budgeted by public agencies or UP. In addition, the existing Southern California Regional Rail Authority (SCRRA) agreements will require renegotiation for the reroute of commuter trains as described above.

BNSF and UP have stated that Metrolink service improvements increasingly consume their freight rail line capacity. Accordingly, both BNSF and UP are seeking public money to fund most of the projects that are inside the Metrolink commuter train operating limits.

4.6 INTERMODAL RAIL CAPACITY CONSTRAINTS

Given the increase in intermodal freight transportation in the study area, most intermodal facilities are experiencing capacity constraints. In addition, there is significant support for moving intermodal capacity closer to and onto the ports, thereby reducing the amount of local truck traffic. However, there are potential obstacles to realizing the full benefits. Examples of these constraints, specifically on-dock, near-dock, and off-dock intermodal facilities, are discussed below.

Since deregulation the railroads have been merging and consolidating routes. Many lines segments which did not have sufficient rail traffic density to justify maintenance and repair work were sold to short line operators. With increasing energy costs and difficult structural changes facing the trucking industry (increased fuel, insurance, equipment and driver recruiting expenses) rail has enjoyed resurgence. This recent growth has by and large absorbed any excess capacity the carriers may have had previously. Today rail rates are increasing in response to demand for more rail capacity. Several trends associated with this rail renaissance are important to note.

Velocity is a key to increasing throughput. This focus on velocity improvement is across all train types and facilities. It is important to increase both terminal velocity as well as linehaul velocity.

This increased demand has also resulted in a reassessment of business segments and current markets. Carriers are focusing on freight which will fill their networks with long-haul end to end density. International traffic is ideal for most carriers, moving from ports to inland markets. Short haul or intermediate markets are being "harvested" from network service as demand and growth in the end-to-end market pairs increases. This means that markets between Southern California and long-haul eastern gateway cities such as Chicago, St. Louis, Kansas City, Memphis and New Orleans are preferred markets. Intermodal terminals intermediate to these locations may not be sustainable if traffic volumes, balance and density do not support trainload volumes.

Railroad business segments (intermodal, coal, carload, automotive, etc.) have different levels of service and profitability. Intermodal and unit train businesses such as coal and grain, where users bring their own equipment to the carrier, are more desirable than single car boxcar services. Many single car shippers are facing steep rate increases if they can't increase the number of shipments or reduce the switching costs to serve them. In some cases this is pushing shippers to rethink rail service all together. In some rural and secondary markets intermodal terminals are being closed and carload service is being reconfigured. Some users in these markets are actively converting portions of traditional carload business to intermodal and some is moving to over-the-road services. The recent trend with Class 1 rail carriers favors intermodal and unit train traffic over carload and mixed user trains.

Throughput is a function of operational practices as well as the type of business at that facility. For example, the City of Industry facility on the UP and the San Bernardino facility on the BNSF focus on domestic intermodal shipments, whereas the East Los Angeles facility (UP) and the Hobart facility (BNSF) handle a mix of domestic and international intermodal traffic.

Based on acreage and volume data for the various intermodal terminals in the study area, the annual per acre throughput estimates are as follows:

- BNSF's San Bernardino facility - 285 acres with a maximum potential throughput of 750,000 lifts per year - 2,600 lifts per acre
- UP's Los Angeles Transportation Center (LATC) - 130[16] acres with 250,000 lifts annually - 2,100 lifts per acre
- UP's East Los Angeles (ELA) - 150[17] acres with 450,000 lifts annually (high) - 3,200 lifts per year (capacity is 550,000 lifts per year - 3,900 lifts per acre)
- UP's Intermodal Container Transfer Facility (ICTF) - 237 acres with 650,000 lifts in 2005 - 2,700 lifts per acre (capacity is 850,000 lifts annually – 3,500 lifts per acre)
- BNSF's Hobart Yard - 245 acres with 1,350,000 lifts in 2005 – 5,500 lifts per acre

The reason for the greater throughput results for Hobart Yard is that the BNSF employs a more expensive but more productive work process there. This includes the vertical stacking of containers by destination and chassis storage on racks. The UP at ICTF has the luxury of a "wheeled operation," where every container is on a chassis. The latter is a lower-cost option, but limiting in container throughput relative to acreage under management. BNSF has allocated containers (per ocean carrier), imposed large detention charges (if over one day), and imposed other restrictions on access to Hobart to increase throughput.

In addition to the varying practices that impact throughput and capacity, there are specific issues related to on-dock facilities that warrant further discussion.

On-Dock Rail Facilities

The benefit of on-dock rail is the reduction of truck traffic on the local roadway system. However, while on-dock facilities are seen as an important solution to congestion in the region, they present significant challenges from a capacity standpoint. Terminals are being configured to optimize

container and rail yard space. On-dock rail yards cannot simply be built to accommodate all direct intermodal cargo for two primary reasons: 1) terminal area constraints that impact container yard area and track layout, and 2) there will always be the need to dray containers to off-dock rail yards due to railroad and shipper logistics (for example, when there is not enough destination-specific volume from one terminal to warrant building an entire unit train on-dock). Also, it is important to note that major expansion projects are needed to construct new or to improve existing on-dock rail yards. Thus, there are some existing constraints to maximizing on-dock rail movements.

Another significant operation constraint for on-dock facility throughput is a restriction on train movements in and out of the facilities while trains on adjacent tracks are being loaded and unloaded. This restriction was implemented to address safety concerns for marine terminal workers who load and unload the trains at on-dock facilities. In comparison, railroad-owned and -operated near-dock and off-dock facilities do not have this constraint, and as a result see higher productivity. Railroads feel their safety procedures allow them to both load and unload trains and arrive and depart trains at the same time in the same facility.

Another constraint is available dock space. Finished vehicles take up large quantities of dock space. Ports are facing increasing demand for high throughput container traffic. Both domestic and import auto companies are faced with increasing costs if they stay at their current facilities, some are looking at new locations when their current leases expire. Some of these locations are in nearby facilities such as San Diego and Hueneme; other locations in other gateway cities are expanding.

As a result, while on-dock rail presents significant environmental and congestion relief benefits, this type of operation presents significant operational constraints that impact railroad productivity.

4.7 GRADE-CROSSINGS

The increase in rail freight traffic in the study area has significant implications relating to safety, environmental issues, community impact, financial concerns, and traffic congestion. Issues include:

- Highway traffic delays and congestion
- Rail, vehicular, and pedestrian traffic conflicts
- Economic and environmental implications
- Railroad operations and derailments
- Rail-highway crossing conflicts

One of the more notable goods movement projects in the study area was developed specifically to address many of these issues. The Alameda Corridor consolidates harbor-related rail traffic from four separate branch lines into a 20-mile, fully grade-separated route. The corridor connects the POLA and POLB to the transcontinental rail line near downtown Los Angeles, eliminating traffic conflicts at 200 at-grade crossings, reducing accidents and improving the safety of the traveling public, and reducing emissions and congestion.

Based on the results of the Alameda Corridor, the Alameda Corridor-East Construction Authority, the OnTrac Joint Powers Authority, Riverside County, and San Bernardino County have identified grade crossings that need to be improved or grade-separated. The federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) earmarks $167.64 million to the Alameda Corridor-East, which would be split among Los Angeles, Orange, Riverside, and San Bernardino counties. An additional $42.88 million has been earmarked for individual grade separations east of downtown Los Angeles.

These projects are under-funded; the earmarks will not deliver the expected funding levels, leaving local communities and agencies struggling to meet the capital investment needs. With the expectation that rail freight traffic will increase, communities along the main lines will continue to face environmental, safety, and congestion impacts as long as the necessary funding levels are not met. Over the long-term, the implication is the continued deterioration of the public's perception of goods movement and its willingness to support further growth.

Simulation studies show the significant impact of vehicle delay at highway-railroad grade crossings along the mainline infrastructure from downtown Los Angeles east and north to Barstow and Indio. The simulated value of total vehicle hours of delay in year 2000 was calculated to be 2,622 hours per peak day.[18] Extrapolating this to an annual value, assuming 300 peak days per year, potentially yields nearly 790,000 vehicle hours delay at these crossings. As the railroads within the MCGMAP region move towards longer trains (8,000 ft.), the extent of grade crossing delays could increase.

Environmental issues at crossings relate to the emissions caused by vehicle delays. A 2005 study by Leachman and Associates established baseline emission conditions from simulation models, including traffic delay emissions at grade crossings.[19] These results are shown in Table 26 below.

Table 26
Mainline Rail Emissions (tons per year) for Year 2000

Contributor	ROG	CO	NOx	PM10	SOx
Rail Emissions	498.43	721.29	15424.10	347.56	958.36
Traffic Delay Emissions	9.65	100.46	13.85	0.54	0.09
Cumulative Emissions	508.08	821.74	15437.95	348.10	958.45

Rail derailments occasionally occur, and they vary in size and impact. When a derailment occurs, the FRA and the railroads investigate it and take corrective action. Projects such as the Alameda Corridor can reduce the impacts of derailments on local communities by separating the rail from adjacent residences.

4.8 HIGHWAY SAFETY AND TRUCK ACCIDENTS

Trucks have a significant impact on the safety of the traveling public. Accidents involving trucks have a higher degree of severity due to the relative size differential between trucks and cars. Of all crashes involving large trucks and passenger vehicles, 84 percent of the fatalities are passengers in vehicles other than the large truck. [20] The great differential in size and mass generally places the occupants of the passenger vehicle at a great disadvantage in such collisions.[21]

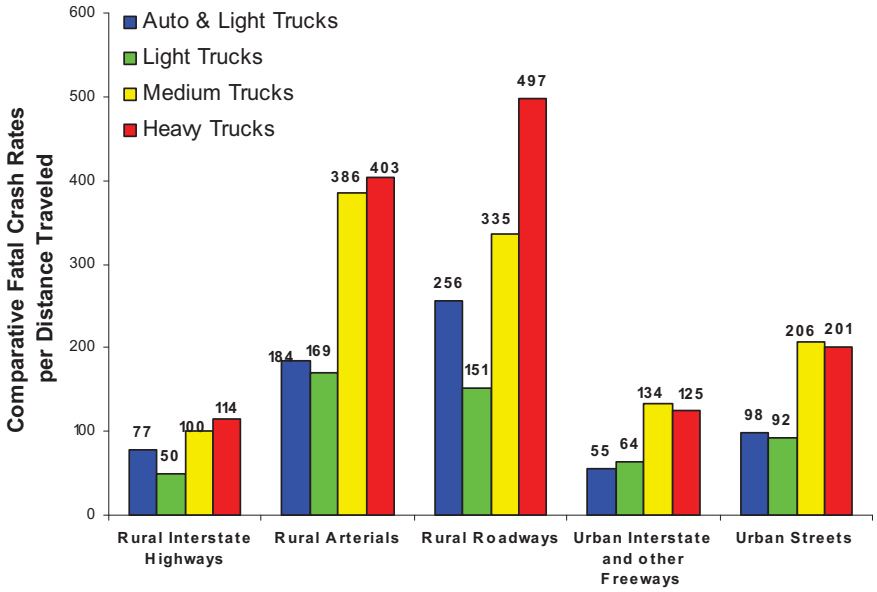
The difference in the size of the vehicles also increases the perception of being more vulnerable. "Large trucks can intimidate motorists traveling in passenger vehicles. It is not unusual for relatively small passenger vehicles to be boxed in by trucks in front, behind, and alongside them. If all vehicles in the general-traffic lanes were roughly the same size, there would be less stress on those motorists who are nervous about sharing the road with large trucks."[22]

Safety on roadways, as it relates to truck traffic, is a factor of the truck volumes and total congestion on the roadway system. The propensity for truck-involved accidents is found to be a decreasing function of the number of lanes and the average annual daily traffic (AADT) per lane, and an increasing function of truck percentages of AADT, all factored by the effects of time of day, day of week, and weather conditions.[23]

From 2000 to 2003, fatalities increased by 17 percent, while injuries remained relatively flat for the study area as a whole. Moreover, the data for truck accidents in the study area correlates with overall truck travel volumes in the study area, by county. In 2003, the highest number of fatalities and injuries involving truck accidents occurred in Los Angeles, Riverside, and San Bernardino counties, which account for the majority of truck travel volumes in the study area.

Fatal crash rates for single-unit trucks and heavy trucks are separated by roadway functional class, as shown in Figure 27. Several patterns are evident. First, the involvement rate on rural Interstate highways is 300 percent to 400 percent lower than it is on rural roadway types and is generally the same for all vehicle types.[24] Of particular note is that off Interstate highways, the involvement rates for medium and heavy trucks are markedly higher than for cars and single unit trucks. When compared on the same rural roadway types (where these vehicles accumulate the majority of their travel and, therefore, exposure to crash risk), medium and heavy trucks consistently exhibit higher rates than single-trailer combinations.

Figure 27
Fatal Crash Rates on Different Highway Classes



Source: Comprehensive Truck Size and Weight (CTS&W) Study, Volume 3 U.S. Department of Transportation, August 2000

Table 27 displays a summary of truck accidents within the counties of the MCGMAP study area.

Table 27
Truck Accident Summary by County
Year 2000 and Year 2003

	2000		2003	
County	Fatalities	Injuries	Fatalities	Injuries
Los Angeles	66	3,526	73	3,411
Orange	9	825	14	629
Riverside	28	674	37	833
San Bernardino	38	1,008	37	1,165
Ventura	4	201	9	207
TOTAL	145	6,234	170	6,245

Source: California Highway Patrol 2004

Table 28 presents critical accident locations in Los Angeles County for 2003. This table indicates how the severity of the accident rate on I-710 compares to other freeways in the Los Angeles County. Accidents on I-710 are largely due to design deficiencies, high traffic volumes, and the current vehicle mix of autos and heavy-duty trucks.[25] These accidents cause property damage, injuries, and fatalities as well as vehicle delays. SR-91, SR-60, and I-605 are also considering critical accident locations in the MCGMAP area.

Table 28
Truck Involved Accidents by Freeway in Los Angeles County
Year 2004

Freeway	Truck Involved Accident	% of Total	Length (mi)	Truck Accidents /mi
I-5	885	20.91%	162.9	5.43
I-10	450	10.63%	111.6	4.03
I-710	432	10.21%	46	9.38
I-405	385	9.10%	97.4	3.95
SR-60	369	8.72%	61.3	6.02
I-605	316	7.47%	54	5.85
U.S.101	291	6.88%	113.1	2.57
I-210	242	5.72%	95.3	2.54
I-110	193	4.56%	45.6	4.23
SR-91	175	4.14%	29.4	5.95
SR-57	74	1.75%	17.8	4.15
I-105	67	1.58%	35.6	1.88
SR-14	53	1.25%	107.4	0.49
SR-1	52	1.23%	46.7	1.11
SR-134	50	1.18%	26.8	1.86
SR-138	36	0.85%	35.1	1.03
SR-118	35	0.83%	30.1	1.16
SR-2	17	0.40%	18.6	0.91
SR-71	16	0.38%	3.6	4.5
SR-72	13	0.31%	13.3	0.97
SR-19	11	0.26%	25	0.44

Source: Truck Count Study, SCAG, December 2004

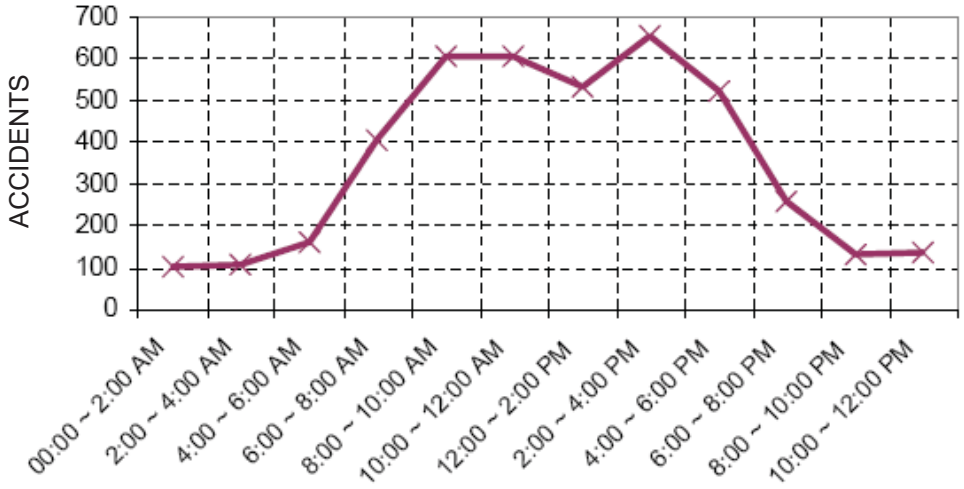
A summary of critical accident locations on the state highway system throughout the MCGMAP region is provided below:

- **I-5** Corridor from north of Rye Canyon Road to Honor Rancho Drive north of SR-126 experiences a high rate of accidents.
- **I-710** experiences about five accidents each day between Ocean Boulevard and SR-60[26]. The two worst locations are at the I-405 interchange and just south of the I-5 interchange.
- **SR-60** in Los Angeles County experiences high truck accidents between I-710 and Route 57.
- **SR-91** corridor has three major accident Locations: SR-55/SR-241, SR-241/SR-71 and SR-71/SR-15
- The greatest overall number of collisions within the **I-15** study area occurs through the Cajon Pass between SR-138 and US-395.

Figure 28 displays the distribution of truck-involved accidents by hour during weekdays. There are two observations to be made from the graph. First is that accidents involving trucks generally follow the time-of-day distribution for truck travel in general (as shown in the Roadways portion of Section

2.0 of this report). Second is that the number of accidents spikes during the peak morning and evening commuter travel periods. This indicates that accidents involving trucks increase when truck travel increases as well as when commuter traffic increases.

Figure 28
2003 Truck-Involved Accidents by Hour on a Weekday
(Number of Accidents Involving Trucks – Left Axis)

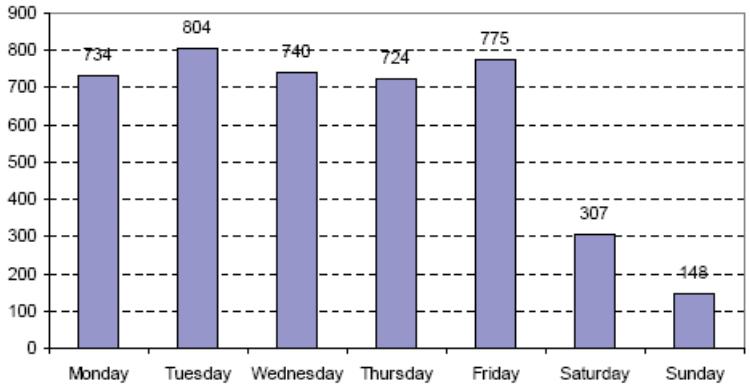


Source: 2003 Statewide Integrated Traffic Records System data, California Highway Patrol's Information Management Division

A 2005 study by Golob and Regan reveals that accidents involving trucks are an increasing function of truck percentages of total AADT.[27] This finding does not correlate with data for the study area. Accidents involving trucks actually decline when truck percentages increase (during the midday hours). This indicates that a stronger contributing factor is the increase in commuter traffic (commuter traffic peaks around the same time as the number of accidents involving trucks spike, and while truck traffic volumes are not at their peak).

As shown in Figure 29, truck-involved accidents occur with similar frequency on the weekdays, with a marked decline on weekends. Again, this is indicative of the propensity for increased truck-involved accidents during days when both truck traffic and non-truck traffic are high.

Figure 29
Truck-Involved Accidents by Day of Week
(Number of Accidents Involving Trucks – Left Axis)



Source: 2003 Statewide Integrated Traffic Records System data, California Highway Patrol's Information Management Division

Cars and trucks in mixed-flow lanes represent a serious safety issue. Again, when an accident involving a truck results in fatalities, there is a high likelihood that an occupant of the passenger car is the victim. However, the statistics indicate that truck-involved accidents are more likely to involve property damage only (PDO), as opposed to injuries or fatalities (injury accidents).[28] As an illustration of this point, Table 29 presents the accident statistics for truck involved accidents in Los Angeles County. While 80 percent of all accidents involving a truck result in property damage, less than 1 percent result in a fatality or an injury.

Table 29
Truck-Involved Accidents by Collision Severity in Los Angeles County
Year 2003

Collision Severity	Number of Accidents	% of Total
Property Damage Only (PDO)	3,373	79.70%
Fatal	32	0.76%
Severe Injury	32	0.76%
Other Visible Injury	288	6.81%
Complaint or Pain	507	11.98%
TOTAL	4,232	100.00%

Source: 2003 Statewide Integrated Traffic Records System data, California Highway Patrol's Information Management Division.

In addition to the data regarding accident rates and severity, truck-involved accidents often result in traffic congestion due to the blockage of travel lanes. Therefore, in addition to safety as a major issue affecting the movement of goods along the roadways in the study area, accidents can cause reductions in available capacity and increase congestion.

Highway Design Deficiencies

Many old existing highways such as I-710 have non-standard features which cause congestion and safety concerns. A summary of the types of deficiencies is provided below:[29]

- **Non-Standard Weaving Distances:** The necessary weaving distance is based on the number of vehicles weaving, and trucks require substantially more weaving distance than do automobiles.
- **Narrow/Non-Existent Shoulders:** Throughout much of the study area the shoulders provide narrow (non-standard) width and in some segments no shoulders are provided at all.
- **Narrow Lane Widths:** Narrow lanes tend to reduce the motorists' comfort level and speed, thus reducing overall capacity, especially when trucks are present.
- **Non-Uniform Ramp Metering:** Some of the ramps within the study area have limited storage distances, and if additional meters are installed, they would have to include ramp widening to provide storage capacity.
- **Median Barriers:** Most of the median barriers on old freeways are an older metal beam type that is no longer in standard use.

4.9 SECURITY

Another issue facing the goods movement system in the study area is seaport, airport, and railroad security. There is the potential that security requirements for air cargo and port cargo will change in the future. Uncertainties in anticipated legislation and their resulting regulations make it difficult for airports and cargo carriers to plan for structural and operational changes with any degree of confidence.

The primary air cargo security measures currently in place include the following:

- **Known Shipper Rule**, which in effect limits passenger airlines (or freight forwarders) from accepting cargo from shippers who have not been through a formal verification process.
- **16-Ounce Rule**, which states mail moving via passenger carriers is now limited to pieces weighing less than 16 ounces. This restriction effectively eliminates all U.S. mail parcel traffic moving on commercial passenger carriers and forces this traffic either onto trucks or all-cargo carriers.
- **Airside Access Requirements** (for both commercial passenger and all-cargo carries) state that all airside access points for cargo must be secured by appropriate means (gate and/or security guard) to insure authorized access only.
- **Airside Access Security Clearance** requirements state that all employees requiring airside access must undergo a security screening.

Two bills on railroad security and safety are under consideration in the California State Assembly. AB 3023 would, among other things, require every rail operator by January 1, 2008, to develop and implement an infrastructure protection program to protect rail infrastructure in the state from acts of sabotage, terrorism, and other crimes. AB 158 would create the Special Railroad Safety Task Force to meet monthly through 2007, study certain railroad safety issues, and make recommendations for improvements in railroad safety measures.

Air Cargo Screening

A key issue facing airports is the proposal to require 100-percent cargo screening. There are currently two amendments to the 2006 Department of Homeland Security authorization bill dealing with air cargo screening. The first would require 100 percent screening of all cargo traveling on commercial passenger carriers by 2008, and the second would require airlines to inform passengers if unscreened cargo is aboard the aircraft. The implication for airports and air carriers (both passenger and all-cargo) is that these rules will result in the greatest operational, financial, and capital-intensive challenge of any air cargo security program to date.

To be effective, all physical infrastructure required to accommodate an air cargo screening program must be located on, or directly adjacent to, secure airport facilities. This will require airports to provide the following:

- Large amounts of land near air cargo facilities
- Consolidation of air cargo facilities
- Additional warehouse/screening buildings
- Separate and secure access roads for queued trucks
- Additional security personnel
- Screening equipment/technology

When the Transportation Security Administration (TSA) decides on the technology and methodology to be used for screening air cargo, individual airports will need to react and adapt to meet regulations. Several proposed and anticipated methods of balancing tighter security with efficient movement of cargo include the following:

- Create truck access points that are separate from other traffic
- Have a centralized truck screening facility
- Limit the number of access points to the airfield
- Place air cargo facilities and aircraft in a concentrated location
- Limit the on-airport distance cargo must travel

Note that the outlined security initiatives, all focusing on cargo screening, involve direct on-airport facility redesign, land use, and infrastructure development. While the technology to be used for such screening is still under development (short of manual unpacking, inspecting, and repacking of all shipments), the burden of accommodating the location, support, and housing of screening technology is a pending airport issue.

The worst-case scenario for airport operators (and carriers) is a 100 percent air cargo-screening requirement. A more likely scenario is a cargo-screening requirement for air cargo moving via passenger carriers, while all-cargo carrier and integrators will rely on "scientific risk assessment" and a regime of random package/shipment screening. However, it cannot be assumed that this will be the case, and, as a result, airport operators must prepare for the potential requirement of 100 percent cargo screening.

Maritime Security Issues

The California Marine and Intermodal Transportation System Advisory Council (CALMITSAC) recently submitted an interim report to the California State Legislature that included a section on maritime security.[30] According to that report, maritime security and ports rely on a "layered" approach, many of whose participants are not at the ports specifically. Effective maritime security requires "multiple lines of defense" across the entire trip length of a shipment, from origin to destination. So the first real issue is the need for cooperation among all of the agencies and entities involved in maritime security. Because there are many different agencies involved in homeland security, the second key challenge is avoiding "overlap, duplication of effort, and conflicting regulations." Another key challenge is the ability to effectively share in "intelligence information among federal, state, and local agencies."

Since September 11, 2001, ports and terminals have increased "surveillance, fencing, lighting, training, and patrols." The core issue for the ports is that the bulk of this increase in security activity is largely funded by the ports themselves. For the most part, "federal port security funding has been inadequate." California as a whole, and indeed the study area, gets a proportionately low share of federal funding for security at the ports. "While California accounts for 40 percent of the containerized waterborne commerce in the U.S, in the [FY 2005 round] of federal port security funding, California received $33,599,417, or 24 percent of the national total of $141,969,968."[31]

In response to September 11, 2001, Congress passed the Maritime Transportation Security Act of 2002. As a result, the largest port security program since World War II was launched. The federal agencies with the largest presence at the ports since then are the Coast Guard and Bureau of Customs and Border Protection (CBP). Some of the notable changes and improvements in their respective programs include the Coast Guard's requirement that ships comply with the Notice of Arrival (NOA) requirement within 96-hours of arrival, up from 24 hours prior to 9/11. The NOA allows the Coast Guard extra time to identify high risk ships for boarding when they arrive at the port. The CBP, which uses cargo information to pre-screen inbound containers, has advanced the timing of the required data on inbound cargo from carriers. In fact, through the Container Security Initiative (CSI) program, CBP inspectors actually inspect cargo at foreign ports of loading before departing for U.S. ports. The CBP has also increased its focus on the supply chain, in addition to focusing on individual shipments. The Customs Trade Partnership Against Terrorism (C-TPAT) gives importers that comply with supply chain security measures preferential treatment for expedited processing of their cargo.

While there is a general consensus that these programs work, there is some concern whether they are adequate in addressing security threats. The Government Accountability Office (GAO) found

several shortcomings with the CSI and C-TPAT.[32] For example, the GAO found that C-TPAT participants were benefiting from reduced scrutiny before CBP had actually confirmed that the recipients were complying with the supply chain security measures. It also found that some of the containers that the CBP targets for inspection at the foreign port of departure are not being inspected.

The issue for Congress is how to increase port security to higher levels without compromising the economic security of trade.[33] There are several major areas of concern: the integrity of overseas screening and loading programs to ensure that the container was not loaded with illegal cargo at the overseas factory, that the loaded container was not tampered with while trucked to the port of loading, and that the cargo information reported to CBP is not fraudulent;[34] and the identity of ocean vessels and their occupants (crews).

Regardless of what Congress decides, increased security measures are likely. It is uncertain whether the bulk of these potential measures will occur at U.S. ports or overseas. The fact still remains that port security as it exists today is under-funded and the study area's ports receive a disproportionately lower share of funding for security.

4.10 AVAILABILITY OF FUNDING

A major constraint to the future development of the goods movement system is the shortage of funding for worthy projects. SAFETEA-LU (P. L. 109-59) provided $286.4 billion in guaranteed spending for highways, rail and transit programs over six years (FY 2004 to FY 2009). This represents a 38% increase over funding levels in the Transportation Equity Act for the 21st Century (TEA-21). Excluding FY 2004, the guaranteed funding level in SAFETEA-LU is $244.1 billion.

SAFETEA-LU, while providing support for several key projects, granted far less funding for goods movement than requested. Examples of significant freight projects that saw a funding shortfall are the Gerald Desmond Bridge and the grade crossing projects related to the Alameda Corridor East and OnTrac. The bridge project and the grade crossing projects each received only 19 percent of what was requested.

In order to generate the levels of revenue needed to fund significant goods movement efforts and requisite mitigation strategies, it will not suffice to rely solely on federal and state sources. Opportunities for local and private funding sources will need to be evaluated further. Subsequent tasks of this project are likely to corroborate this assumption.

4.11 CHANGES IN REGIONAL SHIPPING AND TRANSFER MODES

Several changes have occurred in the way goods are transferred from the ports to inland locations. Again, while this issue may gain further mention and significance during subsequent efforts in this project, it is a currently emerging trend. Trends in shipping patterns, modal reliance, and mode-to-mode transfer need to be identified and recognized.

One example frequently discussed is the development of a shuttle rail service to an inland staging area (or inland port). While implementation of a shuttle train from the ports to an inland location would potentially reduce traffic congestion, it could also increase the delivery time from ships to warehouses (the shuttles may also require public subsidies to be cost-effective). Rail carriers are reluctant to support a short-haul rail service when the demand for long-haul business is so strong. The railroads are concerned about "wasting a train start" on short-haul business unless equal volumes can be generated to move eastbound over the remaining portion of their network. The study area has a large number of warehouses and 3PL firms distributed along the corridor that extends from the ports to downtown Los Angeles, and then east along SR-60 into the Inland Empire.

Alternative technologies are also being explored to handle short-haul traffic and truck transfers between port terminals and trains. Several of these new technologies will be discussed in subsequent tasks of the MCGMAP.

The growth of the transload business also requires mention here. Given that the role of this sector is to consolidate international containers into larger domestic containers, a large portion of which are transferred to intermodal services, they will continue to favor locations close to the intermodal yards. The implication for MCGMAP is that the strength of this transload market will continue to influence the location of goods movement consolidation activities near and around intermodal facilities, despite the trend for the newer (and larger) warehouse and distribution activities to move to more distant locations.

These trends present opportunities and challenges that must be identified and included among the tools and options for accommodating growth in goods movement traffic and potentially mitigating the impacts of goods movement.

4.12 MIGRATION OF LAND USES AND DEVELOPMENT

The preferred location for the construction of new manufacturing and warehousing facilities has "migrated" from urban areas to suburban or rural locations, often in search of cheaper land and labor. The result is a land use impact on the surrounding residential uses at these new locations. Further implications are the longer hauls required by truck carriers to reach more distant facilities. At the same time, these facilities are not being built with rail sidings.

As this trend gains strength, existing warehouse and distribution centers located near the ports and downtown Los Angeles will leave current areas, with a subsequent loss of local jobs, unless the traffic and congestion and other constraints related to these areas are addressed. Those that do relocate will most likely move to locations outside of the Los Angeles basin, including the High Desert and Southern Kern County, and even out of state to cities such as Reno, Nevada and Phoenix, Arizona. Even if the warehouses and distribution centers move further inland, the containers from the ports still have to traverse the freeways and rail lines through the Gateway Cities and other sub-regions to get to these inland locations. Thus, the MCGMAP must address the needs of the highway and railroad systems and be responsive to changes in logistics.

A further implication is that the very same concerns raised by communities with regard to existing goods movement-intensive land uses will continue to be raised as the freight-intensive activities emerge elsewhere, and will likely gain in intensity. Again, if these conflicts are not addressed, counties will increasingly become resistant to goods movement as a whole.

4.13 SYSTEM-WIDE GOODS MOVEMENT DATA AND INFORMATION

One of the key challenges facing the study area's goods movement system is the availability of system-wide goods movement data and information. A significant level of data and understanding on goods movement is available today, some of which are presented in this Tech Memo, and some of which will be used in subsequent efforts; there are, however, two areas of particular concern that need to be mentioned here (although these are not the only areas of concern).

The first is in the **use of traditional travel demand modeling**. The agencies involved in this MCGMAP study are currently engaged in an effort to improve existing travel demand models and data, specifically the truck model developed and operated by SCAG. Specific efforts are focused on improving the understanding of local goods movement flows and patterns, as well as improving the estimation of truck trips generated from goods movement land uses such as ports and intermodal yards. The study area agencies are also working on improving rail capacity data and modeling, specifically as it relates to the operation of commuter trains on a predominantly freight system.

The second area of concern is the **lack of system-wide goods movement performance measures**. The previous section (Section 3.0) of this Tech Memo discusses this issue in detail. While there is some degree of performance monitoring and management by various parties within the overall goods movement system, there are no ongoing efforts, tools, or entities focused on measuring the system-wide performance of goods movement in the study area. As a result, there are instances where policies and approaches deployed on one part of the system lead to negative impacts elsewhere. The lack of system-wide performance measures and data potentially undermines the ability of joint efforts such as the MCGMAP to effectively deploy system-wide solutions. Without good system-wide performance data, it is difficult to measure and manage the implementation of specific strategies, investments, and policies.

A case in point are policies focused on lengthening operating hours (at ports, warehouses, and other freight land uses) so as to shift as much truck traffic as possible to off-peak hours, thereby reducing conflict with commuter traffic. In order for such policies to be optimal, system-wide understanding and management of the impacts of such policies throughout the system are needed. A system-wide approach should reveal the effect of these policies on operating costs for shippers, carriers, terminal operators, and warehouse operators at the same time that it understands and measures the impact of conflicts with nearby residential developments in heavily populated areas (additional noise and traffic at night). It should also understand and monitor the real effect on capacity; i.e., where the reductions in congestion and delay are, who benefits, and to what degree.

Another example is the PierPASS program which, in itself, is a success. It has made significant changes to the distribution of truck trips away from peak periods, shifting between 30 percent and 35 percent of container cargo to off-peak periods.[35] PierPASS was recently introduced to increase the hours of operation at the port. PierPASS offers an incentive to users to pick up and deliver shipments to/from the port from 6:00 pm until 3:00 am Monday through Friday and from 8:00 am to 6:00 pm on Saturdays. Ports are one of the last remaining businesses in the logistics family which do not operate on a 24/7 work schedule. Trucking, air and rail providers all operate on a 24/7 basis. Warehouses that support these logistics services are also opened 24/7 or at least allow shipments to be dropped and pulled from staging facilities. However, the program is unpopular among some drivers. Based on a survey of truck driver attitudes toward PierPASS, many reported that shorter waiting times in the port had not materialized.[36] In addition, they used their allowable driving hours waiting in long lines at night, and reportedly had less work during the day because the same volumes were spread out over a longer work day. A system-wide approach would more effectively address these and many other concerns.

Policies targeted at goods movement work can be effective, but in order to be optimal, a truly system-wide approach is needed. The performance measures should focus on a wide range of measures including the environment, rates of return on investment, capacity, and congestion.

4.14 A DISPARATE GOODS MOVEMENT SYSTEM AND COMMUNITY

The disparate nature in which the goods movement system is organized is a core issue for the study area, and is applicable both on the private side and on the public side. Because the entities involved in goods movement (from the shippers, manufacturers, receivers, private carriers, intermodal operators, warehouse and logistics operators, and port owners and operators to the public entities and transportation agencies) are organized disparately, it is increasingly difficult to address the issues in a coordinated and strategic manner.

The private sector is nimble and reacts quickly to performance measures and productivity improvements. Time is money in the private sector. Planning horizons are typically based on 1-3 and 5-year planning cycles. All projects are evaluated based on return on investment or return on assets. This makes crafting public-private partnerships difficult to broker especially when public planning cycles are often in 10 and 20 year increments.

The Private Sector

Section 3.0 of this Tech Memo reveals that the private intermodal system in the study area is not organized in such a way as to systematically deal with issues across the entire goods movement system. While the private intermodal systems address operational and investment strategies within their respective spheres of influence, they do not have the means or the information to develop system-wide solutions. The challenge is the development of an institutional approach that can garner the collective support of the private sector, the carriers, and the shippers to tackle specific solutions that have broad and system-wide implications. An example is the Gateway City Council of Governments Clean Air Program. The pilot program provides incentive grants to private trucking businesses to eliminate older, more polluting trucks from the roadways and replace them with cleaner trucks. The lesson from the program is that the fragmented structure of the local drayage industry, dominated by small owner-operators, presents an economic, operational, and ownership challenge toward expanding the engine replacement program beyond a pilot phase.

The Public Sector

An example of this issue on the public side surrounds the organization of the ports. The MCGMAP study area's mobility is critically affected by the geographical and institutional structure of the port complex. In addition to the independent ports, operated as departments of separate municipalities, the overall volume of container trade growth is handled by 14 independent privately operated terminals under lease agreement with one or the other of the ports.

Another example of this issue on the public side is the complexity of this specific effort, namely the MCGMAP effort. It is a joint effort including local county transportation commissions, an MPO, and the state's Department of Transportation, as well as a large and complex group of stakeholders. The actual implementation of projects stemming from this effort must be managed in a coordinated fashion, and will likely require some form of institutional approach. This will be further evaluated throughout the course of this effort.

Communities and Politics

The views and perspectives on goods movement vary widely among the communities in the study area. Communities most directly impacted by goods movement, specifically those at and around the ports and intermodal facilities, generally have a more cautious view of goods movement. Communities more removed from the direct impacts of high goods movement volumes are generally more aggressive about attracting goods movement-intensive land uses, with the prospect of generating tax revenues and providing jobs. Hence the political stance toward goods movement varies across communities, which presents a challenge in terms of developing a unified set of goods movement policies and strategies.

4.15 ADDITIONAL ISSUES AND CONSTRAINTS

In addition to the issues facing the various modes of the goods movement system, there are other issues and constraints related to the environment and economy of the study area. Air quality was discussed earlier in this Technical Memorandum, and a comprehensive discussion of environmental and economic issues is presented as a part of Task 5 - Evaluate the Community, Environmental, and Economic Impacts of Freight Movement Generators and Facilities.

Environmental Issues and Constraints

Water Quality Impacts

Water quality impacts associated with goods movement logically occur at the ports and along the ocean shipping lanes. In addition to pollution from vessels and harbor craft, vessel ballast water can bring exotic species into federal and state waters. There are also regional water quality impacts arising from increased truck traffic over the freeway and street network. Such non-point pollution sources help degrade overall water quality and are difficult to treat.

Land Use Conflicts, Noise, and Other Community Impacts

In understanding the environmental impacts of goods movement to the region, the effects on neighborhoods must be considered. As noted elsewhere, incompatible land uses have arisen over time where residential neighborhoods adjoin or are passed through by goods movement activities. The effects generated by goods movement can be readily obvious, such as traffic, air, or noise impacts, or can be more subtle and not as obvious to non-residents. The more subtle and not so obvious effects include:

- streets affected by trucks parked for long periods and late night activities
- prolonged idling for trains
- switching equipment or trucks
- views blocked by stacks of containers

Concerns about environmental and health impacts are also likely to be higher in communities where houses, schools, or parks are located near goods movement facilities. This concern has been increasingly expressed by low income and minority communities, under the term "environmental justice." It should be noted that environmental justice is a complex issue and that the terminology can be misused. The federal Executive Order on this matter addresses disproportionately high and adverse impacts to minority or low-income neighborhoods and communities. An analysis of whether an environmental justice concern exists must evaluate whether an impact is disproportionately high in comparison to the other, non-classified neighborhoods in the region.

Noise pollution from goods movement is another issue, and although it can have physical effects on humans, it is primarily an annoyance affecting the quality of life. Noise impacts occur in association with loading and unloading activities, and along rail and truck routes that support the movement of trains or trucks. Congestion on freeways and the street network can compound noise impacts from

trucks, from the sounds created by their braking and acceleration. To the extent that congestion on streets that serve warehouse operations increases over time, the potential for noise impacts also increases. Communities located near the air and water ports, rail yards, and other transfer points frequently complain about the annoyances associated with the operations of these facilities.

Another rail noise impact is from the sounding of at-grade crossing warning devices. Since safety regulations require that these devices be sounded as a train approaches and during the entire time that the train is passing through the crossing, the noise impact can occur for several minutes at a time. Concurrently, while traffic awaits a train's passage, idling trucks can create annoying noise and also increase air pollution in the area.

Other impacts that affect the communities include traffic congestion and bright or spillover lighting where transfer facilities are located near residential areas. Over time, the lengthening durations of nighttime work has increased, increasing annoyance and concern among residents of affected communities.

Scattered Land Use Impacts

Initially, goods movement-intensive land uses clustered tightly around rail corridors, ports, and freight corridors. As the overall volume of goods movement increased, the locations of transfer facilities spread inland, facilitated by rail and freeway networks. The development of this region-wide system led to a widespread distribution of environmental impacts. Locations that in the past were not affected by the impacts associated with goods movement have become affected. The new areas of impact have moved eastward over the past decade or so, reflecting the growth of distribution centers in the Inland Empire. This shift was driven by the need for large tracts of affordable land on which to build distribution centers that were accessible via the region's rail and freeway networks. The freeway network defines to a large degree where environmental impacts occur in the region, given that impacts are closely linked to where traffic congestion occurs, and the fact that the types of land uses most related to goods movements are served by freeways and major arterials.

The spread of goods movement facilities across the region has also resulted in the spreading of incompatible land uses to other areas, away from the traditional locations mentioned earlier. For instance, some residential areas in the Inland Empire that were once adjoined by agricultural lands are now adjoined by large warehousing complexes. Where the past adjacency relationship was benign, the new uses typically produce traffic, air, noise, and light impacts that are less compatible, if not conflicting, with residential land uses. This can lead to communities being deemed undesirable living areas, contributing to blight.

Numerous aspects of the existing goods movement system within the MCGMAP study area contribute to adverse environmental impacts. These issues are discussed in greater detail as a part of Task 5 - Evaluate the Community, Environmental, and Economic Impacts of Freight Movement Generators and Facilities.

Economic Issues and Constraints

It is important to give early attention to the economic aspects of goods movement, in advance of a more detailed analysis in Task 5. It is well understood that goods movement offers significant economic benefits to the study area. In 2003, over 38,700 firms employed 548,278 workers, 9.3 percent of the study area's employment. In addition, the logistics sector paid better than either the construction or the manufacturing sectors.[37] As discussed in the next section, the goods movement sector has an important strategic role in providing upward social mobility for the blue collar employment base. However, consistent year-to-year growth in the sector has resulted in a shortfall of labor presenting significant issues for industry.

Goods Movement and the Employment Base

The study area's per capita income slipped from a ranking of fourth among the 17 major U.S. consolidated metropolitan statistical areas in 1987 to sixteenth in 2001.[38] The logistics sector (sector involved in receiving, processing, storing, and moving goods) plays an important strategic role as a "skill ladder" for large numbers of blue collar workers that traditionally have only been found in manufacturing. In effect, the sector is backfilling the jobs left in the declining sectors.

The logistics sector is also a relatively capital- and information-intensive sector, which requires leading edge logistics, warehousing, and retailing companies to provide just-in-time services. Much of the information management approaches are computerized and networked into "neuro-logistics" (responsive and leaner) supply and distribution networks. As a result, relatively strong pay scales are possible in the logistics sector.

Shortage of Labor

The growth in the trade and logistics sectors in the study area can be equated to so-called "boom years"-- economic terminology for times of excessive demand that can lead to shortages in resources and upward pressure on prices and labor costs. Based on early research, this is occurring in the study area.

Table 30 is a projection of occupational employment needs for certain logistics sectors from 2004 through 2006. It is indicative of the shortage in resources. The table shows that on-the-job training (OJT) rather than classroom training is provided for each occupational level.

Table 30
Occupations with the Most Job Openings
Occupational Employment Projections 2004-2006 (California)

Occupational Title	Job Openings	Education & Training Levels
Laborers and Freight, Stock, and Material Movers, Hand	28,600	30-DAY OJT
Truck Drivers, Heavy and Tractor-Trailer	10,400	1-12 MO OJT
Packers and Packagers, Hand	8,000	30-DAY OJT
Truck Drivers, Light or Delivery Services	6,000	30-DAY OJT

Source: www.labormarketinfo.edd.ca.gov

Trucking is one of the hardest-hit sectors in terms of a shortage of drivers, a nationwide phenomenon. According to the Pacer Cartage office in Los Angeles (a trucking company that is typical in the port area), demand for truck drivers is so high that lead time to fill truck driver positions ranges up to six months. They anticipate a 25 percent increase in demand for the next year. The shortfall in truck drivers impacts the industry in terms of higher costs, lower productivity, and underutilization of assets. This translates to underutilization of equipment. For example, a local carrier that operates 2,500 trucks would routinely have 80 trucks parked against the fence due to lack of qualified drivers.

Because of the tight labor market, companies begin to rely on technology to keep hiring numbers constant. International Transportation Services, a terminal operating company for the BNSF Railway that manages the gate and intermodal rail terminal activities, plans to keep anticipated employment flat, thanks in part to technology. Also, the facility is at or near capacity and there is little room for volume growth.

One of the reasons that employment supply falls short of demand for the sector is the reliance on technological advancements and a centralization of office functions. Offices have global visibility of shipments yet have local control over dispatching functions. It is typical that when one service desk on the East Coast concludes operations for the day, customer service calls are routed to a Midwest or West Coast service desk to assist customers with dispute resolution. Because the market is very competitive, staff and overhead must be diligently managed. Managers are often asked to do more with less, and this trend will continue into the future.

Assembly Bill (AB) 2650 - A law passed in the state of California that fines terminal operators if trucks idle outside the terminal gate for more than 30 minutes.

Air Cargo - Freight that is moved by air transportation.

Air Carrier - An enterprise offering transportation service via air.

All-Cargo Carrier - An air carrier transporting cargo only.

Arterial - A moderate- or high-capacity highway that is just below an expressway classification. Much like a biological artery, an arterial road carries large volumes of traffic between areas in urban centers. Arterials serve as links between local streets and expressways and freeways with interchanges.

Average Annual Daily Traffic (AADT) - A useful and simple measurement of how busy a road is determined by averaging the daily flow of traffic over a year. Consists of a seven-day average of traffic on a roadway facility.

Balance of Trade - The surplus or deficit that results from comparing a country's exports and imports of merchandise only.

Belly Cargo - Cargo carried in the belly deck below the passenger deck of a passenger aircraft.

Bobtail - A truck with shorter bed. Otherwise known as a Straight Truck, Box Truck, or Box Van.

Boxcar - An enclosed railcar, typically 40 to 50 feet long, used for packaged freight and some bulk commodities.

Break-Bulk - The separation of a consolidated bulk load into smaller individual shipments for delivery to the ultimate consignee. The freight may be moved intact inside the trailer, or it may be interchanged and rehandled to connecting carriers.

Break-Bulk Cargo - Cargo shipped as a unit or package (for example: palletized cargo, boxed cargo, large machinery, trucks) but is not containerized.

Break-Bulk Vessel - A vessel designed to handle break-bulk cargo.

Bulk Area - A storage area for large items that, at a minimum, are most efficiently handled by the palletload.

Bulk Cargo - Goods not in packages or containers. See also, Break-Bulk Cargo.

Bulk Transfer Facilities - Facilities used primarily for the storage and/or marketing of petroleum products, and/or facilities that receive petroleum products by tanker, barge, or pipeline.

Cabotage - The carriage of cargo that originates and terminates within the boundaries of a given country by a carrier of another country.

Cargo - Merchandise carried by a means of transportation.

Cargo-Only Airport - An airport that has one or more air cargo operators and no passenger operations.

Carload - In the rail industry parlance, carload traffic refers to cargo moved in or on boxcars, gondolas, tank cars, flatcars, and other conventional railroad vehicles. Typical carload commodities include lumber, paper, scrap metal, coal, aggregates, chemicals, steel, machinery, and large appliances, among many other things. Trains carrying this traffic are sometimes called carload or merchandise trains.

Carrier - An enterprise engaged in the business of transporting goods.

Classification Yard - A railroad terminal area where railcars are grouped together in blocks to form train units. These blocks are combined into long distance trains that drop off the blocks at various destinations along their routes.

Coastal Carriers - Water carriers providing service along coasts serving ports on the Atlantic or Pacific Oceans or on the Gulf of Mexico.

Combi Aircraft - A passenger/cargo aircraft specially designed to carry unitized cargo loads on the upper deck of the craft, forward of the passenger area.

Container - A single rigid receptacle without wheels that is used for the transport of goods (a type of carrier equipment into which freight is loaded).

Container Chassis - A vehicle built for the purpose of transporting a container so that, when a container and chassis are assembled, the produced unit serves as a road trailer.

Container Depot - The storage area for empty containers.

Container Terminal - An area designated for the stowage of cargo in containers that may be accessed by truck, rail, or ocean transportation.

Container Vessel - A vessel specifically designed for the carriage of containers.

Container Yard - The location designated by the carrier for receiving, assembling, holding, storing, and delivering containers, and where containers may be picked up by shippers or redelivered by consignees.

Containerization - The technique of using a boxlike device in which a number of packages are stored, protected, and handled as a single unit in transit.

Cross Dock - An enterprise that provides services to transfer goods from one piece of transportation equipment to another. Commonly used to transfer shipments between local delivery trucks and long-haul (intercity) trucks.

Cross-Docking - The movement of goods directly from receiving dock to shipping dock to eliminate storage expense. Many times a site is chosen to consolidate goods from several origins and reship to the retail or manufacturing site (sometimes called Merge in Transit or Flow Through Distribution).

Cube Out - The situation when a piece of equipment has reached its volumetric capacity before reaching the permitted weight limit.

Customization Centers - Locations where goods are prepared as floor-ready merchandise based on the latest point of sale data.

Distribution Center (DC) - A finished goods warehouse from which a company assembles customer orders.

Dock - A space used for receiving merchandise at a freight terminal.

Enterprise Resource Planning (ERP) - A cross-functional/regional planning process supporting regional forecasting, distribution planning, operations centers planning, and other planning activities. The process provides the means to plan, analyze, and monitor the flow of demand/supply alignment and to allocate critical resources to support the business plan.

Export - To send goods and services to another country.

Federal Aviation Administration - The federal agency that administers federal safety regulations governing air transportation.

First Tier (or Top Tier) – A term used to point out the leading industry group in a specific sector. This is not typically an official term, but a term used herein to classify the leading entities.

Foreign Trade Zone (FTZ) - A site sanctioned by the U.S. Customs Service in which imported goods are exempted from duties until withdrawn for domestic sale or use. Such zones are used by commercial warehouses or assembly plants.

Freight Forwarder - An enterprise providing services to facilitate the transport of shipments. Services can include documentation preparation, space and equipment reservation, warehousing, consolidation, delivery, clearance, banking and insurance services, and agency services. The forwarder may facilitate transport by land, air, or ocean, or may specialize in one mode of transport. Also called Forwarder or Foreign Freight Forwarder.

Freight Analysis Framework (FAF) - The Freight Analysis Framework, created by the Federal Highway Administration, integrates data from a variety of sources to estimate commodity flows and related freight transportation activity among states, regions, and major international gateways.

Freight Gateways - A term generally used to refer to major freight airports, seaports, or intermodal facilities.

Full Container Load (FCL) - A term used when goods occupy a whole container.

Full Equivalent Unit (FEU) - A unit of measure to account for a full-sized (40-foot long) international container. One FEU equates to two 20-foot Equivalent Units (TEUs).

Full Truck Load (FTL) - Same as Full Container Load, but in reference to motor carriage instead of containers.

Goods - A term associated with more than one definition: 1) common term indicating movable property, merchandise or wares, 2) all materials used to satisfy demands, 3) whole or part of the cargo received from the shipper, including any equipment supplied by the shipper.

Hopper Cars - Railcars that permit top loading and bottom unloading of bulk commodities; some hopper cars have permanent tops with hatches to provide protection against the elements.

Hostling Trucks – A motorized vehicle (small truck) used for moving trailers/chassis around a port terminal or intermodal yard, specifically to transfer cargo containers and equipment from one mode to another.

Hub - A central location to which traffic from many cities is directed and from which traffic is fed to other areas.

Hub Airport - An airport that serves as the focal point for the origin and termination of long-distance flights; flights from outlying areas meet connecting flights at the hub airport.

Integrated Freight Carriers - Typically refers to air cargo and express carriers that provide door-to-door service via any combination of modes. They control the reliability of service by owning the ground transport operations as well as the air lift capacity, exercising control through ownership (for example, FedEx and UPS). They also use information technology to exercise control.

Integrated Logistics - An integrating process that combines the classic logistics functions of physical distribution and materials management with the purchasing of raw materials and/or inventory and sales, marketing, information technology, and strategic planning functions.

Intermodal - See Intermodal Transportation.

Intermodal Facility - Facilities that allow for the transfer of uniform containers from one mode to another. The term is most commonly associated with a facility that allows for the transfer of containers between rail and truck. It is also used more widely to apply to cargo transfer between ships, barges, railcars, and trailer chassis.

Intermodal Transportation - The use of two or more transportation modes to transport freight; for example, rail to ship to truck, most commonly used or applied in industry to describe shipment of containers by rail.

Inventory Carrying Cost - A measure to account for the cost of goods in delay. This measure is not commonly used in the public transportation sector.

Just In Case (JIC) - An inventory strategy companies use whereby large inventories are kept on hand.

Just In Time (JIT) - An inventory strategy companies employ to increase efficiency and decrease waste by receiving goods only as they are needed in the production process, thereby reducing inventory costs. This method requires that producers are able to accurately forecast demand.

Less than Container Load (LCL) - A term used when goods do not completely occupy an entire container. When many shippers' goods occupy a single container, each shipper's shipment is considered to be LCL.

Less-Than-Truckload (LTL) - A segment of the trucking industry catering to shippers with loads that are less than a full truck load. Shipments that are smaller than a full truckload are combined with other LTL shipments, thereby allowing the LTL trucker to benefit from the economies of scale enjoyed by full truckload truckers.

Level of Service (LOS) - A standard measurement used by transportation officials that reflects the relative ease of traffic flow on a scale of A to F, with free-flow conditions being rated LOS A and completely congested conditions rated as LOS F.

Lift Capacity - Term used to describe a particular carrier or terminal operator's capacity to handle cargo. Most often (not exclusively) applied to intermodal yards and air cargo carriers.

Line-Haul - The long-haul portion of an intermodal trip, typically the main rail trip between the originating and terminating intermodal yards. On either end of the line-haul is the local dray to and from the intermodal yard.

Local Dray - A local truck trip to and from an intermodal yard or port or warehouse.

Logistics - The process of planning, implementing, and controlling procedures for the efficient and effective storage of goods, services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements. This definition includes inbound, outbound, internal, and external movements.

Mega Terminals - In the context of the marine and ports industry, a large terminal built to accommodate the new generation of mega ships (sometimes referred to as post-Panamax). In cases where a new terminal cannot be built, one or more of the existing terminals are tied together to provide the needed acreage and facilities.

Metric Revenue Tons (MRT) - Traditionally, cargo volumes through ports were reported in terms of tons (or metric tons). However, for ports that have a high component of containerized traffic, this measure underestimates the volume from a value or revenue standpoint, and hence the measure of metric revenue tons is used. Containerized cargo tends to have a higher value (revenue) to weight ratio than most non-containerized cargo. While non-containerized cargo has a one-to-one relationship between metric tons (MT) and metric revenue tons, the relationship for containerized cargo is typically greater than one and varies depending on the mix of cargo.

Metropolitan Planning Organization (MPO) - A regional transportation planning body required to approve transportation improvement plans, to ensure that they are consistent with federal legislation and that they are fiscally sound. It aims to achieve local consensus between different levels of government and across jurisdictions.

Mode of Transportation - The specific type of technology or vehicle involved in the movement of goods and passengers; for example, a railroad, an automobile, an airplane, or a ship.

Movement of Goods - The transfer of goods from one location to another.

Net Rentable Area - The actual square footage of a building that can be rented.

Net Weight - The weight of the merchandise, unpacked, exclusive of any containers.

Non-Integrated Freight Carriers - These types of freight carriers serve two functions: (1) provide scheduled service on major traffic lanes, and (2) provide outsourcing, carrying contracted freight for freight forwarders and other airlines. They typically involve a single mode of transport.

Non-Vessel Operating Common Carrier (NVOCC) - A firm that offers the same services as an ocean carrier, but does not own or operate a vessel. NVOCCs usually act as consolidators, accepting small shipments (LCL) and consolidating them into full container loads. They also consolidate and disperse international containers that originate at, or are bound for, inland ports. They then act as a shipper, tendering the containers to ocean common carriers. They are required to file tariffs with the Federal Maritime Commission and are subject to the same laws and statutes that apply to primary common carriers.

North American Free Trade Agreement (NAFTA) - A free trade agreement, implemented January 1, 1994, between Canada, the United States, and Mexico.

On-Dock, Near-Dock, Off-Dock Intermodal Facilities - On-dock intermodal facilities are located in or immediately adjacent to marine terminals. Near-dock intermodal facilities are located

within a few miles from port areas. Off-dock intermodal facilities are comparatively distant from port areas.

Person Hours - A measure to account for the number of hours spent by the occupants of vehicles in traffic.

Port - A harbor where ships will anchor.

Ports of Call - Ports at which a vessel, or string of vessels, stop so as to unload and load cargo.

Port of Entry - A port at which foreign goods are admitted into the receiving country.

Post-Panamax Vessel - A container ship too large to pass through the Panama Canal, typically with a capacity in excess of 6,000 TEUs.

Project Cargo - Typically associated with large machinery and equipment used in the construction of major infrastructure projects such as power plants or industrial plants. Large or voluminous shipments, or shipments composed of complex components that must be disassembled, shipped, and then re-assembled.

Private Carrier - A carrier that provides transportation service to the firm that owns or leases the vehicles and does not charge a fee. Private motor carriers may haul at a fee for wholly-owned subsidiaries.

Regional Transportation Plan - A long-term multimodal transportation plan prepared by a Metropolitan Planning Organization (MPO), typically with a 20-year outlook.

Rolling Stock - Traditionally means "vehicles." The term is used in logistics to refer to inventory in motion, or inventory in the pipeline, not at rest.

Roll On/Roll Off (RO/RO) - A term most commonly used to describe ships designed for the carriage of wheeled cargo. These ships typically have large doors in the hull and external ramps that fold down to allow rolling of wheeled cargo between the ship and the pier. The term is also applied to the wheeled cargo itself (RO/RO cargo).

Scheduled Service - A type of service offered by carriers for a designated route that includes multiple designated stopping points, with scheduled times of arrival and departure. The carrier aims to stay within the schedule so as to provide a reliable service that customers can depend on, and can sequence their shipments accordingly.

Second Tier - A term used to point out the second most significant group of players in a specific sector (see First Tier).

Shipping Line - Businesses that own and/or operate the ocean vessels carrying ocean-borne cargo between international ports (also referred to as steamship lines).

Short Line - A local rail line that covers a short distance, not part of a rail network. Ports use a short line to move goods between customers, storage areas, and staging areas within the port without interfering with main line operations.

Spur Track - A railroad track connecting a company's plant or warehouse with the railroad's track; the user bears the cost of the spur track and its maintenance.

Steamship Line - A company that owns and/or operates vessels in maritime trade.

Supply Chain(s) - A group of physical entities such as manufacturing plants, distribution centers, conveyances, retail outlets, people, and information that are linked together through processes (such as procurement or logistics) in an integrated fashion, to supply goods or services from source through consumption.

Supply Chain Management (SCM) - The integration of the supplier, distributor, and customer logistics requirements into one cohesive process to include demand planning, forecasting, materials requisition, order processing, inventory allocation, order fulfillment, transportation services, receiving, invoicing, and payment.

Terminal Operator - The enterprise responsible for the operation of facilities for one or more modes of transportation.

Third Party Logistics Provider (3PL) - A third party that handles many of the supply chain logistics aspects on behalf of a large shipper/receiver. Makes many of the decisions related to the shipment of goods mode choice, routing, transit times, pricing, staging locations, etc.

Transloading - The practice of transferring goods from marine containers to domestic intermodal containers or trucks at a distribution center or warehouse.

Transportation Corridor - A single route or combination of routes along the same general path, between at least two points (one on either end). In general, a transportation corridor is not just one road or rail line, but a combination of modes.

Transshipment - The shipment of merchandise to the point of destination in another country on more than one vessel or vehicle.

Truck Climbing Lanes - Highway lanes in which trucks must operate where the incline of the road becomes steep to the point of reducing truck speeds. They are designed to permit slower-moving trucks to operate at their own pace without reducing the speed of the mixed-flow traffic operating in the lanes without trucks. Typically located on the outside lanes of a highway in an uphill direction.

Truckload (TL) - Quantity of freight required to fill a truck, or at a minimum, the amount required to qualify for a truckload rate.

Truck Turn Time - The time it takes from when a truck arrives at a port (or intermodal yard), loads/unloads its cargo, and departs.

Twenty-foot Equivalent Unit (TEU) - A measure of containerized cargo equal to one standard 20-foot by eight foot by 8½ foot container. A full size 40-foot container (FEU) is counted as two TEUs.

Vessel String - Term used in the ocean shipping business to refer to a group of vessels that serve a specific route. In order to meet a scheduled service, the vessels are sequenced into a string so as to serve the route and meet predetermined dates and times of arrival and departure.

Warehouse - Storage place for products that are in transit. Principal warehouse activities include receipt of product, storage, shipment, and order picking.

AADT	Annual Average Daily Traffic
ACE	Alameda Corridor East
ACTA	Alameda Corridor Transportation Authority
AF	United States Air Force
ARZC	Arizona and California Railroad
BNSF	Burlington Northern and Santa Fe Railway
BUR	Burbank Airport
Caltrans	California State Department of Transportation
CARB	California Air Resources Board
CBRE	C.B. Richard Ellis
CEQA	California Environmental Quality Act
CofI	City of Industry
CTA	Central Terminal Area at LAX
CY	Calendar Year
CZRY	Carrizo Gorge Railway – the Desert Line
EIR	Environmental Impact Report
ELA	East Los Angeles
EPA	Environmental Protection Agency
ERP	Enterprise Resource Planning
FAF	Freight Analysis Framework
FedEx	Federal Express
FERC	Federal Energy Regulatory Commission
FEU	Full Equivalent Unit
FHWA	Federal Highway Administration
FPN	Ferrocarriles Peninsulares del Noroeste
FTZ	Foreign Trade Zone
FY	Fiscal Year
GIS	Geographic Information Systems
GPS	Global Positioning System
HHDT	Heavy Heavy Duty Truck Classification
HOV	High Occupancy Vehicle
ICTF	Intermodal Container Transfer Facility
ILWU	International Longshoreman and Warehouse Union
ITS	Intelligent Transportation Systems
JIC	Just in Case
JIT	Just in Time

LACSD	County Sanitation Districts of Los Angeles County
LAJ	Los Angeles Junction Railway
LATC	Los Angeles Transportation Center
LAWA	Los Angeles World Airports
LAX	Los Angeles International Airport
LCL	Less-Than-Container-Loads
LGB	Long Beach Airport
LHDT	Light Heavy Duty Truck Classification
LNG	Liquefied Natural Gas
LOS	Level of Service
LOSSAN	Los Angeles to San Diego Rail Corridor
LRTP	Long Range Transportation Plan
LTL	Less Than Truckload
MAT	Millions Annual Tons
MCGMAP	Multi-County Goods Movement Action Plan
Metro	Los Angeles County Metropolitan Transportation Authority
MHDT	Medium Heavy Duty Truck Classification
MPO	Metropolitan Planning Organization
MRL	Mesquite Regional Landfill
MRT	Metric Revenue Tons
MSF	Million Square Feet
MT	Metric Tons
NAFTA	North American Free Trade Agreement
NAICS	North American Industry Classification System
NAIOP	National Association of Industrial and Office Properties
NISC	National Infrastructure Security Committee
NOP	Notice of Preparation
NRA	Net Rentable Area
NRDC	Natural Resources Defense Council
NVOCC	Non-Vessel Owning Common Carriers
OCTA	Orange County Transportation Authority
OJT	On-the-job training
ONT	Ontario International Airport
PCH	Pacific Coast Highway
PDS	Position Detection System
PHL	Pacific Harbor Line
POLA	Port of Los Angeles
POLB	Port of Long Beach
PMD	Palmdale Regional Airport
PNW	Pacific Northwest

RCTC	Riverside County Transportation Commission
RFID	Radio Frequency Identification
RO/RO	Roll On/Roll Off
RTP	Regional Transportation Plan
RTW	Round-the-World
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act - A Legacy for Users
SANBAG	San Bernardino Associated Governments
SBD	San Bernardino International Airport
SCAG	Southern California Association of Governments
SCIG	Southern California International Gateway
SCM	Supply Chain Management
SCRRA	Southern California Regional Rail Authority
SDIY	San Diego and Imperial Valley Railroad
SF	Square Feet
SNA	John Wayne/Santa Ana Airport
SPB	San Pedro Bay
3PL	Third Party Logistics
TEU	Twenty-Foot Equivalent Units
TOS	Terminal Operating System
UP	Union Pacific Railroad
UPS	United Parcel Service
USPS	US Postal Services
VCRR	Ventura County Railroad
VCTC	Ventura County Transportation Commission
VMT	Vehicle Miles Traveled
VNY	Van Nuys Airport
YTD	Year to date

Section E.0 – Executive Summary

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Multi-County Goods Movement Action Plan

Technical Memorandum 4a: Freight Demand

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
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REFERENCES **R-1**

E.0 EXECUTIVE SUMMARY

E.1 INTRODUCTION **E-1**
E.2 FREIGHT DEMAND FORECASTS **E-1**
Warehouse/Distribution Forecasts E-1
Marine Cargo Forecasts E-1
Rail Forecasts E-2
Truck Travel Forecasts E-3
Air Cargo Forecasts E-4
E.3 FORECAST SCENARIOS **E-4**
E.4 APPROACH **E-5**

1.0 FORECASTS OF FREIGHT DEMAND

1.1 WAREHOUSING AND DISTRIBUTION **1-1**
Warehouse Land Use Review 1-2
Land Use Shifts and Location Preferences 1-4
Forecast – Key Conclusions 1-7
1.2 RAIL **1-7**
Rail Volume Forecast 1-10
Rail Intermodal Lift Forecasts 1-15
1.3 TRUCK **1-19**
Ports of Los Angeles/Long Beach Freight Volume Trends 1-25
1.4 AIR CARGO **1-28**
1.5 OCEAN CARGO **1-32**

2.0 IDENTIFY POTENTIAL SCENARIOS FOR FURTHER EVALUATION

2.1 PURPOSE OF SCENARIOS **2-1**
2.2 SCENARIO 1 – STATUS QUO LANDSIDE INFRASTRUCTURE **2-1**
Main Driving Forces and Areas of Uncertainty 2-1
Policy/Investment/Operational Variables and Their Purpose 2-2
Evaluation Approach 2-2
Data Needs and Availability 2-3
2.3 SCENARIO 2 – LOWER THAN EXPECTED TRADE FORECASTS **2-3**
Main Driving Forces and Areas of Uncertainty 2-3
Policy/Investment/Operational Variables and Their Purpose 2-5
Evaluation Approach 2-5
Data Needs and Availability 2-6
2.4 SCENARIO 3 – LOWEST TRADE FORECASTS **2-7**
Main Driving Forces and Areas of Uncertainty 2-7
Policy/Investment/Operational Variables and Their Purpose 2-7
Evaluation Approach 2-8
Data Needs and Availability 2-8
2.5 SCENARIO 4 – FULL TRADE AND INVESTMENT OUTCOME **2-8**
Main Driving Forces and Areas of Uncertainty 2-8
Policy/Investment/Operational Variables and Their Purpose 2-9
Evaluation Approach 2-9
Data Needs and Availability 2-10

FIGURES

Figure 1 Railroads and Mainlines in the MCGMAP Study Area Serving California, Arizona, Nevada, and Oregon 1-8
Figure 2 BNSF Transcon West of San Bernardino, UP Los Angeles Subdivision, and UP Alhambra Lines 1-9
Figure 3 Existing Highway System within the MCGMAP Study Area 1-20
Figure 4 2030 Annual Statewide Truck Mile Travel Distribution by County 1-24
Figure 5 Daily Trips-Ports of LA/LB 1-25
Figure 6 I-710 Port Truck Trips, North of Pacific Coast Highway Year 2005, 2010, 2030 1-27
Figure 7 Distribution of Truck Traffic by Roadway 2000, 2010, 2020 1-28
Figure 8 Volume of Trade, 2004 and 2020 1-34

TABLES

Table 1 Projected Total Square Footage of Warehouse Space 1-2
Table 2 Projected Total Square Footage Based on Population Growth 1-2
Table 3 Warehouse Proportion of Existing Industrial Land Use 1-3
Table 4 Acres of Planned Warehousing Land Use 1-3
Table 5 Total Square Footage Distribution of Growth Estimates by County 1-6
Table 6 Forecast of Warehouse Space by County (Millions of Square Feet) 1-6
Table 7 2025 Forecast of Trains per Day on Freight Mainlines in the Los Angeles Area 1-11
Table 8 Current Modal Market Shares For Marine Containerized Traffic 1-16
Table 9 San Pedro Bay Ports Direct Intermodal Rail Volume Forecasts (Millions) 1-16
Table 10 San Pedro Bay Ports Intermodal Rail Transload Volume Forecasts (Millions) . 1-17
Table 11 Rail Intermodal Lift Forecast (Million TEUs per Year) 1-18
Table 12 Summary of Intermodal Forecasts Millions of Containers/Lifts 1-19
Table 13 Highway Performance Measures, Year 2000-Year 2030 1-21
Table 14 Year 2030 Baseline Truck and Vehicle Average Daily Traffic and on the State Highway System 1-21
Table 15 Peak Hour Port Truck Traffic on the Regional System 1-26
Table 16 2004-2024 Air Cargo Forecast Factors Boeing and FAA Growth Rates 1-29
Table 17 MCGMAP Region Air Cargo Forecast Summary 2004-2024 Annual Tons 1-30
Table 18 Annual Tonnage Forecast for the Years 2010, 2020, 2030 1-31
Table 19 SCAG Air Cargo Forecast 2010, 2020, 2030 Annual Tons 1-31
Table 20 Containerized Cargo Forecasts, Port of Los Angeles and Long Beach 2005- 2030 1-33

E.1 INTRODUCTION

Technical Memorandum 4a documents projected levels of goods movement activity in the study area, and outlines four scenarios for future growth and investment in goods movement facilities. These scenarios will be used in Task 6 as a basis for the assessment of a range of impacts for future goods movement plan elements and growth forecasts.

E.2 FREIGHT DEMAND FORECASTS

In order to evaluate the potential impacts of the various components of the freight system, freight demand forecasts to 2030 were developed. The following is a modal summary of these freight demand forecasts for the MCGMAP study area.

Warehouse/Distribution Forecasts

The warehouse sector is expected to remain strong, growing from 1.5 billion square feet of warehouse floor space in 2005 to over 4.5 billion square feet by 2030. This tripling of warehouse space needs is driven on the assumption that international trade through the San Pedro Bay ports will triple from 2005 to 2030 to 42.5 million Twenty Equivalent Units (TEUs). Due to the availability of land, population growth, and real estate and facilities operating costs, by 2020 50% of the new warehouse space is expected to be constructed in San Bernardino and Riverside counties, while 20%, 8%, 8% and 5% are expected to be constructed in Los Angeles, Imperial, Orange and Ventura counties, respectively. The remaining 10% is expected to be constructed outside of the study area, with much of the additional space being provided in the State of Arizona and in Kern County, California. Between 2020 and 2030, based primarily on the decreasing availability of land, the share of the new warehouse space constructed outside the study area will increase to 25% of the total. To accommodate the remaining 75%, Riverside and San Bernardino counties will see 40% of the growth increment, with Los Angeles, Imperial, Ventura and Orange counties seeing 15%, 10%, 5% and 5% respectively[1].

The result is that by 2030, San Bernardino and Riverside counties could have as much as 38% of total warehouse/distribution space, up from 20% in 2005, while Los Angeles County would have about 33% of total warehouse space, down from 60% in 2005.

The above trend is based on the assumption that the demand is directly correlated to the number of TEUs through the ports. If the demand is directly correlated to the growth in population, the total warehouse space will increase to 1.87 billion sq ft. by 2030 due to population growth rate of 23%.

Marine Cargo Forecasts

The MCGMAP study area's ports expect dramatic growth in cargo flows. Driving this growth is the nation's reliance on imports from Asia, particularly from China, whose economy has been growing at an average annual rate of 9% over the past two decades. China is on pace to become

the largest exporter in the world, overtaking the U.S. and Germany by 2010, producing as much as 10% of global trade, up from a current share of 6%.[2]

Container volumes through the San Pedro Bay ports are projected to triple from 14.2 million TEUs in 2005 to 42.5 million TEUs by 2030.[3] These forecasts are capacity constrained at a level significantly below anticipated demand for the study area. One independent study has predicted unconstrained cargo demand to reach 59.4 million TEUs by 2020[4]. The 42.5 million TEUs forecast represents a compound annual growth rate that is half the ports' historical growth rate of 9.7% between 1985 and 2005, and half of China's growth rate over the past two decades. These capacity-constrained forecasts also consider that there will be an improvement in terminal productivity from a current average throughput level of 4,700 TEUs per acre per year to over 10,000 TEUs per acre per year.

The actual number of containers utilizing the landside transportation system will grow from a level of 7.7 million containers to 23 million by 2030, of which 23% or 5.3 million will be local and 77% or 17.7 million are considered long-term discretionary [non-local][5]. Of the long-term discretionary market, 52% or approximately 9.2 million containers would move by rail and the remainder by long-haul truck. By 2030 the truck impact is expected to be about 11 million containers, accounting for the local market and the long haul truck market, but excluding local drayage to and from intermodal yards as well as the local drayage of transload traffic.

Rail Forecasts

Train volumes are expected to increase significantly on the study area's mainline tracks. Growth in train traffic is driven by international trade, domestic intermodal and carload business (which is assumed to grow at the same rate as the domestic economy), and passenger service (Amtrak and Metrolink). The calculations are based on the assumption that TEUs will triple to 42.5 million TEUs from 2005 to 2030. Depending on Metrolink's ultimate growth plan for passenger services, weekday train volumes through the Colton crossing could reach 255 trains by 2025 when compared to 121 trains in 2000. Train traffic through the Alameda Corridor is expected to reach 144 trains per weekday, (an increase of nearly three times averaging 47 trains per day in 2005), and 189 trains per weekday through the Cajon Pass (compared to 96 trains for the year 2000). The Cajon Pass forecast is significantly lower than the growth in intermodal traffic due to an expected shift in some traffic to the El Paso line in order to avoid congestion through the Cajon Pass.

Intermodal Rail Forecasts

There are four distinct intermodal rail market components: international on-dock, international off-dock, transload intermodal (which is international cargo converted into domestic containers), and exclusively domestic intermodal. All four are expected to grow significantly through 2030 based on the assumption that TEUs will triple to 42.5 million TEUs from 2005 to 2030. The first two market components (known as direct intermodal) represent about 40% of the international marine container market. Another 12% represents cargo transloaded into 53-foot domestic containers. The remaining 48% that is trucked is split 23% local trucking and 25% long-haul trucking[6].

Domestic intermodal traffic is expected to grow from a level of 1.2 million lifts in 2004 to 2.4 million lifts by 2030, which represents an annual growth rate of 2.7%, approximately equaling the projected growth of the domestic economy. Lifts is a measure of operational throughput at an intermodal facility relating to the number of containers moved or lifted, from one mode to another (e.g. ship to rail).

By 2030 direct intermodal (on-dock plus off-dock) volumes are expected to reach 9.2 million lifts. There would also be 2.8 million lifts of transloaded intermodal traffic. The transloaded intermodal traffic actually converts to 1.9 million *domestic* containers due to their larger comparative size.

In terms of the on- and off-dock shares of the 9.2 million direct intermodal lifts, if current market ratios hold, each will reach a level of 4.6 million lifts by 2030. However, the San Pedro Bay ports predict that on-dock intermodal could absorb 30% of the entire marine container market, with off-dock absorbing 10%, compared to 20% for each currently. As a result, on-dock intermodal volumes could jump from 1.6 million lifts in 2005 to 6.9 million by 2030, more than a four-fold increase, while off-dock volumes would grow from 1.5 million to 2.3 million lifts annually. Although the railroads have plans for investing in the near-dock facilities in order to reduce the local truck drayage vehicle miles of travel, these projects may not receive community support and environmental approval. As a result the railroads could shift domestic intermodal traffic from the downtown yards to the Inland Empire yards to free up space for international traffic. The result would be an increase in local truck drayage vehicle miles of travel.

Truck Travel Forecasts

Despite the growth in intermodal forecasts, including an aggressive on-dock rail expansion program, truck traffic throughout the region is expected to increase substantially through 2030. The SCAG Heavy Duty Truck model projects truck vehicle miles of travel (VMT) will increase by over 110% by 2030, growing from a level of 22.4 million VMT in 2000 to 48.4 million VMT by 2030. Some freeways in the region currently handle up to 40,000 trucks per day, and by 2025, these freeways may need to handle up to 80,000 trucks per day[7]. As a result of the growth in both passenger and truck traffic, the highway system's performance will deteriorate significantly. Average speeds will drop from 35.9 mph in 2005 to 31.9 mph by 2030, causing an average of 5.4 million hours of delay daily for all traffic and 242,000 hours of delay for heavy duty trucks[8]. These calculations are based on the assumption that TEU's will triple to 42.5 million TEUs from 2005-2030.

The most significant impact of truck traffic will occur at and around the ports. While the share of automobile and truck traffic at the ports of Long Beach and Los Angeles was relatively equally balanced between the two ports in 2000, truck volumes are expected to be 50% higher than auto traffic by 2020[9].

While several highway routes serve as key transportation corridors for freight movements, the I-710 and I-110 corridors are expected to experience the most significant increases in peak-hour port truck volumes by 2025[10].

Air Cargo Forecasts

Growth in air cargo has moderated in the last few years compared to the booming 1980s and 1990s. Distinctions among the major types of service providers are blurring. For example, express carriers which typically focus on small packages now also carry larger packages, and offer time-deferred services in addition to express. Freight forwarders, which typically have not provided line-haul air service, are increasing their role in providing scheduled service to key customers between specific markets. Major gateway airports such as LAX are a focal point for freight forwarders. Moreover, the use of passenger aircraft belly cargo space is expected to continue declining. One indication of this is the United States Postal Service's alliance with integrated carriers such as FedEx, as opposed to their longtime use of passenger belly space to carry mail and parcels. These paradigm shifts in the air cargo industry will have some long-term impacts for the study area. While air cargo will continue to focus on major international gateways such as LAX, the trend away from belly space provides opportunity for air cargo development at the smaller regional airports.

According to Boeing, which manufactures air cargo aircraft and therefore has a working market knowledge of the sector's growth, the domestic air cargo sector is expected to continue growing at an annual rate of 4.1% and the international sector is expected to grow at a rate of 6.8% annually. Using these rates, air cargo volumes for the study area will grow from a level of 2.8 million tons in 2004 to 10.7 million tons by 2030, of which 5.9 million tons will be international and 4.8 million tons will be domestic.

E.3 FORECAST SCENARIOS

For evaluating the impacts of future growth, coupled with various infrastructure investment levels assumed in the SCAG's 2004 Regional Transportation Plan (RTP), four scenarios have been developed, as described below. For this study, SCAG's 2004 RTP Baseline (committed funding and environmental clearance) projects were used for the evaluation process. Baseline represents a future scenario in which only projects that have committed funding and or are in the 2002 Regional Transportation Improvement Plan (RTIP) with state and federal environmental clearance by December 2002 are assumed to be completed. The impacts of these scenarios will be more fully evaluated in Task 6.

Scenario 1: Status Quo Landside Infrastructure Investment	
Purpose	Measure impact of continued trade growth without all of the landside transportation investments that may be required to meet this growth.
Trade/Economics	Trade and economic sectors continue growth. Key trade assumption: 42.5 million TEUs through SPB ports by 2030*.
Infrastructure	Assumes SCAG 2004 RTP Baseline implementation.

Scenario 2: Lower Than Expected Trade Forecasts	
Purpose	Measure impact of lower than expected trade growth without all of the landside transportation investments that may be required to meet this growth.
Trade/Economics	Trade volume is moderated to reflect any possible combination of cargo diversion, economic slowdown, or anti-trade sentiment. Key trade assumption: 33 million TEUs through SPB ports by 2030.
Infrastructure	Assumes SCAG 2004 RTP Baseline implementation

Scenario 3: Lowest Trade Forecasts	
Purpose	Measure impact of an even lower than expected trade growth without all of the landside transportation investments that may be required to meet this growth.
Trade/Economics	Key trade assumption: 24 million TEUs through SPB ports by 2030.
Infrastructure	Assumes SCAG 2004 RTP Baseline implementation.

Scenario 4: Full Trade and Investment Outcome	
Purpose	Measure impact of investing in goods movement system & environmental mitigation to accommodate full trade.
Trade/Economics	Trade & economic sectors continue growth. Key trade assumption: 42.5 million TEUs through SPB ports*.
Infrastructure	Assumes SCAG 2004 RTP Baseline supplemented with additional projects and private investment sources and fees.

* Current containerized cargo forecast for San Pedro Bay ports for 2030.

E.4 APPROACH

To develop and prepare each of the four scenarios for evaluation of impacts in subsequent tasks, a four-step approach was used. For each scenario, the following areas were considered and developed in the overall process:

- Identify the main driving forces and the areas of uncertainty
- Identify the policy/investment/operational variables and their purposes
- Set key evaluation criteria and their measures
- Identify data needs and availability

Therefore for each scenario case, this approach was applied in getting ready to analyze the impacts of future goods movement growth on the existing and future infrastructure needs, leading to the quantification of impacts, the possible mitigation measures and the development of the Multi-County Goods Movement Action Plan (MCGMAP).

Tech Memo 4a presents baseline travel demand forecasts for all modes – rail, truck, ocean, and air. This section discusses forecasts of freight demand in the following major categories:

- Warehousing and distribution
- Rail
- Trucking
- Air cargo
- Ocean cargo

1.1 WAREHOUSING AND DISTRIBUTION

Forecasting of warehousing and distribution begins with the establishment of a baseline (current conditions). The next steps are to project total future square footage and to allocate growth to sub-regions based on siting constraints and location preferences.

- Current Square Footage Data:
  - Regional data is very limited.
  - Warehouse and distribution square footage space data is often included in a category of industrial space, which includes manufacturing, research and development as well as warehousing – basically, industrial includes all facilities other than those classified as office.
  - Organizations producing real estate data, such as Grubb & Ellis, CBRE, and the SIOR (Society of Industrial and Office Realtors), make a reasonable effort to isolate warehouse space, and their data is assumed to be reasonably accurate.

- Forecast Data:
  - There is no group that forecasts warehouse and distribution space beyond the near term (i.e., one or two years).
  - This includes importers, exporters, real estate developers, brokers, and warehouse logistics associations.
  - Individual companies may forecast warehouse requirements; however, they generally are for their proprietary use only.

- Approach for the Study:
  - Projected growth of container volumes through the Ports of Los Angeles and Long Beach (San Pedro Bay Ports) is the most reliable index for forecasting future warehouse needs.

As shown in Table 1 below, there is a reported 1.525 billion square feet of warehouse space in the study area in 2005. Dividing 1.525 billion square feet of warehouse space by 14.2 million TEUs yields 107 square feet per TEU. This factor applied to future TEU forecasts (as shown later in Table 20) yields 3.8 billion square feet in 2020 and 4.5 billion square feet in 2030. As the ports approach capacity between 2020 and 2030, growth in containerized cargo slows down as does growth in warehousing. Not all of the future growth in warehouse space will be confined to the study area. Given the trends toward more distant warehousing, Kern County, Imperial County and Arizona can be expected to capture a share of the future growth.

Table 1
Projected Total Square Footage of Warehouse Space

2005 (Base-Line)	2020	2030
1.525 billion sq ft * 1.525 billion sq ft ÷ 14.2 mil TEUs = 107 sq ft/TEU	3.8 billion sq ft ** (107 sq ft / TEU x 36 mil TEUs)	4.5 billion sq ft ** (107 sq ft / TEU x 42.5 mil TEUs)

*Net rentable area in study area: Los Angeles County, Orange County, Inland Empire, and Ventura County. From Table 1, Technical Memorandum 3.
** Total growth not confined to study area alone.
Source: NAIOP and CBRE 3Q2005

Table 2 below shows the projected total square footage based on the growth in population. This indicates that by 2030, the total warehouse space will increase to 1.87 billion square feet. This is however based on the assumption that the increase in warehouse space directly corresponds to the growth rate in population.

Table 2
Projected Total Square Footage Based on Population Growth

2005 (Base-Line)	2020	2030
1.525 billion sq ft 1.525 billion sq ft ÷ 18 mil = 84.66 sq ft/person	1.75 billion sq ft (84.66 sq ft / person x 20 mil)	1.87 billion sq ft (84.66 sq ft / person x 22 mil)

Source: State of California, Department of Finance, 'Race/Ethnic Population', 2000-2050

Warehouse Land Use Review

Table 1 and Table 2 show the projected warehouse square footage based on future TEUs forecast and growth in population respectively. An assessment of planned warehouse development was made using the existing (Year 2005) land use and 2004 General Plan land use. Both datasets were received from SCAG. There are approximately 25,000 acres of land in the category "Wholesaling and Warehouse" in the 2005 land use. Wholesaling and Warehouse is one of the categories in the Land Use scheme. To accommodate 1.5 billion square feet of warehouse floor space on 25,000

acres of land in 2005 (as shown in Table 1 above) would require approximately 60,000 square feet of floorspace per acre of land.

The existing land use figures were broken down by county as shown in Table 3. Each county was reviewed in the existing (year 2005) land use file to determine the fraction of industrial land that was in "Wholesaling and Warehousing" as shown in the Table 3 below. These figures are shown in square meters.

The General Plan land use file received from SCAG does not have a warehousing category. The General Plan categories are less detailed than the existing land use categories. It was determined that it would be necessary to use the fraction of the warehousing category calculated from the existing land use file and apply to the General Plan industrial land use category.

Table 3
Warehouse Proportion of
Existing Industrial Land Use

COUNTY	Warehouse (sq meters)	Industry (sq meters)	Fraction
IMPERIAL	859754.19	43535682.07	0.020
LOS ANGELES	42182844.12	306877686.4	0.138
ORANGE	12452286.22	88864994.81	0.140
RIVERSIDE	11761325.85	107893171.1	0.109
SAN BERNARDINO	33336625.75	247422760.3	0.135
VENTURA	1828838.22	64857384.8	0.028

Source: SCAG 2005 land use and 2004 General Plan land use

The fractions were then applied to the area of industrial land derived from the 2004 General Plan as shown in Table 4 below. The total warehouse area is approximately 36,600 acres. The 36,600 acres translates roughly into 2.22 billion square feet of warehousing. This is calculated by multiplying the total 36,600 acres and the 60,000 square feet of warehousing per acre.

Table 4
Acres of Planned Warehousing Land Use

COUNTY	Industry (acres)	Fraction	Warehouse(acres)
IMPERIAL	9,631	0.020	190
LOS ANGELES	103,758	0.138	14,262
ORANGE	23,106	0.140	3,238
RIVERSIDE	67,050	0.109	7,309
SAN BERNARDINO	84,868	0.135	11,435
VENTURA	7,339	0.028	207
Total			36,641

Source: SCAG 2005 land use and 2004 General Plan land use

A number of factors may contribute to the difference between planned warehousing and warehousing forecast for the MCGMAP region. The differences are likely due to some combination of these factors:

- General Plan land use is not easy to collect and integrate into a data file. There could be areas planned for industrial development that were not captured or were not placed in the industrial category and may not reflect the current trends.

- The warehouse proportion of industrial land may increase by 2030. There are some 17.5 billion acres of General Plan industrial land. Warehousing is now some 12.7% of that total. To achieve 4.5 billion square feet, warehousing would need to increase region wide to 25.7% of the industrial mix, or roughly double.

- Local jurisdictions, which are the source of the General Plan data, may not have anticipated the requirements for the amount of industrial development that could occur with the increased port utilization and the necessary warehousing of goods in other locations.

Comparing the 1.87 billion square feet of warehouse based on population growth with 2.2 billion square feet of warehouse based on assessment of SCAG General Plan and 4.5 billion square feet of warehouse based on future TEUs forecast, it indicates that growth in warehousing based on population growth for the Year 2030 can be accommodated.

Land Use Shifts and Location Preferences

Based on interviews with senior industrial real estate brokers with CB Richard Ellis, Cushman and Wakefield, and Colliers Seeley Company the following shifts and location preferences were identified:

Los Angeles County

- Virtually no appropriately sized land is available in the Los Angeles basin to build industrial real estate warehouse facilities which is not encumbered by restrictions/environmental concerns such as oil lease or hazardous contaminated soil.
- 1.5 million square feet of warehousing has recently been demolished to make way for residential development.
- Residential square footage is worth 2 ½ to three times the value of industrial square footage.
- Commercial (retail) space, which is worth twice as much as industrial space, is putting pressure on existing warehouse facilities.
- If the merchandize is import related, location preference is close to ports.
- Very little new warehouse construction activity is taking place.
- The primary potential warehouse expansion areas are in the Lancaster/Palmdale area.

Orange County

- There have been many shifts from industrial to residential developments.
- Industrial real estate developers cannot compete for land against residential real estate developers.
- The county is nearly out of land for industrial real estate development.
- The majority of industrial buildings are small manufacturing, entrepreneurial businesses and small to medium size warehouses/distribution operations.
- Many study area cities do not encourage warehousing and trucking activities, through their land use and zoning policies.
- Nearest warehouses of 100,000 sq ft and greater are in Mid Counties (Santa Fe Springs area and Inland Empire area).

Ventura County

- The County is nearly out of buildable land. Difficult to find even one to 10 acres to build on.
- The Save Our Agriculture Resources (SOAR) slow growth initiative has been very effective at keeping away industrial developments.
- During the next two to three years, the west county area should have approximately 800-1,000 gross acres to build industrial facilities.
- Many small companies are moving to the area for its quality of life.
- Ventura County is not located next to major interstate highways or rail intermodal facilities which make it unattractive for Fortune 500 corporations' warehouses.

Inland Empire

- The economies of the western Inland Empire (Rancho Cucamonga, Ontario, Chino, Fontana, Rialto) have matured where communities are beginning to feel that there is a better use (e.g., office, retail, and open areas) for land than for industrial real estate facilities.
- Air quality and traffic congestion issues are making local politicians focus on issues and solutions.
- Even the Inland Empire (San Bernardino, Redlands, Moreno Valley, Perris, and Riverside) with the last desirable industrial real estate, is facing pressures for alternative land uses.
- There is clearly a trend of locating future warehouse locations out more than 80 to 100 miles from the Ports of Long Beach and Los Angeles to the Banning, Beaumont, and Victorville areas.
- A key ingredient for future growth in the Victorville/Apple Valley area is a new rail intermodal facility close by.
- The next big industrial real estate development areas (estimated future buildout of five to 10 million square feet) will be located along I-215 south of the SR-60/I-215 interchange.
- Major highways in the Inland Empire are continually congested with heavy trucks and automobiles throughout a seven day period.

Imperial County, Kern County, Arizona

- A consensus does not exist on land use shifts and location preferences for areas beyond the study area. However, these areas can be expected to capture a share of future growth.

Based on the above location preferences and market considerations, projections of future warehouse space have been made for the different sub-regions.

Table 5
Total Square Footage Distribution of Growth Estimates by County

County	Estimated Capture Rates of Total Square Footage Growth	
	2005- 2020[a]	2020- 2030[b]
Los Angeles	20%	15%
Inland Empire	50%	40%
Orange	7.5%	5%
Ventura	5%	5%
Imperial	7.5%	10%
Other (e.g., Kern County; Arizona)	10%	25%
Total	100%	100%

[a]Based primarily on availability of land, population growth, real estate and facility operating costs
[b]Based primarily on current warehousing trends considering decreasing availability of 'close-in' land in the future
Source: NAIOP and CBRE 3Q2005

Table 6
Forecast of Warehouse Space by County (millions of square feet)

	2005		2020		2030	
Market Area	Net Rentable Area	% of Total	Net Rentable Area	% of Total	Net Rentable Area	% of Total
Los Angeles County	916	60%	1,381	36%	1,486	33%
Inland Empire	303	20%	1,467	38%	1,745	38%
Orange County	246	16%	421	11%	455	10%
Ventura County	60	4%	176	5%	211	5%
Imperial			175	4%	244	5%
Other			233	6%	407	9%
Total	1,525	100%	3,853	100%	4,548	100%

Source: Wilbur Smith Associates, 2006

Forecast – Key Conclusions

- The regional outlook for warehouse and distribution will remain strong in all Southern California sub-regions.
- Current warehouse and distribution square footage is forecasted to triple from current levels of 1.5 billion sqare feet to 4.5 billion square feet in 2030. This growth is driven by the projected tripling of port containerized cargo by 2030.
- The location of warehouses is shifting further east to the high desert of Los Angeles County and further north and east into the Inland Empire and beyond.
  - This is driven primarily by the limited available land for new development close to the ports (i.e., Los Angeles and Orange counties).

1.2 RAIL

The purpose of this section is to outline a forecast for train movements on the Burlington Northern Santa Fe Railway (BNSF) and the Union Pacific Railroad (UP) mainlines in the Los Angeles region in year 2025. These lines provide connection between Los Angeles and the transcontinental rail system as shown in Figures 1 and 2. The forecast includes freight and passenger volumes. Freight volumes include intermodal and carload traffic. Passenger forecasts include Amtrak long distance trains, Amtrak California Corridor trains, and Metrolink commuter trains. All of the forecasts discussed below assume an *unconstrained* track and rail yard infrastructure. In other words, the capacity will be there to support the volumes. The line and yard capacities of short lines are also assumed to increase to meet any increases in demand.

The train forecasts for a peak weekday in 2025 on particular segments of the BNSF and UP mainlines appear in Table 7. The 2025 port-related intermodal forecasts are based on estimates of intermodal volumes developed by the Ports of Los Angeles and Long Beach. Intermodal (domestic and international traffic) grew 5.5% in 2005 and continues to outpace the domestic economy[1]. Rail industry executives interviewed about their growth expectations for intermodal traffic in Southern California are anticipating a compound annual growth rate (CAGR) of 7-9%. The conventional rail carload business is assumed to grow at about the same rate as the domestic economy[2]. Forecasts of 2025 passenger trains also appear in Table 7. For comparative purposes, Table 7 includes track segment forecasts of 2025 train volumes (where they exist) cited in a recent study produced for the Southern California Association of Governments (SCAG).

This discussion highlights three particularly high volume track segments, as these may become congestion bottlenecks in the future: the Alameda Corridor, Colton Crossing, and Cajon Pass.

Source: The Professional Railroad Atlas of North America, Edition 2

Figure 1

RAILROADS AND MAINLINES IN THE MCGMAP STUDY AREA SERVING CALIFORNIA, ARIZONA, NEVADA, AND OREGON

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS

524930/BASE - 3/1/06

ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates

Figure2
BNSF TRANSCON WEST OF SAN BERNARDINO, UP LOS ANGELES SUBDIVISION, AND UP ALHAMBRA LINES

524930/BASE - 3/1/06

Rail Volume Forecast

BNSF Mainline

As noted in Technical Memorandum 3, BNSF's Transcon runs through the Los Angeles region. Train volume on the Transcon considered in this analysis runs on track segments between Barstow in the east and Los Angeles and the Ports of Los Angeles and Long Beach in the west. An average of about 47 BNSF trains per day runs on the Transcon between Fullerton and Hobart Yard. This traffic includes port-related intermodal trains, domestic intermodal trains, carload trains, and ethanol unit trains. This number should more than double to 102 trains in year 2025, based on forecasts of port-related intermodal container volumes and continuing trends in domestic intermodal and container shipments[3]. This figure is very close to the 112 trains predicted by the *Inland Empire Railroad Main Line Study* (June 2005), developed for SCAG[4].

The rail forecasts shown below were derived by the Wilbur Smith Associates team. Freight volumes include intermodal and carload traffic on the BNSF and UP mainlines. Passenger rail forecasts include Amtrak long distance trains, Amtrak Pacific Surfliner corridor trains (Corridor), and Metrolink commuter trains. The forecasts were based on the most recent available data from BNSF, UP, Amtrak, and Metrolink.

Table 7

2025 Forecast of Trains per Day on Freight Mainlines in the Los Angeles Area									Inland Empire Study		
TRACK SEGMENTS	BNSF	UP	Amtrak	Corridor	ML A	ML B	Total A	Total B	Freight	Psgr	Total
BNSF											
Barstow-San Bernardino	131	29	2				162	162	178	8	186
San Bernardino-Colton	111	29	2		26	40	168	182	166	36	202
Colton-West Riverside	111	37	2		26	40	176	190	194	36	230
West Riverside-Atwood	111		2		50	66	163	179	121	62	183
Atwood-Fullerton	102		2		24	26	128	130	112	34	146
Fullerton-Hobart	102		2	32	52	74	188	210	112	106	218
Hobart-Redondo	74		2	32	52	74	160	182			
Atwood-Orange	9				26	40	35	49			
Fullerton-Orange				32	48	48	80	80			
Orange-Laguna Niguel-Oceanside-San Diego	9			32	74	88	115	129			
UP											
East Los Angeles-Pomona (LA Sub)		82			40	44	122	126	68	36	104
Pomona-Mira Loma (LA Sub)		30			40	44	70	74	68	36	104
Mira Loma-West Riverside (LA Sub)		37			40	44	77	81	73	36	109
Pomona-Los Angeles (Alhambra Line)		36	1				37	37	49	8	57
Pomona-West Colton (Alhambra Line)		112	1				113	113	49	8	57
Los Angeles-Burbank		18	2	14	76	78	110	112			
Burbank-Coast Line		12	2	14	34	36	62	64			
Burbank-Palmdale		6			42	42	48	48			
Palmdale-Colton (Colton Cutoff)		27					27	27	9	0	9
Los Angeles-Dolores		4					4	4			
Colton-El Paso Line		80	1				81	81	87	8	95
Alameda Corridor							144	144			
Colton Crossing	111	101	3		26	40	241	255	202	65	267
Cajon Pass	160	27	2				189	189	187	8	195

Note: Corridor refers to the Pacific Surfliner trains
ML A refers to low growth Metrolink A scenario
ML B refers to high growth Metrolink B scenario

Source: Wilbur Smith Associates, 2006

Table 7 highlights forecasted 2025 train movements on BNSF Transcon segments between Barstow and Hobart Yard, as well as on other trackage sold by the former Atchison, Topeka and Santa Fe Railway (predecessor of BNSF) to public agencies between Atwood and San Diego. The Transcon hosts Amtrak long distance trains (the Southwest Chief) and Pacific Surfliner corridor trains (operated by Amtrak and sponsored by Caltrans). 2025 volumes for these services appear in Table 7 as well[5].

Also appearing in Table 7 are Metrolink commuter train volumes. These include trains operating the 91 Line service (Riverside-Los Angeles) and the Inland Empire Orange County Line service (San Bernardino-Atwood-Laguna Niguel). Metrolink 2025 volumes are estimated for two different growth scenarios: low growth Metrolink A (ML A) and high growth Metrolink B (ML B), per current Metrolink planning assumptions for Year 2020. Accordingly, total train volume on the Fullerton-Hobart Yard segment of the Transcon could reach 210 trains per day in the high-growth scenario. This compares to 218 predicted by the *Inland Empire Railroad Main Line Study*.

A forecast of Year 2025 UP trains operating on the BNSF Transcon also appears in the table. UP trains run on the Transcon only between West Riverside (the connection to the UP Los Angeles Subdivision) and Daggett, east of Barstow (the connection to the UP's Las Vegas Line).

As noted in Technical Memorandum 3, UP shares BNSF's tracks over Cajon Pass (BNSF does not have operating rights on UP's track through the Pass). By 2025, this analysis concludes 160 freight and 2 passenger trains will run on BNSF tracks through the Pass. These will include BNSF, UP and Amtrak long distance trains.

The BNSF and UP volumes were calculated from projections of intermodal traffic provided by ports. The carload growth were based on an assumption of the growth of the national economy. Amtrak and Pacific Surfliner numbers were estimated by Wilbur Smith Associates and the Metrolink train numbers were obtained from Metrolink.

The rest of the Transcon between Hobart and San Bernardino should be very busy as well. There are plans today to triple track the existing double track between Hobart and Fullerton to accommodate future freight and passenger volumes. It is likely that freight and passenger volumes will also require triple track between Fullerton and Colton. BNSF today has three main tracks between Colton and Rana and four main tracks between Rana and San Bernardino.

As noted earlier, the forecasts that appear in Table 7 are *unconstrained* forecasts: they are not limited by existing capacity of the mainlines in the Los Angeles area. At the same time, the forecasted volumes of various lines may well exceed the current capacity of the lines – thus begging the question of capacity investments. Indeed, BNSF and Metrolink planners have considered fully triple tracking the Transcon from Fullerton to Colton to facilitate future freight and commuter train volumes. Metrolink assumes that the UP's Los Angeles Subdivision may need to be fully double tracked to allow for future freight and commuter volumes there. As a general comment, this analysis concludes that the capacities of Los Angeles area mainlines need to be reviewed carefully to ascertain what capacity enhancements are needed to allow for the forecasts discussed above.

At the same time, current agreements between public agencies sponsoring passenger services and the freight railroads may not allow for the volumes envisioned in Table 7. Accordingly, if these volumes are to be achieved, the railroads may force these agreements to be renegotiated.

UP Mainline

UP runs trains on multiple corridors into and out of the Los Angeles Basin. The lines include the Alhambra Line between West Colton and Los Angeles and the Los Angeles Subdivision between West Colton and Los Angeles. UP also uses the Coast Line, the Santa Clarita Line, the El Paso Line, and the Colton Cutoff. This analysis developed Year 2025 train volume forecasts for all these lines.

Shown in Table 7, the highest daily volume track segments for UP in 2025 will be the Los Angeles Subdivision between East Los Angeles and Pomona with a maximum of 126 trains, the Alhambra Line between Pomona and West Colton with 113 trains, and the Los Angeles-Burbank with a maximum of 112 trains. The first two-track segments should actually be understood in this forecast as two sides of the same coin. That is, UP will use an LA Subdivision-Alhambra Line routing, with a crossover at Pomona, for the bulk of its intermodal movements in 2025. This is a different approach from today, where UP generally seeks to route eastbound through traffic[6] on the LA Subdivision and westbound through traffic on the Alhambra Line[7]. Forecasts in the 2005 SCAG study apparently did not assume this change.

Traffic on East LA-Pomona segment of the LA Subdivision will include port-related and domestic intermodal trains, carload trains, and Metrolink commuter trains. The Pomona-West Colton segment of the Alhambra Line will see intermodal, carload, and local "hauler" trains, as well as one Amtrak long distance train six days a week (the Sunset runs three times a week in each direction).

Volume between Los Angeles and Burbank will be comparatively high for two reasons. First, UP routes both Coast Line and Santa Clarita Line traffic to and from Los Angeles through Burbank, and this traffic will grow[8]. Second, passenger train volumes will increase. Surfliner corridor trains total 14 trains per day[9]. Amtrak Coast Starlight service will be unchanged. Metrolink also will have increasing volumes for its Ventura Line and Antelope Valley Line commuter services, both of which use this track segment.

West of Burbank (on the Coast Line), UP will route carload and local hauler trains. Surfliner, Coast Starlight and Metrolink Ventura Line trains will also run west of Burbank. Corridor and commuter services will have higher service levels than today, whereas the Amtrak Coast Starlight will not.

North of Burbank on the Santa Clarita Line, UP will run domestic intermodal traffic between LA, the Bay Area, and the Pacific Northwest. Metrolink will also run its Antelope Valley Line trains in increasing numbers.

East of Colton, UP runs trains on the El Paso Line to destinations in the midwest and Gulf Coast. UP is upgrading this line to handle the bulk of its east-west transcontinental traffic – including the majority of UP's share (assumed here at 52%) of Los Angeles and Long Beach port-related intermodal shipments. By 2025, this analysis assumes 81 trains will run on this line segment on a peak weekday. The total includes one Amtrak Sunset train six days a week. UP also runs traffic north of Colton, through the Cajon Pass and onto the Colton Cutoff. This is the traditional former Southern Pacific routing for traffic running between the Pacific Northwest/Northern California and the Gulf Coast. The present volume of 15 trains per day should increase to 27 by 2025.

Alameda Corridor Transportation Authority (ACTA) was selected by UP and BNSF to conduct a feasibility study to analyze alternatives and costs for the design and construction of an east-west structure, which would grade separate the BNSF and UP mainline tracks at Colton Crossing. In addition, a north-south flyover will be evaluated to the south of Colton Crossing to reduce conflicts of UP trains crossing the BNSF San Bernardino Subdivision. The study will define the preferred project concept as well as the required staging to support operations during construction, and project costs. The final study will be used to revise and update the existing Colton Crossing Project Study Report (PSR) on file with the California Department of Transportation and to provide input to a future Project Report/Environment Documents (PR/ED), to be developed by San Bernardino Associated Governments (SANBAG).

Alameda Corridor

This forecast estimates that there will be 144 trains on a peak weekday operating on the Alameda Corridor between Redondo Junction and the Ports of Los Angeles and Long Beach. This is a 220% increase from 45 trains per peak day in 2005. The vast majority of the traffic is port-related intermodal traffic, to and from on-dock and near-dock intermodal facilities in the port area. The corridor is a triple-track segment, and any train derailment on any track would have the potential for severely restricting train flow. BNSF and UP maintain their separate pre-corridor routes between downtown LA and the ports in part for this eventuality.

Colton Crossing

This is where the BNSF Transcon crosses the UP El Paso Line. Volume through the crossing should climb to 255 in 2025. This averages to more than 10 trains per hour. The forecasted total is an 88% increase from the current volume of 135 trains per peak day. Maintaining an at-grade crossing with such volume may not be practical. If so, a solution would be to build a grade separation of the two rail routes.

Cajon Pass

Tracks in the Pass today consist of two BNSF tracks and a UP track (the UP track is referred to as part of the Colton Cutoff); a total of three tracks. This analysis assumes total BNSF and UP volumes through the Pass should total to a maximum of 189 trains in 2025. This is an increase of 89% from the current volume of about 100 trains per peak day. The previously referenced SCAG

study forecasted 195 trains per peak day in 2025. The difference is due to that study's assumption of six more passenger trains through the Pass.

As with the Alameda Corridor, a derailment on any of these three tracks would have the potential for severely restricting train flow. BNSF is building a third track through the Pass, which, when put into operation in 2008, will provide a fourth track. At that point there would be three BNSF tracks and one UP track through the Pass.

The BNSF system has three existing main tracks south of Cajon Pass and two higher speed tracks north of the Pass. The third track through the Pass will remove the bottle neck that results from the slow train speeds required to negotiate the steep grades through the Pass. The third main track through Cajon Pass is being constructed between Cajon Summit and Keenbrook, a distance of about 16 miles.

Rail Intermodal Lift Forecasts

As reported in Technical Memorandum 3, both the mainline and intermodal facilities face significant capacity and operational issues. One of the key rail market segments that is driving the need for capacity is international containerized intermodal cargo through the ports. Therefore, in addition to estimating the mainline forecast volumes, it is also important to estimate the intermodal lift forecast volumes. This section of the report summarizes international marine-related intermodal forecasts as well as domestic intermodal forecasts.

Marine-Related Intermodal Lift Forecasts

The marine-related intermodal forecasts are based on the port container forecasts produced in this report, converted into intermodal container equivalents. The forecasts are for three major intermodal categories:

1. On-Dock Intermodal
2. Off-Dock Intermodal
3. Transload Intermodal

The first two categories are referred to as "direct" intermodal, whereby the containers transfer directly from the ocean vessel to the rail car, without being consolidated or transloaded. The third category is containerized marine shipments that are consolidated into larger containers before being transloaded onto rail.

Tables 8 and 9 present a breakdown of the direct intermodal forecasts. The first step in estimating the intermodal forecasts is to convert the port TEU forecasts into container equivalents. This is an essential step that estimates the actual number of intermodal lifts that have to occur. TEUs are a 20-foot equivalent measure of volume and not necessarily a measure of the actual number of boxes or containers. Based on the most recent San Pedro Bay Ports data, there are 1.85 TEUs per actual container/box[10]. In other words, to get an accurate measure of the number of boxes that

have to be lifted (for example, at an intermodal yard), the TEU equivalent forecasts are divided by 1.85.

It is estimated that in 2030 the forecasted 42.5 million TEUs equates to roughly 23 million actual containers.

The next step is to divide the number of containers by the market shares for the different modal components. Based on the data produced for Technical Memorandum 3, the current modal market shares are shown in Table 8.

Table 8
Current Modal Market Shares for Marine Containerized Traffic

Rail Intermodal	52%
On-Dock Intermodal	20%
Off-Dock Intermodal	20%
Transload Intermodal	12%
Truck	48%
Local	23%
Long-Haul	25%

Source: Wilbur Smith Associates, 2006

For purposes of the forecasts, the overall mode split between truck and rail intermodal is assumed to remain the same. Moreover, the transload intermodal share is also assumed to remain constant.

By applying the 1.85 TEUs/Container conversion factor to each of the port forecast years, and then applying the 40% intermodal market share, the marine container intermodal market will reach an estimated 9.2 million lifts by 2030, up from 3.2 million lifts in 2005 as shown in Table 9.

Table 9
San Pedro Bay Ports Direct Intermodal Rail Volume Forecasts (Millions)

	2010	2020	2030
Total Port TEUs (a)	19.700	36.200	42.500
Total Port Containers (b)	10.649	19.568	22.973
On-Dock Intermodal	2.130	3.914	4.595
Off-Dock Intermodal	2.130	3.914	4.595
Total On & Off-dock Intermodal	4.259	7.827	9.189
As % of Total Port Containers (c) (d)	40.0%	40.0%	40.0%

Sources for data and assumptions:
(a) Ports of Los Angeles and Long Beach.
(b) Total port container throughput calculated by dividing TEUs by 1.85 TEUs/container.
(c) Direct intermodal (excludes transload).
(d) Assume direct intermodal share remains constant (rail share is fully saturated).

Following the same overall approach and utilizing the respective market share estimates for the intermodal transload market (12%), it is estimated that by 2030, 1.9 million containers will be transloaded and transferred to intermodal rail. However, this estimate also takes into consideration the reduction in container lifts as a result of the marine cargo shipped in smaller containers being packed into larger domestic containers. While it is difficult to accurately define the conversion factors, it is estimated that roughly 85% of the domestic container fleet will be 53 foot standard containers, which hold 149% more than 40 foot marine container, and 15% will be 48 foot standard containers, which hold 135% more than 40 foot marine container.[11] These container conversion factors were taken into consideration when producing the transload intermodal lift estimates. These volume forecasts are shown in Table 10.

Table 10
San Pedro Bay Ports Intermodal Rail Transload Volume Forecasts (Millions)

	2010	2020	2030
Total Port TEUs (a)	19.700	36.200	42.500
Total Port Containers (b)	10.649	19.568	22.973
Marine Containers Transloaded to Rail			
Total Marine Containers	1.278	2.348	2.757
As % of Total Containers (c)	12%	12%	12%
Standard Container Equivalents Transloaded			
48 Foot Standard Container (d)	0.142	0.261	0.306
As % of Rail Transload Fleet (e)	15%	15%	15%
53 Foot Standard Container (f)	0.729	1.340	1.573
As % of Rail Transload Fleet (e)	85%	85%	85%
Total Transload Rail Lifts	0.871	1.601	1.879

Sources for data and assumptions:
(a) Ports of Los Angeles and Long Beach.
(b) Total port container throughput calculated by dividing TEUs by 1.85 TEUs/container.
(c) "Consolidation Activity in the Southern California Area," Alameda Corridor Transportation Authority, March 2004. Table 10.
(d) 48 foot standard container assumed to hold 135% more than 40 foot marine container.
(e) "Port and Modal Elasticity Study." Southern California Association of Governments, September 2005. Page 83.
(f) 53 foot standard container assumed to hold 149% more than 40 foot marine container.

Table 11 shows the direct rail intermodal demand and capacity which includes the on-dock, near-dock and off-dock and excludes transloaded cargo. The SPB variance of -2.23 means that there would be a shortfall of 2.23 million TEUs in intermodal lift capacity if no additional near dock or off-dock facilities are constructed.

Table 11
Rail Intermodal Lift Forecast
(Million TEUs per Year)

Direct Intermodal excludes transload	2005 Actual	2010	2015	2020	2030
SPB Cargo Forecast (Demand)	14.2	20.2	27.1	36.2	42.5
SPB Direct Intermodal (Demand)	5.67	8.10	10.84	14.48	17.01
POLB On-Dock Capacity	1.09	2.27	4.15	5.49	6.10
POLA On-Dock Capacity	1.84	2.79	4.33	6.25	6.84
SPB Off-Dock Capacity	1.69	0.67	0.04	0.00	0.00
SPB Near-Dock Capacity	1.08	1.40	1.84	1.84	1.84
SPB Variance (negative = shortfall)	0.03	-0.97	-0.48	-0.90	-2.23

Source: San Pedro Bay Ports Rail Study Update, December 2006

Domestic Intermodal Lift Forecasts

In 2004, the number of intermodal lifts totaled 4.67 million, of which an estimated 2.86 million were direct marine intermodal transfers, or international.[12] The domestic intermodal volumes made up the difference of 1.81 million lifts, which included an estimated 580,000 lifts in transload containers (31%) which are counted as domestic intermodal lifts by the railroads. The 2004 transload estimate is based on the same approach outlined earlier, namely, applying a 12% market share to the 2004 TEU volumes through the ports, further adjusted by the 1.85 TEUs/container factor, and further adjusted to account for the uploading of marine container contents to the larger 48 foot and 53 foot domestic containers. Therefore, the adjusted domestic intermodal estimated volume for 2004 is 1.23 million lifts.

Domestic intermodal business is assumed to grow at about the same rate as the domestic economy, specifically between 2-3% annually.[13] Therefore, the domestic share of the intermodal is expected to reach 2.4 million lifts by 2030 as shown in Table 12.

It is important to note that the domestic intermodal market includes containers on flat car (COFC) as well as containers on trailers loaded on flat car (TOFC).

Summary of Intermodal Rail Forecasts

Table 12 contains a summary of the rail intermodal forecasts. As a whole, the study area is expected to generate roughly 13.5 million intermodal lifts by 2030, a threefold increase from 2005 levels. 68% of the intermodal market is expected to be direct marine intermodal transfers, 14% is expected to be transloaded marine cargo, and 18% is expected to be exclusively domestic.

Table 12
Summary of Intermodal Forecasts
Millions of Containers/Lifts

	2010	2020	2030
Int'l Intermodal	4.259	7.827	9.189
Transload Intermodal	0.871	1.601	1.879
Domestic Intermodal	1.428	1.863	2.430
Total	6.558	11.291	13.498

Source: Wilbur Smith Associates, 2006

1.3 TRUCK

Forecasting future volumes of truck traffic helps to determine how much freight activity the highway system will need to accommodate. Freeways and major streets currently need improvement to deal with existing problems as well as anticipated future growth. Figure 3 shows the existing highway system within the study area. Some freeways in the region currently handle up to 40,000 trucks per day, and by 2025, they may need to handle up to 80,000 trucks per day[14]. The SCAG Heavy Duty Truck model projects an increase of over 110% in truck vehicle miles traveled (VMT) by 2030[15]. SCAG estimates that by 2025 VMT for all classes of vehicles will increase by 42% and that heavy-duty truck mileage will increase by 70%.[16].

SCAG 2004 RTP used both the Base Year (2000) and the Baseline (committed funding and environmental clearance) scenario for 2030 to compare for each criterion of the Plan (2030). Baseline (committed funding and environmental clearance) growth represents a future in which there are no changes in land-use from established general plans. Baseline (committed funding and environmental clearance) growth represents a trend projection that assumes continuation of existing land-use policies, and completion of regional transportation projects that are already committed for funding.[17] This projection excludes consideration of growth proposed in the RTP, and projects that are proposed in the Plan over and beyond the committed projects, including Maglev and other corridor improvement projects.[18]

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Figure 3
EXISTING HIGHWAY SYSTEM WITHIN THE MCGMAP STUDY AREA

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Table 13 is based on the SCAG's regional travel demand model. Speed and delay are used to compute performance measures for both 2030 Baseline and Plan 2030[19].

Table 13
Highway Performance Measures, Year 2000 – Year 2030

Performance Measure	Baseline 2000	Baseline 2030	Plan 2030
Average Daily Speed (mph)	35.9	31.9	35.2
Average Daily Person Hours of Delay (in millions)	2.2	5.4	3.2
Average Daily Heavy Duty Truck Hours of Delay (in thousands)	71	242	165

Source: SCAG 2004 RTP

Table 14 presents a summary of the vehicle and truck forecasts on the State highway system within the SCAG region for the Year 2030. These forecasts are based on the travel demand modeling results produced by SCAG for the 2007 Draft Air Quality Management Plan and include all Baseline projects from the 2004 RTP. The Baseline projects have committed funding and can therefore be assumed to be constructed by 2030.

Table 14
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Name	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
I-10	E	PCH to I-405	4,892	93,603	0.05	W	4,441	85,746	0.05
I-10	E	I-405 to I-110	8,161	161,698	0.05	W	8,814	157,124	0.06
I-10	E	I-110 to I-5	12,107	164,656	0.07	W	11,596	152,176	0.08
I-10	E	I-5 to I-710	7,475	127,320	0.06	W	8,997	123,820	0.07
I-10	E	I-710 to I-605	8,535	124,943	0.07	W	9,469	125,958	0.08
I-10	E	I-605 to SR-57	12,668	112,408	0.11	W	15,178	100,866	0.15
I-10	E	SR-57 to I-15	21,655	112,076	0.19	W	16,055	106,089	0.15
I-10	E	I-15 to I-215	10,154	92,981	0.01	W	12,902	101,491	0.13
I-101	N	I-5 to I-10	13,838	98,783	0.14	S	12,269	107,680	0.11
I-101	N	I-10 to I-110	18,466	170,571	0.11	S	15,274	172,289	0.09
I-101	N	I-110 to I-170	18,887	173,880	0.11	S	17,068	169,782	0.10
I-101	E	SR-170 to I-405	12,965	161,027	0.08	W	13,812	172,454	0.08
I-101	E	I-405 to SR-118	11,505	146,641	0.08	W	12,528	142,837	0.09
I-105	E	PCH to I-405	5,177	74,430	0.07	W	4,851	74,209	0.07
I-105	E	I-405 to I-110	8,590	101,566	0.08	W	9,127	108,082	0.08
I-105	E	I-110 to I-710	7,461	96,861	0.11	W	8,622	98,175	0.09
I-105	E	I-710 to I-605	16,227	107,924	0.15	W	11,725	76,125	0.14

Table 14
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Name	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
I-110	N	Arroyo Pky to I-10	2,468	124,666	0.01	S	2,234	110,216	0.01
I-110	N	I-10 to I-105	14,837	140,430	0.11	S	14,810	140,743	0.11
I-110	N	I-105 to SR-91	14,124	131,181	0.11	S	13,250	117,533	0.11
I-110	N	SR-91 to I-405	18,580	152,002	0.12	S	12,938	106,930	0.12
I-110	N	I-405 to SR-47	11,157	70,526	0.17	S	15,369	112,870	0.14
I-15	N	I-215 to SR-138	20,358	118,648	0.17	S	23,862	122,244	0.20
I-15	N	I-210 to I-215	16,346	86,213	0.19	S	19,794	87,284	0.23
I-15	N	I-10 to I-210	10,332	101,968	0.10	S	12,736	109,379	0.12
I-15	N	SR-60 to I-10	10,572	116,444	0.09	S	9,656	116,419	0.08
I-15	N	SR-91 to SR-60	10,163	88,053	0.12	S	7,357	87,932	0.08
I-15	N	SR-74 to SR-91	14,194	91,554	0.16	S	7,899	92,669	0.09
I-210	N	SR-14 to SR-118	11,386	76,653	0.15	S	8,258	80,838	0.10
I-210	N	SR-118 to SR-2	15,319	96,870	0.16	S	11,614	93,249	0.13
I-210	N	SR-2 to SR-134	14,689	104,403	0.14	S	11,556	100,576	0.12
I-210	E	SR-134 to I-605	15,628	126,313	0.12	W	18,479	128,682	0.14
I-210	E	I-605 to SR-57	20,062	117,993	0.17	W	22,853	115,306	0.20
I-215	N	SR-30 to I-15	11,767	92,151	0.11	S	4,519	63,559	0.07
I-215	N	SR-60 to I-10	9,936	114,295	0.09	S	10,134	117,592	0.09
I-405	N	I-5 to SR-133	6,031	92,328	0.07	S	6,293	99,302	0.06
I-405	N	SR-133 to SR-55	8,112	127,991	0.06	S	7,909	125,564	0.06
I-405	N	SR-55 to SR-22	15,028	136,647	0.11	S	13,575	155,952	0.09
I-405	N	SR-22 to I-605	21,716	189,002	0.12	S	17,029	178,858	0.10
I-405	N	I-605 to I-710	14,906	133,948	0.11	S	13,286	132,289	0.10
I-405	N	I-710 to I-110	13,562	132,230	0.10	S	12,807	129,292	0.10
I-405	N	I-110 to SR-91	12,715	119,040	0.11	S	12,275	122,230	0.10
I-405	N	SR-91 to I-105	13,034	128,647	0.10	S	12,193	127,099	0.10
I-405	N	I-105 to I-10	14,374	149,354	0.10	S	13,445	152,610	0.09
I-405	N	I-10 to US-101	11,707	175,180	0.06	S	11,253	151,690	0.07
I-405	N	US-101 to I-5	7,410	142,371	0.05	S	6,463	126,201	0.05
I-5	N	LA County Line to I-605	23,321	138,101	0.17	S	17,868	147,832	0.12
I-5	N	I-605 to I-710	25,087	155,890	0.16	S	19,219	155,458	0.12
I-5	N	I-710 to SR-60	25,170	161,925	0.16	S	20,490	163,406	0.13
I-5	N	SR-60 to SR-134	16,674	142,956	0.12	S	14,180	142,724	0.10
I-5	N	SR-134 to SR-	14,311	127,149	0.11	S	12,655	132,547	0.10

Table 14
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Name	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
		118							
I-5	N	SR-118 to SR-14	17,013	176,510	0.10	S	13,387	159,617	0.09
I-5	N	SR-57 to LA County Line	18,780	124,981	0.15	S	14,468	130,022	0.11
I-5	N	SR-55 to SR-57	17,521	156,485	0.11	S	16,369	178,949	0.09
I-5	N	SR-133 to SR-55	16,375	132,710	0.12	S	13,385	150,074	0.09
I-5	N	I-405 to SR-133	15,214	101,694	0.15	S	11,420	104,836	0.11
I-5	N	I-405 to SR-73	17,914	137,274	0.13	S	14,183	143,285	0.10
I-5	N	SR-73 to SD County Line	20,625	135,800	0.15	S	13,924	128,552	0.11
I-605	N	I-405 to SR- 91	8,945	104,774	0.09	S	7,693	107,383	0.07
I-605	N	SR-91 to I-105	14,975	139,885	0.11	S	13,824	155,265	0.09
I-605	N	I-105 to I-5	20,128	127,720	0.16	S	17,378	124,879	0.14
I-605	N	I-5 to SR-60	21,148	115,071	0.19	S	20,827	112,813	0.19
I-605	N	SR-60 to I-10	17,174	111,544	0.15	S	17,223	101,262	0.17
I-605	N	I-10 to I-210	12,326	110,619	0.11	S	12,341	104,670	0.12
I-710	N	Port to I-405	17,414	52,166	0.27	S	21,203	63,072	0.29
I-710	N	I-405 to SR- 91	34,058	109,758	0.32	S	33,541	103,070	0.33
I-710	N	SR-91 to I-105	25,983	123,616	0.22	S	25,162	134,410	0.19
I-710	N	I-105 to I-5	17,122	125,845	0.14	S	16,258	118,899	0.14
I-710	N	I-5 to SR-60	10,860	112,673	0.10	S	8,730	110,882	0.08
I-710	N	SR-60 to I-10	9,452	100,495	0.09	S	7,245	99,333	0.07
I-710	N	I-10 to I-210	8,542	101,782	0.08	S	6,862	93,596	0.07
SR-134	E	I-5 to I-210	9,048	113,085	0.08	W	9,318	108,779	0.09
SR-134	E	I-101 to I-5	9,048	113,085	0.08	W	9,207	110,503	0.08
SR-55	N	I-405 to I-5	7,367	120,962	0.06	S	6,492	116,644	0.05
SR-55	N	I-5 to SR-22	7,726	112,372	0.07	S	7,226	113,268	0.06
SR-55	N	SR-22 to SR-91	9,162	124,028	0.07	S	8,326	115,820	0.07
SR-57	N	I-5 / SR-22 to SR-91	10,256	121,293	0.08	S	9,144	124,719	0.07
SR-57	N	SR-91 to SR-60	11,493	131,438	0.09	S	10,510	120,647	0.09
SR-57	N	SR-60 to I-10	6,280	102,101	0.06	S	7,811	99,983	0.08
SR-57	N	I-210 to SR-30	11,290	108,540	0.11	S	9,006	109,449	0.08
SR-60	E	I-10 to I-710	10,164	140,256	0.07	W	11,131	137,489	0.08
SR-60	E	I-710 to I-605	11,592	141,498	0.08	W	13,617	141,754	0.10
SR-60	E	I-605 to SR-57	12,512	118,998	0.11	W	13,662	117,793	0.12

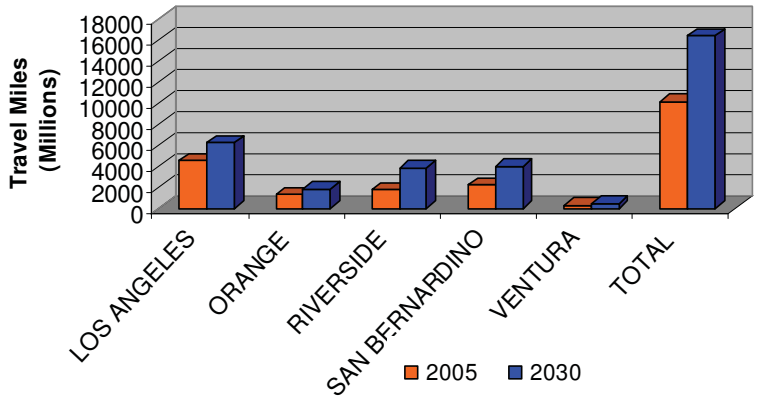
Table 14
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Name	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
SR-60	E	SR-57 to I-15	12,740	114,780	0.11	W	14,894	114,299	0.13
SR-60	E	I-15 to I-215	8,796	109,776	0.08	W	10,948	105,513	0.10
SR-91	E	I-110 to I-710	11,319	111,032	0.10	W	10,255	104,307	0.10
SR-91	E	I-710 to I-605	19,626	123,286	0.16	W	20,563	129,334	0.16
SR-91	E	I-605 to I-5	18,602	114,163	0.16	W	19,186	122,910	0.16
SR-91	E	I-5 to SR-57	17,162	116,260	0.15	W	21,863	127,617	0.17
SR-91	E	SR-57 to SR-241	16,481	136,712	0.12	W	19,578	138,493	0.14
SR-91	E	SR-241 to I-15	22,131	159,292	0.14	W	26,023	165,959	0.16
SR-91	E	I-15 to I-215	11,310	96,782	0.12	W	13,009	102,837	0.13
SR-118	E	I-405 to SR-23	5,794	98,698	0.06	W	7,606	108,516	0.07
SR-170	E	I-5 to SR-134	12,193	127,895	0.10	W	9,813	129,345	0.08

Note: D – Direction
N – North
S – South
E – East
W – West
Sources: SCAG 2007 Draft Air Quality Management Plan, Wilbur Smith Associates, 2006.

Projected regional truck VMT is shown in Figure 4[20]. The western Riverside County area is expected to be a major generator and attractor of truck trips in the future. The second highest growth in regional truck trips will also be in the Inland Empire area along the combined north-south I-15 and I-215 corridors, which are projected to carry an additional 37,000 daily truck trips by 2020.

Figure 4
2030 Annual Statewide Truck Mile Travel Distribution by County

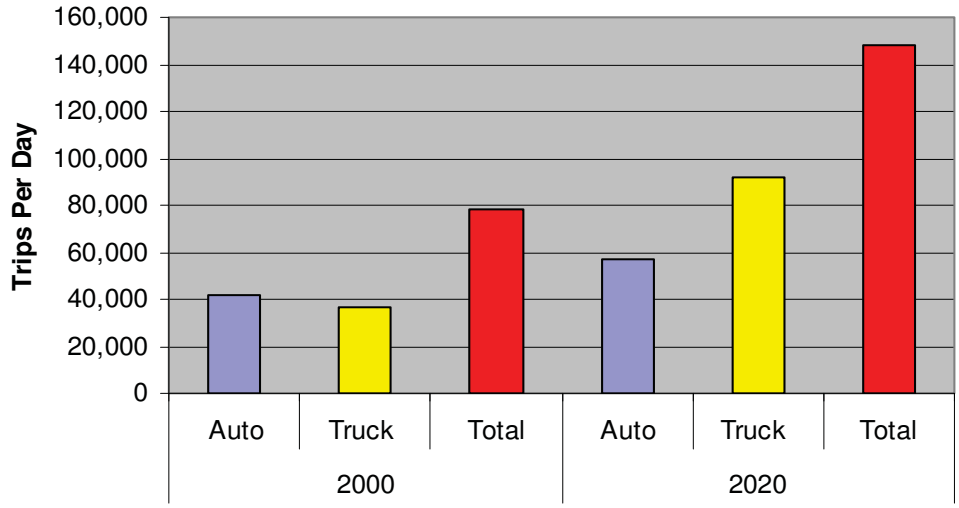


Source: SCAG Regional Transportation Plan. 2004

Port of Los Angeles/Long Beach Freight Volume Trends

Estimates of port-related truck trips on the regional system are very important for future regional goods movement planning. These facilities carry goods to distribution warehouse and rail yards within the region. This section provides growth forecast information for the Ports of Los Angeles and Long Beach. Figure 5 gives the forecast of daily auto and truck trips to and from the San Pedro Bay Ports for 2000 and 2020 taken from the Ports Transportation Study[21].

Figure 5
Daily Trips-Ports of LA/LB



Source: California Transportation Commission Presentation. "I-710 Desmond Bridge Gateway Program", October 3, 2002 <http://www.dot.ca.gov/hq/transprog/ctcbooks/1002/82(4.7).pdf>.

Notes:

(1) Totals include container and non-container truck and auto trips
(2) On-Dock rail share assumed to be 30% of container movements
(3) 15% of moves assumed on weekend
(4) Excludes inter-terminal truck moves

Several routes serve as key transportation corridors for freight movement through southern California and to and from the ports, including I-710, I-110, I-405, SR 60 and SR 91. Table 15 illustrates the existing peak hour port truck traffic on the regional system as well as the projected increase in peak-hour port trucks and the added passenger car equivalents on the regional system. The truck trips calculated include only the direct truck trips to and from the ports. Note that the port truck trips are only one segment of all the regional truck trips and Table 15 does not reflect the high volume of inter and intra-regional truck traffic within the MCGMAP region.

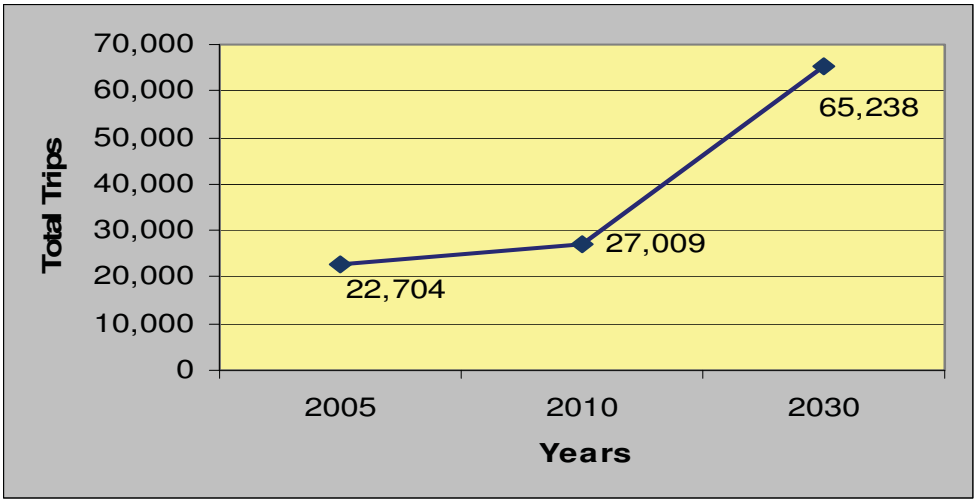
Table 15
Peak Hour Port Truck Traffic on the Regional System

Regional Highway System Segment		2004 Peak Hour Port Trucks	2025 Peak Hour Port Trucks	2025 Peak Hour Passenger Car Equivalents	Growth in Port Trucks	Percent Growth in Port Trucks
I-110	SR-47 to Anaheim	1,185	2,080	3,475	895	76%
	Anaheim to PCH	1,185	2,080	3,475	895	76%
	PCH to Sepulveda	1,185	2,010	3,355	825	70%
	Sepulveda to I-405	1,040	1,920	3,205	880	85%
	I-405 to SR-91	745	1,395	2,330	650	87%
	SR-91 to I-105	595	1,290	2,155	695	117%
	I-105 to I-10	245	435	725	190	78%
I-710	SR-47 to Anaheim	2,905	4,245	7,090	1,340	46%
	Anaheim to PCH	2,745	3,960	6,615	1,215	44%
	PCH to Willow	2,660	4,160	6,945	1,500	56%
	Willow to I-405	2,605	3,870	6,465	1,265	49%
	I-405 to SR-91	2,300	3,480	5,810	1,180	51%
	SR-91 to I-105	1,720	2,780	4,645	1,060	62%
	I-105 to I-5	1,350	2,040	3,405	690	51%
	I-5 to SR-60	105	195	325	90	86%
	SR-60 to I-10	50	155	260	105	210%
I -405	SR-22 to I-605	215	635	1,060	420	195%
	I-605 to I-710	225	630	1,050	405	180%
	I-710 to I-110	325	420	700	95	29%
	I-110 to SR-91	255	400	670	145	57%
	SR-91 to I-105	185	275	460	90	49%
	I-105 to I-10	145	250	420	105	72%
SR -- 91	SR-57 to I-5	145	455	760	310	214%
	I-5 to I-605	260	580	970	320	123%
	I-605 to I-710	450	945	1,580	495	110%
	I-710 to I-110	245	865	1,445	620	253%
	I-110 to I-405	15	50	85	35	233%
I-105	I-605 to I-710	420	900	1,505	480	114%
	I-710 to I-110	230	490	820	260	113%
	I-110 to I-405	30	55	90	25	83%
I-5	SR-57 to SR-91	30	80	135	50	167%
	SR-91 to I-605	5	5	10	0	0%
	I-605 to I-710	25	70	115	45	180%
	I-710 to SR-60	165	295	495	130	79%
	SR-60 to I-10	60	200	335	140	233%
SR-60	SR-57 to I-605	180	385	645	205	114%
I-10	SR-57 to I-605	210	310	520	100	48%
	I-605 to I-710	30	65	110	35	117%
	I-710 to I-5	15	45	75	30	200%
	SR-60 to I-110	45	75	125	30	67%
I-605	I-405 to SR-91	2	2	3	0	0%
	I-105 to I-5	465	915	1,530	450	97%
	I-5 to SR-60	430	850	1,420	420	98%
	SR-60 to I-10	250	405	675	155	62%
SR-57	I-5 to SR-91	1	15	25	14	1400%
	SR-91 to SR-60	15	235	390	220	1467%
	SR-60 to I-10	10	110	185	100	1000%

Source: Meyer, Mohaddads Associate, Inc., Port of Los Angeles Baseline Transportation Study, April 2004

The Ports of Los Angeles and Long Beach rely heavily on the Long Beach Freeway (I-710) for truck access. Over the years, there has been a significant increase in truck and auto traffic on I-710 driven by economic and population growth. As shown in Figure 6, the ports' truck trip reduction study predicted a 187% increase in truck traffic on I-710 north of Pacific Coast Highway by 2030, leading to more traffic congestion, delays, and accidents during peak periods, as trucks compete with passenger vehicles for shrinking freeway capacity.

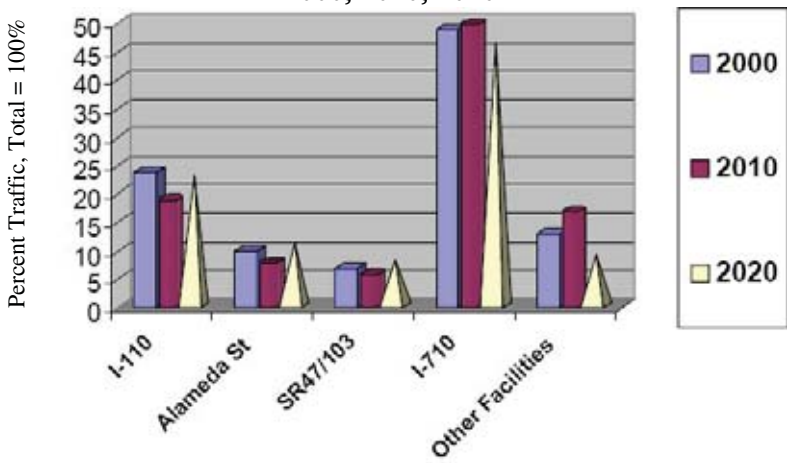
Figure 6
I-710 Port Truck Trips, North of Pacific Coast Highway
Years 2005, 2010, 2030



Source: Cambridge Systematics, Inc., Port Truck Trip Reduction Strategies. Final Report, December 2005

The ports transportation study reveals relatively small changes in the distribution of truck traffic by roadway in 2010 and 2020 as shown in Figure 7. Truck routing decisions are made by individual truck drivers based upon the distribution of origins and destinations of inbound and outbound freight.

Figure 7
Distribution of Truck Traffic by Roadway
2000, 2010, 2020



Source: Meyer, Mohaddes & Associates, Inc., Ports of Long Beach/ Los Angeles Transportation Study, June 2001

1.4 AIR CARGO

A number of key assumptions have been made in preparing the air cargo forecasts for the study area:

- The regulatory environment will remain constant throughout the period (security, environmental, business).
- Integrated express carriers will generally operate using the same mode of transport throughout the planning period.
- The ratio of trucks-to-aircraft used to serve the region's air cargo market by the major integrators (FedEx, UPS, DHL, BAX Global) will not change over the forecast period.
- The types of air cargo aircraft operating by the end of the planning period will generally be the same as are currently operating in the air cargo fleet today with the exception of the Airbus A380 introduction to Los Angeles International (LAX).
- There will not be a significant shift in the commodity mix transiting the region's airports.
- The region's airports will maintain constant relative market share throughout the forecast period.

For each airport air cargo volume has been projected in two separate scenarios: a low-growth scenario and high-growth scenario. Source data for the applied growth rates include FAA Aerospace Forecasts 2005-2016 and Boeing World Air Cargo Forecast 2004/2005. The FAA offers a more conservative and straight-forward approach in its forecast with anticipated growth rates for domestic and international air cargo. In contrast, the Boeing forecast provides a more aggressive growth outlook coupled with greater detail in both world region factors and inbound versus outbound growth rates. Table 16 details the growth rates used in the MCGMAP air cargo forecast.

Table 16
2004-2024 Air Cargo Forecast Factors
Boeing and FAA Growth Rates

Market Pair	Direction	Annual Growth
Boeing Forecast		
Domestic	Inbound	4.1%
	Outbound	4.1%
US-Canada	Inbound	6.8%
	Outbound	6.8%
US-Asia Pacific	Inbound	7.3%
	Outbound	7.2%
US-Europe	Inbound	5.8%
	Outbound	5.2%
US-Latin America/ Caribbean*	Inbound	6.1%
	Outbound	5.5%
US-Mid-East/Africa	Inbound	4.7%
	Outbound	4.7%
FAA Forecast		
Domestic		3.3%
International		6.3%

*Includes Mexico
Source: Boeing World Air Cargo Forecast 2004/2005,
FAA Aerospace Forecasts, Fiscal Years 2005-2016

2004 FAA T-100 data furnished by the Bureau of Transportation Statistics are used to provide the baseline air cargo volume for each airport in the study region. T-100 data not only provide total volume numbers, but also detail market pairs (airport-to-airport level) and direction (inbound versus outbound). Table 17 details the total air cargo forecast for the MCGMAP study area, encompassing all five airports reporting air cargo activity. LAX accounts for the majority of current and forecasted activity (over 75% of total air cargo volume).

Table 17
MCGMAP Region Air Cargo Forecast Summary
2004-2024 Annual Tons

	Annual Growth	2004 (Actual)	2009	2014	2019	2024
Boeing Forecast						
Domestic Total:		**1,680,586**	**2,054,539**	**2,511,702**	**3,070,589**	**3,753,836**
Inbound	4.1%	792,773	969,176	1,184,830	1,448,471	1,770,775
Outbound	4.1%	887,813	1,085,363	1,326,871	1,622,118	1,983,061
International Total:		**1,069,871**	**1,493,451**	**2,087,059**	**2,919,693**	**4,088,588**
Inbound	6.8%	679,852	957,364	1,348,905	1,901,581	2,682,046
Outbound	6.8%	390,019	536,086	738,154	1,018,113	1,406,542
Boeing Forecast Total:		**2,750,457**	**3,547,990**	**4,598,761**	**5,990,282**	**7,842,424**
Inbound	5.6 %	1,472,625	1,926,540	2,533,735	3,350,052	4,452,821
Outbound	4.9 %	1,277,832	1,621,450	2,065,025	2,640,231	3,389,603
FAA Forecast						
Domestic	3.3%	1,680,586	1,976,798	2,325,220	2,735,052	3,217,119
International	6.3%	1,069,871	1,452,104	1,970,898	2,675,041	3,630,753
FAA Forecast Total:		**2,750,457**	**3,428,902**	**4,296,117**	**5,410,092**	**6,847,872**

*Includes Mexico
Source: Bureau of Transportation Statistics - FAA T-100 Data, Boeing World Air Cargo Forecast 2004/2005, FAA Aerospace Forecasts, Fiscal Years 2005-2016

It is likely that each airport in the study area will maintain its current role, with LAX continuing to serve as a premier international gateway, Ontario International (ONT) expanding UPS hub operations with the potential to attract additional international gateway operations and Burbank (BUR), Long Beach (LGB) and John Wayne (SNA) continuing their roles as local market stations. Overall, air cargo volume will approximately triple within the forecast period with international traffic accounting for 52% (Boeing forecast) or 53% (FAA forecast). LAX will continue to handle the bulk of the study area's air cargo volume with ONT best positioned to capture LAX overflow in both domestic and international markets when LAX reaches capacity.

As part of the SCAG 2004 Regional Transportation Plan, an air cargo forecast through the year 2030 was conducted. The SCAG air cargo forecast totals for the region fall between the Boeing based and FAA based MCGMAP air cargo forecasts shown above. The SCAG forecasts anticipate the following annual tonnage in comparison to the MCGMAP forecasts:

Table 18
Annual Tonnage Forecast
for the Years 2010, 2020, 2030

	2010	2020	2030
SCAG	3,300,000	6,312,000	8,724,000
MCGMAP (FAA)	3,585,600	5,668,900	n/a
MCGMAP (Boeing)	3,735,469	6,319,300	n/a

Source: SCAG 2004 Regional Transportation Plan.

Note that the SCAG forecasts include air cargo tonnage for March Air Reserve Base (RIV), Southern California Logistics Airport (VCV) and Palm Springs International Airport (PSP). These airports currently have very limited air cargo activity and were not included in the MCGMAP forecasts. As illustrated in Table 19, the SCAG forecasts show these airports, particularly RIV, as garnering an increasing share of the region's total air cargo activity; nine percent by 2010, 17 percent by 2020 and 20 percent by 2030.

Table 19
SCAG Air Cargo Forecast
2010, 2020, 2030 Annual Tons

		2010	2020	2030
SCAG Forecast				
Bob Hope-Burbank	BUR	60,000	87,000	87,000
Los Angeles International	LAX	1,570,000	2,059,000	2,340,000
Long Beach	LGB	86,000	133,000	137,000
Ontario International	ONT	876,000	1,536,000	2,252,000
Palmdale Regional	PMD	119,000	605,000	1,024,000
Palm Springs International	PSP	82,000	123,000	128,000
March Air Reserve Base	RIV	132,000	627,000	1,117,000
San Bernardino International	SBD	253,000	756,000	1,092,000
John Wayne-Orange County	SNA	41,000	43,000	43,000
Southern California Logistics	VCV	81,000	343,000	504,000
SCAG Forecast Total		**3,300,000**	**6,312,000**	**8,724,000**

Source: SCAG 2004 Regional Transportation Plan, Technical Appendix D-6-11, Preferred Aviation Plan

The projected increase in the utilization of these airports can be attributed to capacity constraints anticipated at LAX. As LAX reaches capacity, cargo will be diverted to alternate airports with the necessary capacity and infrastructure to accommodate cargo activity and a location that is within near proximity to the core Los Angeles metro market area. ONT is currently filling this role, and it is anticipated that as the Los Angeles metro area grows, RIV and VCV will also expand activity in support of the region's air cargo market.

As previously mentioned, capacity constraints at LAX will likely force overflow to surrounding airports. As cargo carriers have expanded in congested markets, they have used innovative strategies to compensate. For example, as FedEx has grown in the Los Angeles market, and as

highway and airport congestion has interfered with the carrier's efficiency, the carrier has had to place aircraft at secondary airports in order to serve the market with the same reliable service. FedEx in the Los Angeles market has wide-body aircraft (MD11) serving LAX and narrow-body B727 aircraft serving eastern portions of Los Angeles County out of Ontario and a narrow-body B727 aircraft serving southern portions of Los Angeles County out of Long Beach. Los Angeles World Airports officials have also taken a proactive approach in planning for air cargo capacity at LAX. In the LAX 2015 Airport Master Plan, plans are outlined to improve and expand current air cargo facilities while also making access and traffic congestion improvements on the roads and freeways surrounding the airport.

1.5 OCEAN CARGO

The San Pedro Bay ports are currently preparing new cargo forecasts through 2030. In completing this new forecast, the ports are revisiting key underlying economic variables for the U.S. and its trading partners, reassessing the relative attractiveness of San Pedro Bay, and evaluating the impacts of possible future port projects in Canada and Mexico, as well as improvements to the Panama Canal. The ports are now reviewing output from Global Insight's econometric modeling system showing tonnage and TEU projections for the west and east coasts. The next step will be to spatially allocate these coastal totals to the San Pedro Bay ports and their major competitors. This work is scheduled to be completed in 2007.

In the meantime, the ports have been using forecasts based on a 1998 study by Mercer Management/DRI and Standard & Poors. This study estimated that container cargo would grow at a compound annual growth rate of 7.9% through 2023, starting from a base year of 1996. The 7.9% annual growth rate was derived from a modified "High Growth" scenario contained in the 1998 cargo forecast study for the period 1996-2020.

This scenario generated a year 2020 forecast of approximately 36 million TEUs. For planning purposes the port staff recently extrapolated this forecast to 2030, which produced unconstrained TEU volumes significantly higher than projected terminal capacity in San Pedro Bay. A capacity constrained forecast for 2030 is 42.5 million TEUs, up from 14.2 million in 2005. Using these two numbers alone would imply an average compound annual growth rate from 2005 to 2030 of 4.5%; however, the figure is misleading because in the ports' year-by-year forecast, container volumes for the last seven years (2023 – 2030) are constrained by terminal capacity. Table 20 illustrates the containerized cargo forecasts currently used by the ports.

Table 20
Containerized Cargo Forecasts, Port of Los Angeles and Long Beach
2005-2030

Year	Container Volume (millions of TEUs)
2005	14.2
2010	19.7
2020	36.0
2030	42.5

Source: Ports of Los Angeles and Long Beach

A recent study for the Federal Highway Administration (FHWA) predicted that *unconstrained* demand at the San Pedro Bay ports would be 59.4 million TEUs in 2020. This forecast is shown in Figure 8 below. These projections are not based on capacity or the ability of the ports to handle these growing volumes of containers. Of note, the percentage growth along the eastern U.S. is predicted to be higher than on the west coast. The 59.4 million TEU forecast for the San Pedro Bay ports represents an average compound annual growth rate of 12.2% from 2005 to 2020, which is higher than the San Pedro Bay ports' actual 20-year historical growth rate from 1985 to 2005 (9.7%).

If the unconstrained demand is indeed greater than the ports' capacity of 42.5 million TEUs, then cargo will divert to other ports, potentially including ports in Canada and Mexico. Other ports throughout the U.S. are facing similar constraints to growth due to community, environmental and capacity concerns. An interesting question to consider is what would be the long term implications for the U.S. economy if the nation's ports were unable to accommodate projected demand?

Figure 8
Volume of Trade, 2004 and 2020

Source: Federal Highway Administration (FHWA), March 2006

The purpose of this section is to define several goods movement growth scenarios for the study area. This report does not evaluate the impacts of the scenarios, nor does it suggest a preferred scenario or strategy. The scenarios are the building blocks for Task 6, and the resulting evaluation and conclusions will assist the agencies and stakeholders to structure the ultimate MCGMAP.

2.1 PURPOSE OF SCENARIOS

The purpose of scenarios is to help stakeholders collaborate and to make strategic decisions about their future, and to identify and investigate a wide range of transportation options to address the identified issues, challenges and problems related to goods movement within the MCGMAP Region. The scenarios represent a range of future outcomes and provide a framework for evaluating and determining specific strategies.

This section of the Tech Memo outlines four scenarios that focus on the main driving forces and areas of uncertainty in the future goods movement system:

- Scenario 1 - Status Quo Landside Infrastructure Investment
- Scenario 2 - Lower Than Expected Trade Forecasts
- Scenario 3 – Lowest Trade Forecasts
- Scenario 4 – Full Trade and Investment Outcome

Specifically, the committed funding plans of the MCGMAP project partners represent the "current investment levels" specified under Scenarios 1, 2, and 3. The "full investment levels" would require additional investment beyond the existing committed funding plans of the MCGMAP project partners.

2.2 SCENARIO 1 – STATUS QUO LANDSIDE INFRASTRUCTURE

The status quo landside infrastructure scenario will evaluate the impact of continued growth in goods movement and passenger traffic without the requisite investment in landside improvements. This scenario assumes that the base case forecasts laid out in this report come to fruition without the requisite investments in highway and rail capacity.

Main Driving Forces and Areas of Uncertainty

There are several factors that introduce uncertainty in future investment in landside infrastructure:

- **Lack of Funding** - The lack of sufficient local funding for major projects, combined with limited success at securing federal and state resources for high profile projects such as the Alameda Corridor East grade-crossing projects and the Gerald Desmond Bridge.

- **Air-Quality Attainment** – There is a level of uncertainty surrounding the attainment of air quality standards which could have implications for the expansion of major landside transportation projects.
- **Environmental and Community Concerns** - A series of recent community-based efforts have slowed landside infrastructure investments; e.g., the expansion of the I-710 corridor near the ports. While air quality and health impacts are the principal concerns of communities, other issues such as noise and land use compatibility can also impact project delivery.

This report, nor the overall MCGMAP effort, does not attempt to predict the likelihood of any of these individual factors. Nor is it the position of this Tech Memo that any one of these factors is more important than any of the other factors. The purpose is to define a range of uncertainties that could affect investment in transportation facilities.

Scenario 1: Assumptions - Status Quo Landside Transportation Capacity

Variable	Measurement	Description
Port	TEU	Assumes port throughput will increase as currently projected.
Highway	VMT	VMT is increased as a function of population and trade growth. No new capacity in highways beyond committed programs included in 2004 RTP.
Rail	Trains	Freight and passenger train volumes will increase based on growth in goods and passenger movement. International and domestic intermodal traffic assumed to increase as currently projected. No new rail capacity.
Airport	Tons	Assumes continued growth in air cargo and passenger volumes. Throughput assumed to increase.
Warehouse	SQFT.	International and domestic goods movement demand and warehouse space assumed to increase in pace with forecasts.

Policy/Investment/Operational Variables and Their Purpose

The key variable for this scenario is the capacity of landside infrastructure, which will be assumed to remain constant while growing the goods movement and passenger traffic volumes.

Evaluation Approach

The approach is to utilize the rail and highway models used to prepare the system performance report as part of Task 4, the results of which are documented in Tech Memo 4b – Systems Performance Report. The systems and operational capacities for each of the modes will remain constant at the existing levels over the forecast period. The analysis will focus on documenting and tabulating the system's performance as goods movement and passenger volumes increase over the forecast intervals. The highway capacity measures will include the number of deficient

highway lane miles over the forecast periods. The performance measures will include traditional measures such as the level of service, as well as speed and delay for passengers and for freight. For the rail component, the measure will be the amount of delay in minutes or hours. In addition to systems performance, the evaluation will estimate the impact on the environment, specifically the impact on emissions, as well as the economic impacts related to the user benefits derived from the system's response to trade volumes.

Scenario 1: Evaluation Approach

Evaluate	Description	Key Measures
Highway	Use baseline regional highway model. No additional capacity beyond projects with committed funding included in 2004 RTP. Passenger and freight VMT assumed to grow as forecasted.	Level of Service, delay, speeds
Rail	Use Mainline Rail Capacity Model. No additional capacity beyond projects with committed funding included in 2004 RTP. Passenger and freight train volumes assumed to grow as forecasted.	Delay
Economics	Use economic impact model to estimate economic impacts of user benefits, as well as overall structural impacts	Employment, population, earnings, output.
Environment	Use model to measure air quality impacts	Emissions

Data Needs and Availability

Data needs will include the trade forecasts and the trucking and railroad volumes presented in this Tech Memo and the existing networks included in the rail and highway models.

2.3 SCENARIO 2 – LOWER THAN EXPECTED TRADE FORECASTS

The purpose of this scenario is to evaluate the impacts of lower than expected level of international trade.

Main Driving Forces and Areas of Uncertainty

This section outlines a series of goods movement forecasts for the study area. While most of these forecasts are constrained by the capacity of the ports and airports, there are a series of uncertainties that may impact the actual demand, as discussed below.

- **Potential Diversion** - There is some debate about the potential diversion of marine containers to other ports along the Pacific coast such as Vancouver, Seattle/Tacoma, Oakland, and to the

East Coast via all-ocean routes through the Suez Canal and the Panama Canal, as well as planned ports at Prince Rupert in Canada or on the Pacific coast of Mexico. The diversion debate has been fueled by the temporary 4.1% loss of Asian import market share for the San Pedro Bay Ports because of the San Pedro Bay port congestion of 2004. Between August 2004 and July 2005 approximately 356,000 TEUs of containerized cargo diverted to the Ports of Seattle, Tacoma and Oakland. The share of U.S. West Coast imports from Asian ports captured by the Ports of Seattle, Tacoma, and Oakland grew from 19.8% in 2003/2004 to 23.9% in 2004/2005[1]. In 2006, San Pedro Bay ports regained their market share as there was no congestion at the ports.

- **Economic Slowdown** – The growth in international trade is largely a function of the strength of the U.S. economy and its overall purchasing power. Given that the economic cycles demonstrated by the U.S. economy typically follow a tighter pattern than the long-term outlook of the forecasts, it is reasonable to assume that the U.S. economy may experience a downward cycle at some point within the forecast period, thereby having some effect on the trade forecasts.
- **Anti-Trade Sentiment** – The continued decline in manufacturing-based employment has significant economic implications for the nation's residents and workers. Loss of U.S. manufacturing jobs may influence public sentiment towards open trade policies. A shift away from open and free trade policies would likely have a downward impact on the trade forecasts.

This scenario represents a group of potential trade, shipping, policy and economic factors. This report does not argue for or against any of these factors. The evidence supporting these factors is largely hypothetical and is not based on any particular set of well-established long-term trends. For example, while there are plans to expand the Panama Canal to accommodate wider post-Panamax container ships, there are significant challenges, from a financial, environmental and engineering standpoint. An expansion of the Panama Canal would occur over an extended period of time. There is also significant uncertainty about the prospects for economic decline or shifts in trade sentiment and policy.

Nonetheless, any combination of these factors could develop, and if significant enough, could impact the trade forecasts. Therefore, it is important to evaluate the impact of lower than expected trade, whatever the reason may be, on the study area's goods movement system, the environment and the economy.

Scenario 2: Assumptions - Lower than Expected Trade Forecasts

Variable	Measurement	Description
Port	TEU	Assumes growth will be limited to 66% of the base line growth.
Highway	VMT	VMT is increased as a function of population growth and the lower than expected trade growth.
Rail	Trains	Trains will be increased as a function of lower than expected trade growth, as well as domestic trade and commuter growth.
Airport	Tons	Assumes growth will be limited to 66% of the base line growth.
Warehouse	SQFT.	Domestic goods movement demand assumed to increase in pace with forecasts. Assumes growth of international cargo and warehouse space will be limited to 66% of the base line growth.

Policy/Investment/Operational Variables and Their Purpose

As a major gateway for international trade, the study area bears a disproportionate share of the financial, economic, environmental and community impacts of trade. The overwhelming scale of the impacts has generated significant public debate about the costs and benefits of growth and the needs for mitigation and funding.

The key variable to be evaluated under this scenario is uncertainty about future trade volumes. The study area is a gateway for a third of the nation's international containerized cargo, three quarters of which passes through the study area. The key points of entry and departure are the major gateways such as the ports, airports and intermodal yards. Data produced as part of the Task 3 evaluation indicate that as much as 65% of goods inbound to warehouse/distribution centers (by truck) originate at these types of facilities.

Evaluation Approach

For this scenario, the approach will be to assume a reduced forecast for port cargo. As in the previous scenario, the level of landside infrastructure investment will remain constant.

To test the impact on the highway system, the level of truck traffic in the highway model will be reduced to represent a reduction in forecasted levels of trade through the gateways. And to test the impact on the rail system, the forecasted level of intermodal rail volumes will be reduced.

The analysis will focus on documenting and tabulating the system's performance as goods movement and passenger volumes reach levels lower than expected over the forecast intervals. The results will demonstrate the impact on overall capacity and performance. The units of measure of capacity and delay will be the same as is Scenario 1. As in the previous scenario, the evaluation will also estimate the impact on the environment as well as on the economy.

Scenario 2: Evaluation Approach

Evaluate	Description	Key Measures
Highway	Use baseline regional highway model. No additional capacity beyond projects with committed funding included in 2004 RTP. Passenger VMT assumed to grow as forecasted. Freight VMT growth assumed to be 66% of baseline growth.	Level of Service, delay, speeds
Rail	Use Mainline Rail Capacity Model. No additional capacity beyond projects with committed funding included in 2004 RTP. Passenger trains assumed to grow as forecasted. Freight train traffic growth assumed to be 66% of baseline growth.	Delay
Economics	Use economic impact model to estimate economic impacts of user benefits, as well as overall structural impacts.	Employment, population, earnings, output.
Environment	Use model to measure air quality impacts.	Emissions

Data Needs and Availability

The proposed approach is to cap the net change between the current traffic levels and the base case forecasts at 66%. This results in a lower forecast for 2030 of approximately 33 million TEUs, calculated as follows:

- The net change between the 2005 level of 14.2 million TEUs and the base case forecast of 42.5 million TEUs is 28.3 million TEUs.
- 66% of 28.3 million TEUs is 18.7 million TEUs.
- 18.7 million added to the 2005 base of 14.2 million is 32.9 million TEUs, or 33 million TEUs, rounded up to the nearest million.

A 66% factor applied to the net change in base case forecasts translates to a diversion of about 10 million TEUs annually to other ports by 2030. This means that competing ports would need to accommodate this amount over and above the increase in traffic they would normally receive by 2030. To put this in perspective, the four other largest major ports on the west coast –Vancouver, Seattle, Tacoma and Oakland – together handled 8.2 million TEUs in 2005. These four ports would have to more than double in size to handle an additional 10 million TEUs, over and above normal growth. A diversion of 10 million TEUs is almost 30 times the amount of cargo diverted during the 2004 port congestion.

2.4 SCENARIO 3 – LOWEST TRADE FORECASTS

The purpose of this scenario is to evaluate the impact of an even lower international trade forecast. The proposed approach is to cap the net change between the current traffic levels and the base case forecasts at 33%. This results in a lower forecast for 2030 of approximately 23.5 million TEUs, calculated as follows:

- The net change between the 2005 level of 14.2 million TEUs and the base case forecast of 42.5 million TEUs is 28.3 million TEUs.
- 33% of 28.3 million TEUs is 9.3 million TEUs.
- 9.3 million added to the 2005 base of 14.2 million is 23.5 million TEUs, or 24 million TEUs, rounded up to the nearest million

Main Driving Forces and Areas of Uncertainty

The driving forces for this scenario are the same as for Scenario 2, but to a greater degree.

Scenario 3: Assumptions - Lower than Expected Trade Forecasts

Variable	Measurement	Description
Port	TEU	Assumes growth will be limited to 33% of the base line growth. (Results in 24 million TEUs in 2030)
Highway	VMT	VMT is increased as a function of population growth and the lower than expected trade growth.
Rail	Trains	Trains will be increased as a function of lower than expected trade growth, as well as domestic trade and commuter growth.
Airport	Tons	Assumes growth will be limited to 33% of the base line growth.
Warehouse	SQFT.	Domestic goods movement demand assumed to increase in pace with forecasts. International component and warehouse space growth assumed to be 33% of base line growth.

Policy/Investment/Operational Variables and Their Purpose

The variables to be evaluated and the scenario are the same as in Scenario 2.

Evaluation Approach

The evaluation approach for Scenario 3 is the same as for Scenario 2.

Scenario 3: Evaluation Approach

Evaluate	Description	Key Measures
Highway	Use baseline regional highway model. No additional beyond projects with committed funding included in 2004 RTP. Passenger VMT assumed to grow as forecasted. Freight VMT growth assumed to be 50% of baseline growth.	Level of Service, delay, speeds
Rail	Use Mainline Rail Capacity Model. No additional capacity beyond projects with committed funding included in 2004 RTP. Passenger trains assumed to grow as forecasted. Freight train traffic growth assumed to be 50% of baseline growth.	Delay
Economics	Use economic impact model to estimate economic impacts of user benefits, as well as overall structural impacts.	Employment, population, earnings, output.
Environment	Use model to measure air quality impacts.	Emissions

Data Needs and Availability

The data needs for Scenario 3 are the same as for Scenario 2.

2.5 SCENARIO 4 - FULL TRADE AND INVESTMENT OUTCOME

This scenario evaluates the impact of maintaining the expected growth in trade through the study area's gateways, while concurrently investing in the study area's landside infrastructure and making investments that mitigate the impact of goods movement.

Main Driving Forces and Areas of Uncertainty

The driving force for this scenario is the desire to develop a MCGMAP that maximizes the efficiency and productivity of goods movement and maximizes the mitigation of impacts. While the previous two scenarios are intended to measure the impact of the range of uncertainties surrounding the level of future trade and investment, the focus of this scenario is on measuring the ability of the study area to accommodate the expected growth in forecasts through sufficient levels of investment in landside capacity.

Policy/Investment/Operational Variables and Their Purpose

As in the case of the first scenario, this scenario assumes that the base case forecasts laid out in this report come to fruition. However, unlike in the three previous scenarios where the landside investments are assumed to remain unchanged, this scenario assumes an aggressive landside goods movement investment as well as the mitigation of impacts. Goods movement investment policy variables include both physical investment strategies as well as non-physical, operational and technological strategies.

Scenario 4: Assumptions - Full Trade and Investment

Variable	Measurement	Description
Port	TEU	Assumes continued growth in port forecasts. Throughput assumed to increase.
Highway	VMT	VMT is increased as a function of population growth and trade growth. Capacity added on key highway corridors.
Rail	Trains	Trains will be increased based on goods movement and commuter traffic. Int'l and domestic intermodal traffic assumed to increase. Capacity added on key rail corridors.
Airport	Tons	Assumes continued growth in air cargo and passenger forecasts.
Warehouse	SQFT.	International and domestic goods movement demand and warehouse space assumed to increase in pace with forecasts.

Evaluation Approach

As in the previous scenarios, the analysis will focus on documenting and tabulating the system's performance as goods movement and passenger volumes increase over the forecast intervals. The units of measure of capacity and delay will be the same as in the other scenarios. Again, the evaluation will also estimate the impact on the environment as well as on the economy.

- **Evaluation of Investment Strategies** – As part of Task 6, a comprehensive list of potential strategies and evaluation criteria will be developed. The "full investment levels" would require additional investment beyond the existing committed funding plans of the MCGMAP project partners. Therefore, the projects and strategies described are assumed to be implemented under Scenario 4: High Growth - Full Investment Levels. A subsequent screening will be conducted to narrow the strategies down to the most viable options which will be evaluated as part of this more detailed scenario analysis. While it is too early to identify the list of potential investment strategies, it is likely that the highway strategies will include the addition of physical capacity along key goods movement corridors, innovations such as truck-only lanes and other mass flow concepts, as well as operational strategies that shift some portion of truck volumes to off-peak periods such as the PierPASS program. The list of rail strategies will include additional mainline rail capacity, additional near-dock and on-dock intermodal lift capacity, as well as operational improvements to enhance rail and intermodal operational

efficiency and productivity. Also included will be port and airport operational strategies that enhance the throughput and efficiency of goods movement

- **Evaluation of Mitigation Strategies** – Again, while it is too early to identify a complete list of mitigation strategies, they will likely include approaches that reduce emissions as well as investments that reduce conflict between commuters and goods movement including grade-crossing enhancements, and land-use strategies that reduce the conflict between goods movement and residential and other uses.
- **Evaluating the Funding Strategies** –Funding options for goods movement are limited. Traditional transportation funding sources have proven inadequate; therefore, the focus of this evaluation will be on alternative revenue streams, including project-specific user fees. The evaluation will identify a range of candidate projects and strategies that may generate significant value to the end users at a sufficient level to generate user-based funding.

Scenario 4: Evaluation Approach

Evaluate	Description	Key Measures
Highway	Use baseline regional highway model. Additional capacity is assumed. Passenger and freight VMT assumed to grow.	Level of Service, delay, speeds
Rail	Use Mainline Rail Capacity Model. Additional capacity is assumed. Passenger and freight train volumes assumed to grow.	Delay
Economics	Use economic impact model to estimate economic impacts of user benefits, as well as overall structural impacts.	Employment, population, earnings, output.
Environment	Use model to measure air quality impacts.	Emissions

Data Needs and Availability

The data needs for this scenario will be more comprehensive and complex than for the previous scenarios. While the trade forecasts are a known quantity outlined in this Tech Memo, the other variables are not as well known and clearly documented.

- **Data Related to the Potential Investment Strategies** – Identifying and evaluating a consensus based list of investment projects and strategies for a large and intricate geography such as the MCGMAP study area can be a complicated and lengthy process. The conventional means for developing a series of investments and strategies is the Regional Transportation Planning (RTP) process. The last RTP was developed in 2004 and the next plan is currently under development. The MCGMAP effort will use a combination of sources to identify potential investment strategies, including projects listed in the existing RTP, as well as projects identified in recent studies including but not limited to the 2005 Port and Modal Elasticity Study by Dr. Robert C. Leachman. Therefore, the projects and strategies described are assumed to be implemented under Scenario 4: High Growth - Full Investment Levels.

- **Data Related to the Mitigation Strategies** –Data and information from recent and ongoing efforts will be utilized, including mitigation strategies identified by the study area's ports and airports, the railroads, trucking industry and other major industry stakeholders. In addition, there are ongoing efforts by the Gateway Cities COG, SCAG, METRO, Caltrans and other funding partners to identify and evaluate mitigating strategies.
- **Data Related to the Funding Strategies** – The availability of data about funding strategies is limited. However there are recent studies that have provided significant insight into the study area's goods movement system and users' ability to generate revenue for specific investments and mitigation. Initial data sources will include the 2005 Port and Modal Elasticity Study, the 2006 California Marine and Intermodal Transportation System Advisory Council (CALMITSAC) Interim Report to the California State Legislature on Growth of California Ports: Opportunities and Challenges, the OnTrac and ACE grade-crossing initiatives, and studies related to truck-specific solutions along the I-710, SR 60, I-10 and I-15.

Section E.0 – Executive Summary

1. National Association of Industrial and Office Properties (NAIOP) and C.B.Richard Ellis (CBRE), 3Q2005.
2. Economic Survey of China 2005, 16 September 2005, Organization for Economic Cooperation and Development (OECD).
3. Ports of Long Beach and Los Angeles, 2006.
4. The State of the U.S. Freight System: Trends and Challenges, 2000-2020, Jeffrey N. Shane, Under Secretary for Policy National Surface Transportation Policy and Revenue Study Commission, June 26, 2006.
5. Port and Modal Elasticity Study, Southern California Association of Governments, September 2005.
6. Port and Modal Elasticity Study, Southern California Association of Governments, September 2005 and Consolidation Activity in the Southern California Area, Alameda Corridor Transportation Authority, March 2004.
7. SCAG Goods Movement program: White paper, January 2002.
8. SCAG Regional Transportation Plan 2004.
9. California Transportation Commission: I-710 Desmond Bridge Gateway Program, October 3, 2002.
10. Port of Los Angeles Baseline Transportation Study, Meyer, Mohaddes & Associates, Inc., April 2004.

Section 1.0 – Forecasts of Freight Demand

1. Intermodal Association of North America webpage, www.intermodal.org
2. This analysis assumes a domestic economic growth rate of 3% per year.
3. The port-related intermodal train volume forecast is derived from a 44-million TEU intermodal volume in 2025, per forecasts from the Ports of Los Angeles and Long Beach.
4. This study relied on forecasts generated by the Los Angeles Economic Development Corporation in its *Los Angeles - Inland Empire Railroad Main Line Advanced Planning Study* (October 2002). These forecasts assumed growth rates that apply to various types of freight traffic – with port-related intermodal traffic growing faster than either domestic intermodal or carload traffic. Metrolink commuter train and Amtrak volumes were based on comments received from Metrolink and Amtrak planners in 2001.
5. No change in Amtrak long distance train volumes is assumed here. California Corridor train (Pacific Surfliner) volume is assumed to be 16 trains in each direction per day (hourly service).
6. "Through traffic" for this analysis is traffic originating in the LA area (or, more broadly, Southern California) and terminating outside the LA area (e.g. Chicago or Houston), as well as traffic originating outside the LA area and terminating in the LA area; local traffic originating and terminating at shippers along the Alhambra Line and LA Subdivision move in the direction required.
7. UP terms this operating scheme "directional running."
8. Domestic intermodal, carload, and hauler volumes are assumed to grow at about 3% per year.
9. Per the Draft *LOSSAN North Corridor Strategic Plan* (June 2005): seven daily round trips between LA and Santa Barbara, and a third round trip serving San Luis Obispo.
10. Data for the Ports of Long Beach and Los Angeles, 2002-2005, www.polb.org.
11. Port and Modal Elasticity Study, Southern California Association of Governments, September 2005, page 83.

12. UP, BNSF Intermodal Data, 2005.
13. This analysis assumes a domestic economic growth rate of 3% per year.
14. SCAG Goods Movement program: White paper, January 2002.
15. SCAG Regional Transportation Plan, 2004.
16. SCAG Goods Movement program: White paper, January 2002.
17. SCAG Regional Transportation Plan, 2004, pg. 38.
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20. SCAG Regional Transportation Plan, 2004.
21. Meyer, Mohaddes & Associates, Inc., Ports of Long Beach/ Los Angeles Transportation Study, June 2001

Section 2.0 – Identify Potential Scenarios for Further Evaluation

1. Growth of California Ports: Opportunities and Challenges, An Interim Report to the California State Legislature; California Marine and Intermodal Transportation System Advisory Council (CALMITSAC), January 2006.

Multi-County Goods Movement Action Plan

Technical Memorandum 4b: System Performance Report

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
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REFERENCES **R-1**

E.0 EXECUTIVE SUMMARY

E.1 INTRODUCTION **E-1**
E.2 KEY FINDINGS **E-1**
Rail E-1
Highway E-2
E.3 CONCLUSIONS **E-2**

1.0 RAIL SYSTEM PERFORMANCE

1.1 RAIL NETWORK **1-1**
1.2 RAIL FORECASTS **1-4**
1.3 SYSTEM PERFORMANCE **1-8**
Performance Measures 1-8
Performance 1-8
Improvements Assumed 1-11
1.4 CONCLUSION **1-12**

2.0 HIGHWAY SYSTEM PERFORMANCE

2.1 HIGHWAY **2-1**
2.2 TRUCK FORECASTS **2-1**
2.3 SYSTEM PERFORMANCE 2-12
Performance Measure 2-12
Performance 2-12
Improvements Assumed 2-30
2.4 CONCLUSION **2-30**

FIGURES

Figure 1 Railroads and Mainlines in the MCGMAP Study Area Serving California, Arizona, Nevada, and Oregon 1-2
Figure 2 BNSF Transcon West of San Bernardino, UP Los Angeles Subdivision, and UP Alhambra Lines 1-3
Figure 3 Year 2025 Forecast of Freight Rail Volumes 1-5
Figure 4 Year 2025 Forecast of Commuter Rail Volumes on the Study Area Mainlines 1-6
Figure 5 Year 2025 Forecast of Freight and Passenger Rail Volumes on the Study Area Mainlines 1-7
Figure 6 Existing Highway System within the MCGMAP Study Area 2-2
Figure 7 Percentage Change in Daily Truck Volumes on I-15 Segments (Years 2003 to Year 2030) 2-8
Figure 8 Percentage Change in Daily Truck Volumes on I-5 Segments (Years 2003 to Year 2030) 2-9
Figure 9 Percentage Change in Daily Truck Volumes on SR-91 Segments (Years 2003 to Year 2030) 2-9

Figure 10 Percentage Change in Daily Truck Volumes on I-10 Segments (Years 2003 to Year 2030) 2-10
Figure 11 Percentage Change in Daily Truck Volumes on I-710 Segments (Years 2003 to Year 2030) 2-10
Figure 12 100 Percent or more Change in Daily Truck Volumes 2-11
Figure 13 Year 2030 System Performance Forecast ADT on SCAG Region Highways Trucks 2-13
Figure 14 Year 2030 System Performance Forecast V/C Ratios on SCAG Region Highways AM Peak 2-14
Figure 15 Year 2030 System Performance Forecast V/C Ratios on SCAG Region Highways PM Peak 2-15
Figure 16 Year 2030 System Performance Forecast V/C Ratios on SCAG Region Highways Night Time 2-16
Figure 17 Year 2030 System Performance Forecast V/C Ratios on SCAG Region Highways Mid Day 2-17
Figure 18 Year 2030 System Performance Forecast Speed on SCAG Region Highways AM Peak 2-18
Figure 19 Year 2030 System Performance Forecast Speed on SCAG Region Highways PM Peak 2-19
Figure 20 Year 2030 System Performance Forecast Speed on SCAG Region Highways Night Time 2-20
Figure 21 Year 2030 System Performance Forecast Speed on SCAG Region Highways Mid Day 2-21
Figure 22 Total Truck Volume Comparison Year 2030 2-28
Figure 23 Total Vehicle Volume Comparison Year 2030 2-28
Figure 24 Total Traffic Volume Comparison Year 2030 2-29

TABLES

Table 1 2025 Forecast of Trains per Day by Segment 1-4
Table 2 BNSF Peak-Day Rail Traffic for 2025 on the Los Angeles Inland Basin Rail Network (Number of Trains per Day by Segment) 1-9
Table 3 UP Peak-Day Rail Traffic for 2025 on the Los Angeles Inland Basin Rail Network (Number of Trains per Day by Segment) 1-10
Table 4 Freight Train Delay on the Los Angeles-Inland Empire Rail Network in 2025 (With Assumed Additional Tracks and Improvements) 1-11
Table 5 Required Capacity Improvements 2025 for Routing Alternatives 1-12
Table 6 Year 2030 Baseline Truck and Vehicle Average Daily Traffic and on the State Highway System 2-3
Table 7 Daily Truck Volumes, Year 2003 and 2030 on Selected Highway Segments 2-7
Table 8 Truck Volumes Post-Processes Model Runs 2-23
Table 9 Traffic Volume Comparison Year 2030 2-27

E.1 INTRODUCTION

Tech Memo 4a – Freight Demand presented baseline travel demand forecasts for both rail and truck and identified potential scenarios for future evaluations. Those baseline forecasts provide projections of rail volumes (to 2025) and truck volumes (to 2030), recognizably different years, but still the years for which data are available. It documents projected levels of goods movement activity in the study area, and outlines four alternative scenarios for future growth and investment in goods movement facilities. Technical Memorandum 4b – System Performance Report presents the potential for future performance under baseline conditions and travel demand on the rail and highway networks within the Multi-County Goods Movement Action Plan (MCGMAP) study area.

This report summarizes the performance measures and capacity improvements assumed for both rail and highway networks for the target years – 2025 for rail and 2030 for highways.

- **Performance Measure** – Quantitative indicator of how future systems compare to baseline conditions based on projected growth.
- **Improvements Assumed** – Capacity improvements identified to accommodate the projected growth.

E.2 KEY FINDINGS

The document is divided into two sections addressing rail and highway system performance. Key findings are summarized below.

Rail

The future year performance of the BNSF and UP mainlines east of Los Angeles was the subject of the 2002 *Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study*. That study assumed mainline train volumes similar to those presented in Tech Memo 4a. Therefore, the assumption has been made that the two volume forecasts – given similar assumptions of mainline rail capacity and operating patterns – would generate similar performance.

The 2002 study assessed the BNSF and UP mainline performance in terms of various scenarios. One was the Status Quo Alternative, that is, the railroads run trains much as they do today. Another was Alternative 1a, which assumed that UP will concentrate more freight traffic on a combination route of the Los Angeles Subdivision between Los Angeles and Pomona and the Alhambra Line between Pomona and West Colton – the same operating pattern which the WSA forecast assumed.

Further assuming major rail line capacity enhancements, the 2002 study predicted that the Status Quo Alternative would result in average delays per freight train in 2025 of 30.6 minutes on the BNSF and 23.7 minutes on the UP. By contrast, Alternative 1a would result in average delays per freight train in 2025 of 28.7 minutes on the BNSF and 14.7 minutes on the UP. Absent the line

capacity improvements, delays for both BNSF and UP on mainlines east of Los Angeles would be about 200 minutes per train by 2010, according to the study. With the capacity improvements assumed in the study, delays in 2025 would be at or less than 2000 levels.

Highway

State highway growth projections for the study area were prepared using the Southern California Association of Governments (SCAG) Draft 2030 Air Quality Management Plan (AQMP) Baseline model. This includes all types of truck including light, medium and heavy duty. The forecast truck volumes for the Year 2030 indicate the following:

- By 2030, the daily truck volumes on I-5 between SR-55 and SR-57 show an increase of more than 50% from a little more than 20,000 in 2003 to about 34,000.
- Truck volumes on a section of I-110 between I-105 and I-10 increase from 15,000 to almost 30,000 by 2030, and volumes on I-405 between I-110 and SR-91 escalate from 11,000 to more than 24,000 by 2030, an increase double or more than 2003 truck volumes.
- US-101 will experience significant increase in truck volumes between I-110 to SR-170 from 7,000 to 35,000 by 2030 and between SR-170 to I-405 from 8,000 to 26,000, an increase of more than 300% and 200%, respectively, when compared to 2003.
- SR-60 from its terminus to I-710 shows an increase of approximately 110% from 10,000 in 2003 to more than 21,000 daily volumes by 2030.
- I-605 between SR-91 and I-105 shows an increase from 11,000 to almost 29,000, an approximately 150% increase in daily volumes.

Some of the congested segments in the study area for the Year 2030 that will have to accommodate growing traffic greater than their current capacities during the AM peak period and PM peak period (thus experiencing significant traffic delays) are listed below:

- I-5 between SR-118 and SR-14
- I-405 between I-10 and SR-118
- I-15 between SR-91 and SR-74 and through Cajon Pass
- I-215 between SR-74 and SR-60
- SR-14 between I-5 to SR-138
- I-5, US-101, I-10, and I-110 around the vicinity of downtown Los Angeles

E.3 CONCLUSIONS

The future performance of the MCGMAP study area's rail and highway network is directly linked to the substantial increase on volumes forecast. As shown in Tech Memo 4a, both freight and passenger volumes are forecast to increase on all MCGMAP study area rail lines and highways. Current planning efforts have identified a number of required improvements to accommodate baseline future conditions; however, the system will still face performance challenges.

On the MCGMAP study area rail lines, increased freight volumes to and from the Ports of Los Angeles and Long Beach combined with increased passenger rail service along already congested lines will lead to potential delays along the rail network. The delays would increase on the BNSF freight line from 32 minutes in 2000 to 206 minutes by 2010 and on the UP freight line from 30 minutes in 2000 to 197 minutes by 2010 per train. These delays will impact both passenger service and freight supply chains. Planning efforts are underway; however, there is still an identified capacity constraint in terms of the number of tracks available and the demand for both passenger and freight service along shared lines.

The MCGMAP study area highways will see a similar increase in both freight and passenger volumes. The baseline forecasts for the SCAG region show approximately 3,096,000 truck trips per day. Truck trips would account for approximately 39,482,000 vehicle miles of travel (VMT) per day out of the approximately 508,807,000 VMT for all vehicles. Significant delays and capacity constraints will occur along portions of I-5, I-405, I-15, I-215, SR-14, I-10, I-710, SR-60, US-101, and I-110. The performance measures discussed in this report take into account baseline improvements identified through recent planning efforts; however, it is clear that substantial congestion and delays would continue to persist without improving system capacity.

1.1 RAIL NETWORK

This section reviews and evaluates the capacity of the mainline railroad system east of Los Angeles (both the freight-rail and passenger-rail system), and its ability to keep pace with the expected growth of the economy through Year 2025. It also describes the capacity improvements required to meet the rail traffic demand.

There are two major freight hauling railroads serving the study area. These are the Union Pacific Railroad (UP) and the Burlington Northern and Santa Fe Railway (BNSF). The three east-west rail lines that provide connections between Los Angeles and the transcontinental rail system in the study area are the BNSF Transcon, the UP Los Angeles Subdivision, and the UP Alhambra Line. The BNSF Transcon runs from San Bernardino to downtown Los Angeles, where it connects to the triple track Alameda Corridor and thus to the Ports of Los Angeles and Long Beach. The UP Los Angeles Subdivision runs from West Riverside to downtown Los Angeles, and the UP Alhambra Line runs from Colton to downtown Los Angeles. Both UP lines connect in Los Angeles to the Alameda Corridor and to the north-south rail routes for UP – the Coast and the Santa Clarita Lines.

Metrolink, the commuter rail service provided by the Southern California Regional Rail Authority, operates its 91 Line service, its Inland Empire Orange County Line service, and its Orange County Line service on the BNSF Transcon. Its Riverside Line service operates on UP's Los Angeles Subdivision. Amtrak's long distance Southwest Chief and Pacific Surfliner corridor trains also operate on the Transcon. Amtrak's Sunset Limited operates on the UP's Alhambra Line. These railroad mainlines are shown in Figures 1 and 2.

For these mainlines, the impact of capacity constraints is a reduction in system velocity, which results in delay and increased backlog along the rail lines as well as at the rail yards. Currently, the average train trip is delayed by over 30 minutes east of Los Angeles[1]. A back-up in the system can be far reaching, resulting in the delay of time-sensitive shipments to customers across the region.

Metrolink is planning major increases in passenger trains using BNSF and UP mainlines in the study area; these increases will further strain capacity in the absence of any improvements. Metrolink trains are most frequent during the morning and afternoon weekday commute periods, and are oriented inbound to Los Angeles in the morning and outbound in the afternoon. About a third of Metrolink trains operate on BNSF and UP mainlines today.

Amtrak Pacific Surfliner corridor trains will likely increase in the future, with the increases potentially contributing to congestion and train delay on the mainlines.

Source: The Professional Railroad Atlas of North America, Edition 2

Figure 1

RAILROADS AND MAINLINES IN THE MCGMAP STUDY AREA SERVING CALIFORNIA, ARIZONA, NEVADA, AND OREGON

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Figure 2
BNSF TRANSCON WEST OF SAN BERNARDINO, UP LOS ANGELES SUBDIVISION, AND UP ALHAMBRA LINES

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1.2 RAIL FORECASTS

The freight and passenger trains' summary rail forecasts shown in Table 1 were derived from the Wilbur Smith Associates team's forecasts presented in Tech Memo 4a. Freight volumes include intermodal and carload traffic on the BNSF and UP mainlines. Passenger rail forecasts include Amtrak long distance trains, Amtrak Pacific Surfliner corridor trains (Corridor) , and Metrolink commuter trains. The forecasts were based on the most recent available data from BNSF, UP, Amtrak, and Metrolink.

Table 1
2025 Forecast of Trains per Day by Segment

	FACILITY TYPE/PROVIDER					
TRACK SEGMENTS	**BNSF**	**UP**	**Amtrak**	**Corridor**	**Metrolink**	**Total**
BNSF						
Barstow-San Bernardino	131	29	2			**162**
San Bernardino-Colton	111	29	2		40	**182**
Colton-West Riverside	111	37	2		40	**190**
West Riverside-Atwood	111		2		66	**179**
Atwood-Fullerton	102		2		26	**130**
Fullerton-Hobart	102		2	32	74	**210**
Hobart-Redondo	74		2	32	74	**182**
Atwood-Orange	9				40	**49**
Fullerton-Orange				32	48	**80**
Orange-Irvine/San Juan Capistrano/Oceanside/San Diego	9			32	88	**129**
UP						
East Los Angeles-Pomona (LA Sub)		82			44	**126**
Pomona-Mira Loma (LA Sub)		30			44	**74**
Mira Loma-West Riverside (LA Sub)		37			44	**81**
Pomona-Los Angeles (Alhambra Line)		36	1			**37**
Pomona-West Colton (Alhambra Line)		112	1			**113**
Los Angeles-Burbank		18	2	14	78	**112**
Burbank-Coast Line		12	2	14	36	**64**
Burbank-Palmdale		6			42	**48**
Palmdale-Colton		27				**27**
Colton-El Paso Line		80	1			**81**
Alameda Corridor						**144**
Colton Crossing	111	101	3		40	**255**
Cajon Pass	160	27	2			**189**

Source: Wilbur Smith Associates, 2006

Figures 3 through 5 show the train volumes per day for the Year 2025 for freight trains, commuter trains, and freight and passenger trains combined.

Legend

Volumes (Trains/Day)

- 0 - 18
- 19 - 37
- 38 - 112
- 113 - 160
- 161 - 212

- Water
- Urban Areas
- County Boundary
- Freeways
- Ports
- Airports

Year 2025 Forecast of Freight Rail Volumes on the Study Area Mainlines

Source: Wilbur Smith Associates, 2006
TeleAtlas StreetMap USA

0 2.5 5 10 15 20 Miles

N

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Figure 3

Legend

Volumes (Trains/Day)

- 1 - 26
- 27 - 50
- 51 - 92
- 93 - 120

- Water
- Urban Areas
- County Boundary
- Freeways
- Ports
- Airports

Year 2025 Forecast of Commuter Rail Volumes on the Study Area Mainlines

Source: Wilbur Smith Associates, 2006
TeleAtlas StreetMap USA

0 2.5 5 10 15 20 Miles

N

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Figure 4

Legend

Volumes (Trains/Day)

- 27 - 49
- 50 - 81
- 82 - 130
- 131 - 162
- 163 - 255

- Water
- Urban Areas
- County Boundary
- Freeways
- Ports
- Airports

Year 2025 Forecast of Freight and Passenger Rail Volumes on the Study Area Mainlines

Source: Wilbur Smith Associates, 2006
TeleAtlas StreetMap USA

0 2.5 5 10 15 20 Miles

N

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Figure 5

1.3 SYSTEM PERFORMANCE

Performance Measures

Growth in freight demand, combined with forecast growth in passenger demands, will contribute to increased congestion and reduced performance of the region's rail transportation system unless major capacity enhancements are made. The performance of the rail transportation system in the study area can be assessed based on two parameters:

- **Rail Volume** – The rail traffic for the Year 2025 derived from previous studies assumes growth rates that apply to various types of freight traffic with port-related intermodal traffic growing faster than either domestic intermodal or carload traffic on the BNSF Transcon, the UP Alhambra Line and the UP Los Angeles Subdivision.

- **Train Delay** – The principal determinant of velocity, or the average speed of trains, is train delay due to congestion, or simply too many trains on too little track.

The projected growth in freight and passenger railroad traffic can be accommodated provided certain capacity improvements are carried out on the rail lines. With a maximum capacity of 50 trains per day per line, both BNSF and UP will have track capacity shortfalls on certain line segments by 2010, barring any major improvements, according to the 2002 "Los Angeles-Inland Empire Railroad Mainline Advance Planning Study." The data presented below assumes specific track capacity improvements and operational changes.

Proposed capacity improvement projects in the region would include:
- Freight railroad infrastructure (tracks, signals)
- Flying junctions
- Grade separations

Performance

Rail Volume Forecasts

The rail traffic forecast data used in the following analysis comes from the 2002 "Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", rather than from the forecast trains per day shown in Table 1 (which was based on the more recent information). The reason for using the 2002 study forecast here was that the 2002 study included analysis of future train performance delay, which is a key measure of train performance. No future train performance analysis was done relative to the forecast above. With this noted, the two volume forecasts are similar overall. It is reasonable, therefore, to assume that the two volume forecasts - given similar assumptions of mainline rail capacity and operating patterns - would generate similar performance.

Traffic on BNSF and UP track segments for the Year 2025 appears in Tables 2 and 3 below.

WSA's forecast assumed operating patterns on the UP similar to those assumed in the 2002 study's Alternative 1a, wherein Metrolink's Riverside Line trains remain on the LA Sub between Los Angeles and Pomona. To the consulting team's knowledge, Metrolink has no plans to shift Riverside Line trains to the Alhambra Line west of Pomona, as was assumed in the 2002 study's Alternative 1b.

Table 2
BNSF Peak-Day Rail Traffic for 2025 on the Los Angeles Inland Basin Rail Network
(Number of Trains per Day by Segment)

	Hobart-Fullerton	Fullerton-Atwood	Atwood-Riverside	Riverside-Colton
Year 2025 Total	**218**	**144**	**183**	**174**
BNSF through freight	112	112	121	121
Passenger	106	32	62	36
UP through freight	–	–	–	17

Source: "The Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC), 2002.
Note: UP volume between Riverside and Colton on the BNSF was updated to 73 trains in the 2005 "Inland Empire Railroad Main Line Study Final Report", prepared for the Southern California Association of Governments (SCAG). Accordingly, total daily trains would reach 230 in 2025 on that segment.

Illustrative of the BNSF Transcon traffic increases forecasted from Year 2000 is the following. According to the 2002 study, there were 57 daily BNSF trains between Riverside and Colton in Year 2000. On the other hand, Table 2 shows that BNSF freight traffic at 121 daily trains on the same segment by 2025. That is, Table 2 BNSF train volumes equate to over a 100 percent increase on that segment. Considering UP and passenger train volumes (Amtrak and Metrolink), total daily trains will increase 69 percent, from 103 in 2000 to 174 in 2025 on the segment.

Table 3 represents a change in how the UP may operate its services in the future. That is, it may shift traffic around on the Los Angeles Subdivision and the Alhambra Line to gain operating flexibility. The daily number of flexible trains that may be routed along either line is forecasted at 92 by 2025.

Illustrative of the UP traffic increases forecasted from Year 2000 is the following. According to the 2002 study, there were 31 daily UP trains in East Los Angeles and Pomona on the LA Subdivision. Per Table 3, UP freight traffic could reach 106 daily trains on the same segment by 2025, depending on how UP decides to route trains. That is, Table 3 UP train volumes equate to more than a 240 percent increase on that segment. Considering UP and passenger train volumes (Metrolink), total daily trains will increase 230 percent, from 43 in 2000 to 142 in 2025 on the segment.

Table 3
UP Peak-Day Rail Traffic for 2025 on the Los Angeles Inland Basin Rail Network
(Number of Trains per Day by Segment)

Line	West of Pomona	Pomona-West Colton	West Colton-Colton
UP Alhambra Line			
UP through freight	13	17	27
Passenger	8	8	8

	West of Pomona	East of Pomona
UP Los Angeles Subdivision		
UP through freight	14	14
Passenger	36	36
Flexible Freight	92	

	Through Pomona	Through Colton
Total UP Trains	161	176
UP through freight	117	132
Passenger	44	44

Source: "The Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC), 2002.

Train Delay

Table 4 below shows average minutes of delay per train (under the two alternatives set forth in the 2002 "Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study"). One is the Status Quo Alternative, that is, the railroads run trains pretty much as they do today. The other is Alternative 1a, which assumed that UP will concentrate more freight traffic on a combination routing of the Los Angeles Subdivision between East Los Angeles and Pomona and the Alhambra Line between Pomona and Colton. This is the same assumption used in the Wilbur Smith Associates team forecast appearing in Table 1. The results (shown below in Table 4) indicate reductions in delay for trains of both railroads. The greatest change is for UP trains in Alternative 1a, with a reduction of about 38 percent. This result represents a decrease in average delay of 9 minutes per train.

Table 4
Freight Train Delay on the Los Angeles-Inland Empire Rail Network in 2025
(With Assumed Additional Tracks and Improvements)

Routing Option	Average Delay Per Train (minutes) 2025 Freight and Passenger
Status Quo	
BNSF Freight	30.6
UP Freight	23.7
Alternative 1a	
BNSF Freight	28.7
UP Freight	14.7

Source: "The Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC), 2002.
Note: Assumed capacity improvements are those recommended in the aforementioned study. These appear in the following section.

The capacity improvements which enable the railroads to handle the increasing volume are described in the following section. Assuming no track and other improvements, an average delay of 206 minutes per BNSF train and 197 minutes per UP train would occur in 2010, according to the 2002 rail study. These figures compare with an average 32 minutes of delay per BNSF train and 30 minutes per UP train in 2000, as cited in the study. With capacity improvements cited in the study, delays in 2025 would be at or less than 2000 levels.

Improvements Assumed

The projected growth in freight and passenger railroad traffic can be accommodated provided certain capacity improvements are carried out on the rail lines. With a maximum capacity of 50 trains per day per line, both BNSF and UP will have track capacity shortfalls on certain line segments by 2010, barring any major improvements, according to the 2002 "Los Angeles-Inland Empire Railroad Mainline Advance Planning Study."

Proposed capacity improvement projects in the region would include:

- Freight railroad infrastructure (tracks, signals)
- Flying junctions
- Grade separations

The improvements recommended by the study and assumed for the two routing alternatives – the Status Quo Alternative and Alternative 1a for Year 2025 – are detailed in Table 5.

Table 5
Required Capacity Improvements 2025
for Routing Alternatives

Status Quo Alternative	
BNSF	4 main tracks, Hobart-Fullerton
	4 main tracks, Atwood-Colton
	3 main tracks, Atwood-Riverside
	Flying Junction at Riverside
	Grade separation of Colton Crossing
UP	2 main tracks, East LA-Pomona
	2 main tracks, LATC-Pomona
	Flying Junction of Palmdale Line at West Colton
	Flying Junction at Riverside
	Grade separation of Colton Crossing
BNSF Alternative 1a	
	4 main tracks, Hobart-Fullerton
	3 main tracks, Atwood-Colton
	Grade separation of Colton Crossing
UP Alternative 1a	
	3 main tracks, East LA-Pomona
	Flying Junction at Pomona
	Flying Junction of Palmdale Line at West Colton
	Grade separation of Colton Crossing

Source: "The Los Angeles-Inland Empire Railroad Main Line Advanced Planning Study", Los Angeles County Economic Development Corporation (LAEDC), 2002.

The above stated improvements, according to the referenced study, are limited to the rail infrastructure required to physically handle the assumed train volumes. The Status Quo Alternative would require more track capacity improvements and more rail-grade separations than Alternative 1a; whereas Alternative 1a would have the added benefit of opening up the Alhambra Line for more Metrolink Service.

The 2002 rail study does not look at UP routes west of Los Angeles. At the same time, volume increases on these lines (the UP Coast Line and UP Santa Clarita Line), are not likely to be as great as on the BNSF and UP east-west Los Angeles basin lines.

1.4 CONCLUSION

On the MCGMAP study area rail lines, increased freight volumes combined with increased passenger rail service will lead to high volumes of rail movements on limited facilities. The 2005 "Inland Empire Railroad Main Line Study Final Report", a follow-up to the 2002 study and prepared for the Southern California Association of Governments (SCAG), forecasted 267 total

trains per day through Colton Crossing and 195 total trains per day through Cajon Pass[2]. Both the 2002 and 2005 studies forecasted well over 100 freight and passenger trains per day on BNSF and UP main lines east of Los Angeles (recognizing that UP can shift volumes between portions of the LA Subdivision and the Alhambra Line), as does the Wilbur Smith Associates team forecast in Table 1.

The analysis described above makes clear that, without additional rail capacity, the performance of the MCGMAP study area's rail system will face worsening congestion and delays.

2.1 HIGHWAY

Highway performance is directly related to the use of the highway system by various classes of users which include both passenger vehicles and commercial truck traffic.

This section presents information on system performance on the highway network within the SCAG region based on the travel forecasts prepared using the SCAG Draft 2030 Air Quality Management Plan (AQMP) Baseline model. Currently, over 54 million vehicle trips per day travel on the regional highway and arterial system[1]. The SCAG 2004 RTP reported that in the year 2000, total daily delay from congestion, for both personal travel and goods movement, was estimated at approximately 2.2 million person-hours throughout the SCAG region. The impact of delay on the freight industry is significant, and congestion and delay can increase the hourly cost of carrying goods by 50% to 250%, depending on the commodity[2].

The state highway system within the MCGMAP study area is shown in Figure 6.

2.2 TRUCK FORECASTS

The rapid growth of all vehicular traffic, increased congestion, and air quality impacts has caused a widespread recognition that the smooth and efficient movement of people and goods is essential for economic prosperity. For the highway system to operate efficiently in the future, it is important to project the volume of goods and vehicles in order to determine what the system will need to accommodate. Table 6 shows the forecast for truck and vehicle volumes and the volume-to-capacity ratio on the region's freeway system for the Year 2030. The volume-to-capacity ratios presented in the Table 6 are for daily traffic, and therefore may be lower than if the ratios were computed for peak-hour conditions. (Note: This information was also presented in Tech Memo 4a).

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Figure 6
EXISTING HIGHWAY SYSTEM WITHIN THE MCGMAP STUDY AREA

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Table 6
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Route	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
I-10	E	PCH to I-405	4,892	93,603	0.05	W	4,441	85,746	0.05
I-10	E	I-405 to I-110	8,161	161,698	0.05	W	8,814	157,124	0.06
I-10	E	I-110 to I-5	12,107	164,656	0.07	W	11,596	152,176	0.08
I-10	E	I-5 to I-710	7,475	127,320	0.06	W	8,997	123,820	0.07
I-10	E	I-710 to I-605	8,535	124,943	0.07	W	9,469	125,958	0.08
I-10	E	I-605 to SR-57	12,668	112,408	0.11	W	15,178	100,866	0.15
I-10	E	SR-57 to I-15	21,655	112,076	0.19	W	16,055	106,089	0.15
I-10	E	I-15 to I-215	10,154	92,981	0.01	W	12,902	101,491	0.13
I-101	N	I-5 to I-10	13,838	98,783	0.14	S	12,269	107,680	0.11
I-101	N	I-10 to I-110	18,466	170,571	0.11	S	15,274	172,289	0.09
I-101	N	I-110 to I-170	18,887	173,880	0.11	S	17,068	169,782	0.10
I-101	E	SR-170 to I-405	12,965	161,027	0.08	W	13,812	172,454	0.08
I-101	E	I-405 to SR-118	11,505	146,641	0.08	W	12,528	142,837	0.09
I-105	E	PCH to I-405	5,177	74,430	0.07	W	4,851	74,209	0.07
I-105	E	I-405 to I-110	8,590	101,566	0.08	W	9,127	108,082	0.08
I-105	E	I-110 to I-710	7,461	96,861	0.11	W	8,622	98,175	0.09
I-105	E	I-710 to I-605	16,227	107,924	0.15	W	11,725	76,125	0.14
I-110	N	Arroyo Pky to I-10	2,468	124,666	0.01	S	2,234	110,216	0.01
I-110	N	I-10 to I-105	14,837	140,430	0.11	S	14,810	140,743	0.11
I-110	N	I-105 to SR-91	14,124	131,181	0.11	S	13,250	117,533	0.11
I-110	N	SR-91 to I-405	18,580	152,002	0.12	S	12,938	106,930	0.12
I-110	N	I-405 to End	11,157	70,526	0.17	S	15,369	112,870	0.14
I-15	N	I-215 to SR-138	20,358	118,648	0.17	S	23,862	122,244	0.20
I-15	N	I-210 to I-215	16,346	86,213	0.19	S	19,794	87,284	0.23
I-15	N	I-10 to I-210	10,332	101,968	0.10	S	12,736	109,379	0.12

Table 6
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Route	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
I-15	N	SR-60 to I-10	10,572	116,444	0.09	S	9,656	116,419	0.08
I-15	N	SR-91 to SR-60	10,163	88,053	0.12	S	7,357	87,932	0.08
I-15	N	SR-74 to SR-91	14,194	91,554	0.16	S	7,899	92,669	0.09
I-210	N	SR-14 to SR-118	11,386	76,653	0.15	S	8,258	80,838	0.10
I-210	N	SR-118 to SR-2	15,319	96,870	0.16	S	11,614	93,249	0.13
I-210	N	SR-2 to SR-134	14,689	104,403	0.14	S	11,556	100,576	0.12
I-210	E	SR-134 to I-605	15,628	126,313	0.12	W	18,479	128,682	0.14
I-210	E	I-605 to SR-57	20,062	117,993	0.17	W	22,853	115,306	0.20
I-215	N	SR-30 to I-15	11,767	92,151	0.11	S	4,519	63,559	0.07
I-215	N	SR-60 to I-10	9,936	114,295	0.09	S	10,134	117,592	0.09
I-405	N	I-5 to SR-133	6,031	92,328	0.07	S	6,293	99,302	0.06
I-405	N	SR-133 to SR-55	8,112	127,991	0.06	S	7,909	125,564	0.06
I-405	N	SR-55 to SR-22	15,028	136,647	0.11	S	13,575	155,952	0.09
I-405	N	SR-22 to I-605	21,716	189,002	0.12	S	17,029	178,858	0.10
I-405	N	I-605 to I-710	14,906	133,948	0.11	S	13,286	132,289	0.10
I-405	N	I-710 to I-110	13,562	132,230	0.10	S	12,807	129,292	0.10
I-405	N	I-110 to SR-91	12,715	119,040	0.11	S	12,275	122,230	0.10
I-405	N	SR-91 to I-105	13,034	128,647	0.10	S	12,193	127,099	0.10
I-405	N	I-105 to I-10	14,374	149,354	0.10	S	13,445	152,610	0.09
I-405	N	I-10 to US-101	11,707	175,180	0.06	S	11,253	151,690	0.07
I-405	N	US-101 to I-5	7,410	142,371	0.05	S	6,463	126,201	0.05
I-5	N	LA County Line to I-605	23,321	138,101	0.17	S	17,868	147,832	0.12
I-5	N	I-605 to I-710	25,087	155,890	0.16	S	19,219	155,458	0.12
I-5	N	I-710 to SR-60	25,170	161,925	0.16	S	20,490	163,406	0.13
I-5	N	SR-60 to SR-134	16,674	142,956	0.12	S	14,180	142,724	0.10

Table 6
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Route	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
I-5	N	SR-134 to SR-118	14,311	127,149	0.11	S	12,655	132,547	0.10
I-5	N	SR-118 to SR-14	17,013	176,510	0.10	S	13,387	159,617	0.09
I-5	N	SR-57 to LA County Line	18,780	124,981	0.15	S	14,468	130,022	0.11
I-5	N	SR-55 to SR-57	17,521	156,485	0.11	S	16,369	178,949	0.09
I-5	N	SR-133 to SR-55	16,375	132,710	0.12	S	13,385	150,074	0.09
I-5	N	I-405 to SR-133	15,214	101,694	0.15	S	11,420	104,836	0.11
I-5	N	I-405 to SR-73	17,914	137,274	0.13	S	14,183	143,285	0.10
I-5	N	SR-73 to SD County Line	20,625	135,800	0.15	S	13,924	128,552	0.11
I-605	N	I-405 to SR-91	8,945	104,774	0.09	S	7,693	107,383	0.07
I-605	N	SR-91 to I-105	14,975	139,885	0.11	S	13,824	155,265	0.09
I-605	N	I-105 to I-5	20,128	127,720	0.16	S	17,378	124,879	0.14
I-605	N	I-5 to SR-60	21,148	115,071	0.19	S	20,827	112,813	0.19
I-605	N	SR-60 to I-10	17,174	111,544	0.15	S	17,223	101,262	0.17
I-605	N	I-10 to I-210	12,326	110,619	0.11	S	12,341	104,670	0.12
I-710	N	Port to I-405	17,414	52,166	0.27	S	21,203	63,072	0.29
I-710	N	I-405 to SR-91	34,058	109,758	0.32	S	33,541	103,070	0.33
I-710	N	SR-91 to I-105	25,983	123,616	0.22	S	25,162	134,410	0.19
I-710	N	I-105 to I-5	17,122	125,845	0.14	S	16,258	118,899	0.14
I-710	N	I-5 to SR-60	10,860	112,673	0.10	S	8,730	110,882	0.08
I-710	N	SR-60 to I-10	9,452	100,495	0.09	S	7,245	99,333	0.07
I-710	N	I-10 to I-210	8,542	101,782	0.08	S	6,862	93,596	0.07
SR-134	E	I-5 to I-210	9,048	113,085	0.08	W	9,318	108,779	0.09
SR-134	E	I-101 to I-5	9,048	113,085	0.08	W	9,207	110,503	0.08
SR-55	N	I-405 to I-5	7,367	120,962	0.06	S	6,492	116,644	0.05
SR-55	N	I-5 to SR-22	7,726	112,372	0.07	S	7,226	113,268	0.06
SR-55	N	SR-22 to SR-91	9,162	124,028	0.07	S	8,326	115,820	0.07
SR-57	N	I-5 / SR-22 to SR-91	10,256	121,293	0.08	S	9,144	124,719	0.07

Table 6
Year 2030 Baseline Truck and Vehicle Average Daily Traffic on the State Highway System

Route	D	Segments	Total Trucks	Total Vehicles	Truck Percentage	D	Total Trucks	Total Vehicles	Truck Percentage
SR-57	N	SR-91 to SR-60	11,493	131,438	0.09	S	10,510	120,647	0.09
SR-57	N	SR-60 to I-10	6,280	102,101	0.06	S	7,811	99,983	0.08
SR-57	N	I-210 to SR-30	11,290	108,540	0.11	S	9,006	109,449	0.08
SR-60	E	I-10 to I-710	10,164	140,256	0.07	W	11,131	137,489	0.08
SR-60	E	I-710 to I-605	11,592	141,498	0.08	W	13,617	141,754	0.10
SR-60	E	I-605 to SR-57	12,512	118,998	0.11	W	13,662	117,793	0.12
SR-60	E	SR-57 to I-15	12,740	114,780	0.11	W	14,894	114,299	0.13
SR-60	E	I-15 to I-215	8,796	109,776	0.08	W	10,948	105,513	0.10
SR-91	E	I-10 to I-710	11,319	111,032	0.10	W	10,255	104,307	0.10
SR-91	E	I-710 to I-605	19,626	123,286	0.16	W	20,563	129,334	0.16
SR-91	E	I-605 to I-5	18,602	114,163	0.16	W	19,186	122,910	0.16
SR-91	E	I-5 to SR-57	17,162	116,260	0.15	W	21,863	127,617	0.17
SR-91	E	SR-57 to SR-241	16,481	136,712	0.12	W	19,578	138,493	0.14
SR-91	E	SR-241 to I-15	22,131	159,292	0.14	W	26,023	165,959	0.16
SR-91	E	I-15 to I-215	11,310	96,782	0.12	W	13,009	102,837	0.13
SR-118	E	I-405 to SR-23	5,794	98,698	0.06	W	7,606	108,516	0.07
SR-170	E	I-5 to SR-134	12,193	127,895	0.10	W	9,813	129,345	0.08

Note: D – Direction
N – North
S – South
E – East
W – West

Source: SCAG 2030 Draft AQMP Baseline model, SCAG, April 2006.

Table 7 shows the increase in volume of trucks from the Years 2003 to 2030 on selected segments of the highway system. These segments were selected based on potential routes for truck improvements described and evaluated as part of Task 6.

Table 7
Daily Truck Volumes, Year 2003 and 2030
On Selected Highway Segments

Name	Segments	SCAG Model TRUCK 2003	SCAG Model Truck 2030	Percent Change in Daily Truck Volume
I-10	PCH to I-405	7,465	9,333	25%
I-10	I-405 to I-110	14,402	16,975	18%
I-10	I-110 to I-5	19,057	23,703	24%
I-10	I-5 to I-710	12,208	16,472	35%
I-10	I-710 to I-605	12,209	18,004	47%
I-10	I-605 to SR-57	16,484	27,847	69%
I-10	SR-57 to I-15	21,003	37,710	80%
I-10	I-15 to I-215	13,112	23,056	76%
I-15	I-215 to SR-138	19,690	44,220	125%
I-15	I-210 to I-215	15,487	36,140	133%
I-15	I-10 to I-210	11,779	23,068	96%
I-15	SR-60 to I-10	11,912	20,228	70%
I-15	SR-91 to SR-60	10,666	17,519	64%
I-15	SR-74 to SR-91	11,009	22,093	101%
I-5	SR-118 to SR-14	17,336	30,399	75%
I-5	SR-134 to SR-118	16,882	26,966	60%
I-5	SR-60 to SR-134	23,892	30,854	29%
I-5	I-710 to SR-60	34,037	45,660	34%
I-5	I-605 to I-710	31,621	44,306	40%
I-5	LA County Line to I-605	26,972	41,189	53%
I-5	SR-57 to LA County Line	22,144	33,248	50%
I-5	SR-55 to SR-57	24,184	33,890	40%
I-5	SR-133 to SR-55	19,633	29,760	52%
I-5	I-405 to SR-133	16,120	26,635	65%
I-5	SR-73 to I-405	18,485	32,096	74%
I-5	San Diego County Line to SR-73	15,947	34,549	117%
I-605	I-405 to SR- 91	11,945	16,638	39%
I-605	SR-91 to I-105	20,969	28,798	37%
I-605	I-105 to I-5	24,521	37,506	53%
I-605	I-5 to SR-60	25,925	41,975	62%
I-605	SR-60 to I-10	20,414	34,397	68%
I-605	I-10 to I-210	13,933	24,667	77%
I-710	Port to I-405	25,173	46,543	85%
I-710	I-405 to SR- 91	34,564	67,599	96%
I-710	SR-91 to I-105	29,634	51,145	73%
I-710	I-105 to I-5	22,323	33,381	50%
I-710	I-5 to SR-60	12,403	19,590	58%
I-710	SR-60 to I-10	8,344	16,697	100%
I-710	I-10 to I-210	8,022	15,404	92%
SR-57	I-5 / SR-22 to SR-91	14,060	19,400	38%
SR-57	SR-91 to SR-60	16,434	22,003	34%

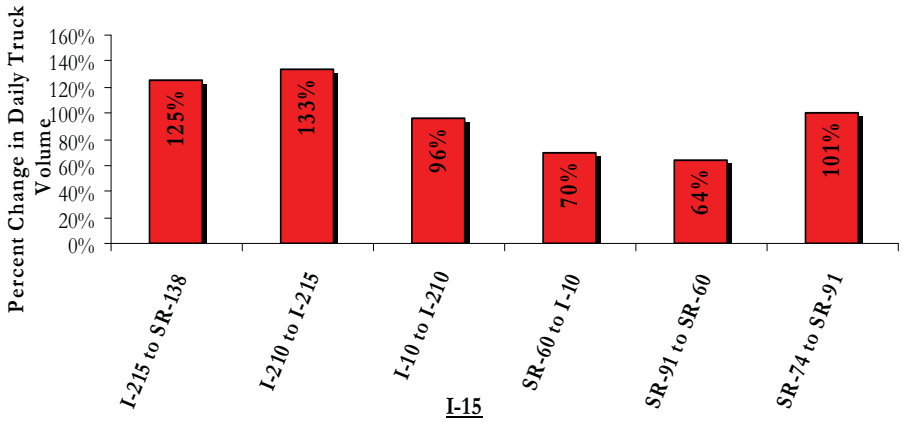
Name	Segments	SCAG Model TRUCK 2003	SCAG Model Truck 2030	Percent Change in Daily Truck Volume
SR-57	SR-60 to I-10	8,914	14,091	58%
SR-57	I-10 to I-210	11,753	18,447	57%
SR-60	I-10 to I-710	17,321	21,294	23%
SR-60	I-710 to I-605	18,907	25,209	33%
SR-60	I-605 to SR-57	19,415	26,174	35%
SR-60	SR-57 to I-15	19,548	27,634	41%
SR-60	I-15 to I-215	11,117	19,744	78%
SR-91	I-110 to I-710	14,774	21,574	46%
SR-91	I-710 to I-605	23,017	40,189	75%
SR-91	I-605 to I-5	20,162	37,788	87%
SR-91	I-5 to SR-57	20,397	39,025	91%
SR-91	SR-57 to SR-241	18,613	36,060	94%
SR-91	SR-241 to I-15	22,320	48,154	116%
SR-91	I-15 to I-215	11,449	24,319	112%

Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

The forecast shown above indicates the following:

- I-15 will experience significant increase in truck volumes between I-210 to the SR-138 from 15,000 to 44,000 by 2030 and between SR-74 and SR-91 from 11,000 to 22,093, an increase of more than 130% and 100% percent, respectively, when compared to 2003 (as shown in Figure 7)

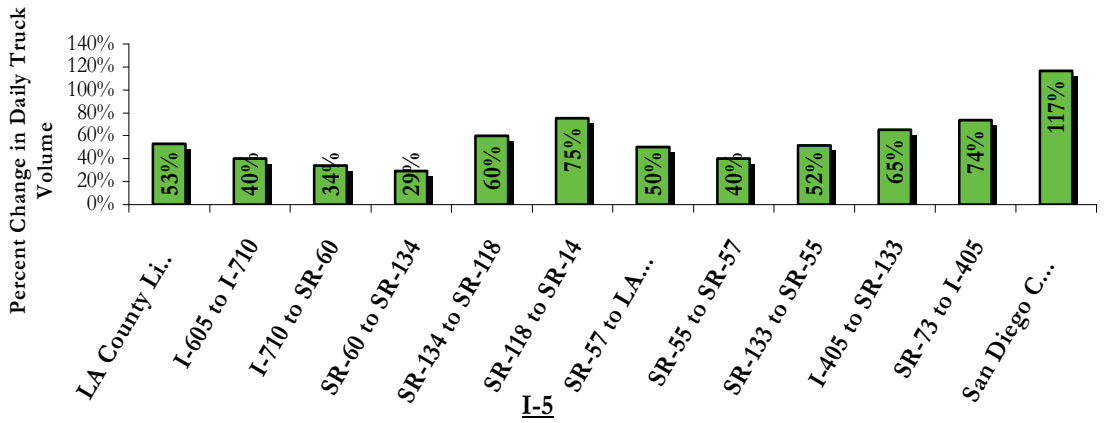
Figure 7
Percentage Change in Daily Truck Volumes on I-15 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- The daily truck volumes on I-5 between SR-73 and San Diego County show an increase of more than 100% from a little more than 15,000 in 2003 to about 34,000 by 2030 as shown in Figure 8.

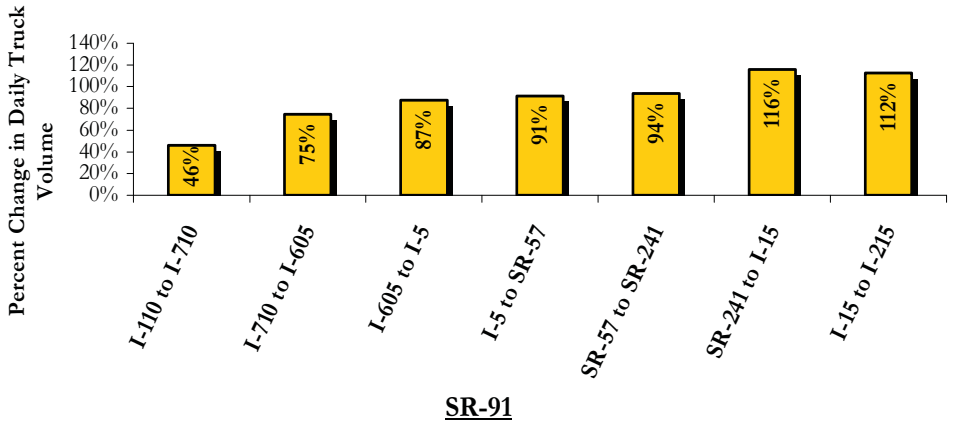
Figure 8
Percentage Change in Daily Truck Volumes on I-5 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- Truck volumes on SR- 91 between I-5 and I-15 escalate from 11,000 to more than 48,000 by 2030, an increase more than 110% as shown below.

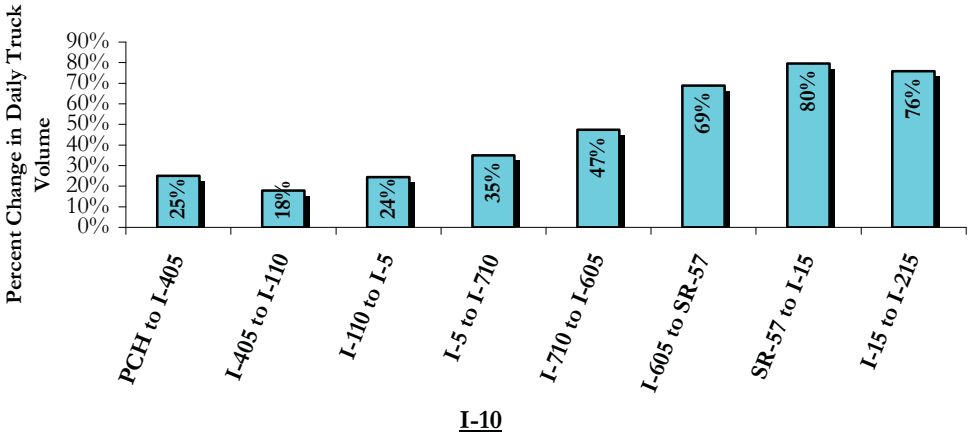
Figure 9
Percentage Change in Daily Truck Volumes on SR-91 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- I-10 from SR-57 to I-215 shows an increase from 13,000 to 37,000 by 2030, an approximately 80% increase in daily volume (shown in Figure 10).

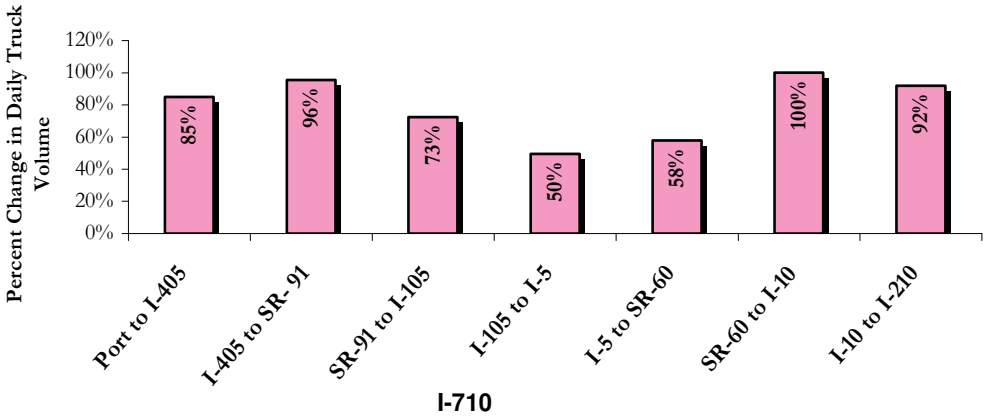
Figure 10
Percentage Change in Daily Truck Volumes on I-10 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- The daily Truck volumes on I-710 between SR-60 to I-10 show an increase of 100% from 8,000 to more than 15,000 by 2030 as indicated in Figure 11.

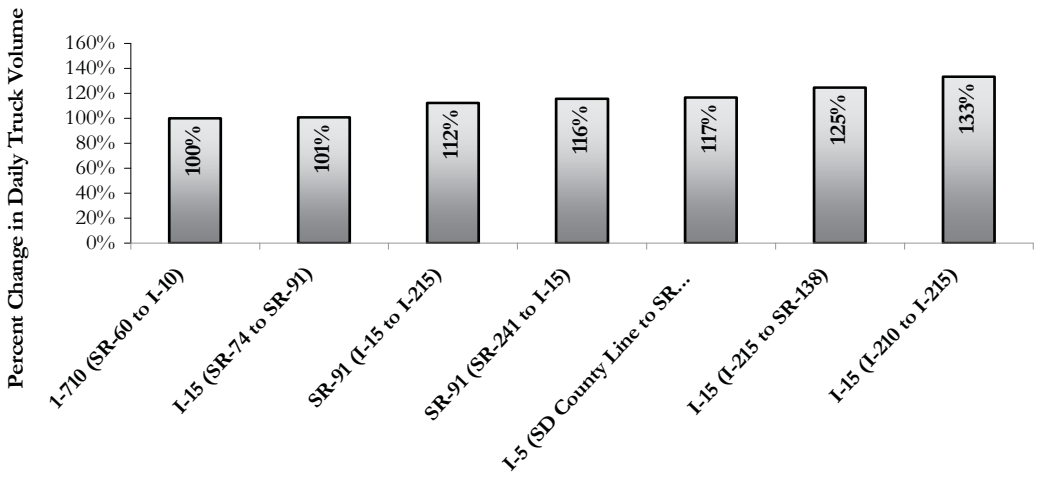
Figure 11
Percentage Change in Daily Truck Volumes on I-710 Segments
(Year 2003 to Year 2030)



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

- Truck volumes on I-710 between I-10 and I-210 increase from 8,000 to 15,000 by 2030, an increase more than 90%, due to the assumed extension of I-710 by 2030. Currently, I-710 ends at Valley Blvd. (just north of I-10 in Alhambra). In 2030, I-710 is assumed to continue through to I-210.
- I-605 from I-10 to I-210 escalate from 13,000 to more than 24,000 by 2030, an increase of 70% in daily truck and volumes on SR-60 from I-15 to I-215 shows an increase more than 75% than the 2003 truck volumes.
- The daily truck volumes on SR-57 between SR-60 to I-210 show an increase of more than 55% from 11,000 to 18,000 by 2030.
- Figure 12 presents more than 100% change from 2003 to 2030 for all the freeways on Table 7. As shown in Figure 12, I-15 with more than 130 percent increase has highest growth by 2030.

Figure 12
100 Percent or more Change in Daily Truck Volumes



Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

2.3 SYSTEM PERFORMANCE

Performance Measure

As reported in previous Tech Memos, truck travel patterns are different from private vehicle travel patterns; and must be analyzed separately in order to determine their impact on the highway system. Highway capacity-related performance measures include truck volumes, average speed, and volume-to-capacity ratios. These performance measures are estimated for the Year 2030 as shown in Figures 13 through 21.

Performance

Truck volumes

The truck traffic volumes for the Year 2030 are the average daily trips made by trucks on links on the highway network. The volumes presented are unadjusted model-based results. These daily volumes are useful for planning purposes and for estimating the increase in volumes of freight traffic on the highways. Figure 13 shows the average daily truck traffic on highway links for the Year 2030.

Volume-to-capacity ratio

A critical factor in highway capacity analysis is the proportion of the facility's capacity being utilized by traffic. This ratio is often used as a measure of sufficiency of existing or proposed facility capacity. In forecasting situations, a volume-to-capacity (v/c) ratio above 1.00 predicts that the demand will exceed the available capacity, leading to delays, queues, and congestion. The v/c ratios for the Year 2030 have been combined with the study area's highway network and are plotted thematically, allowing visual representation of congested segments of the highway. Figures 14 through 17 show highway link v/c ratios for the AM peak, PM peak, nighttime (off-peak) and midday time periods.

Average Speed

The travel time delay on the highway is calculated as the difference between the congested travel time and the free flow travel time. The average speed of truck travel is the length (distance traveled) divided by the congested travel time. Figures 18 through 21 show the average speed on the region's highway system for the Year 2030 during the AM and PM peak hours, nighttime and midday.

0
1 - 7409
7410 - 11632
11633 - 15561
15562 - 36515

Water
Urban Areas
County Boundary
Other Highways
Ports
Airports

Year 2030 System Performance

Forecast ADT on SCAG Region Highways
Trucks

0 5 10 20 30 40 Miles

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

10/18/06

VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast V/C Ratios on SCAG Region Highways
AM Peak

0 5 10 20 30 40 Miles

10/18/06

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

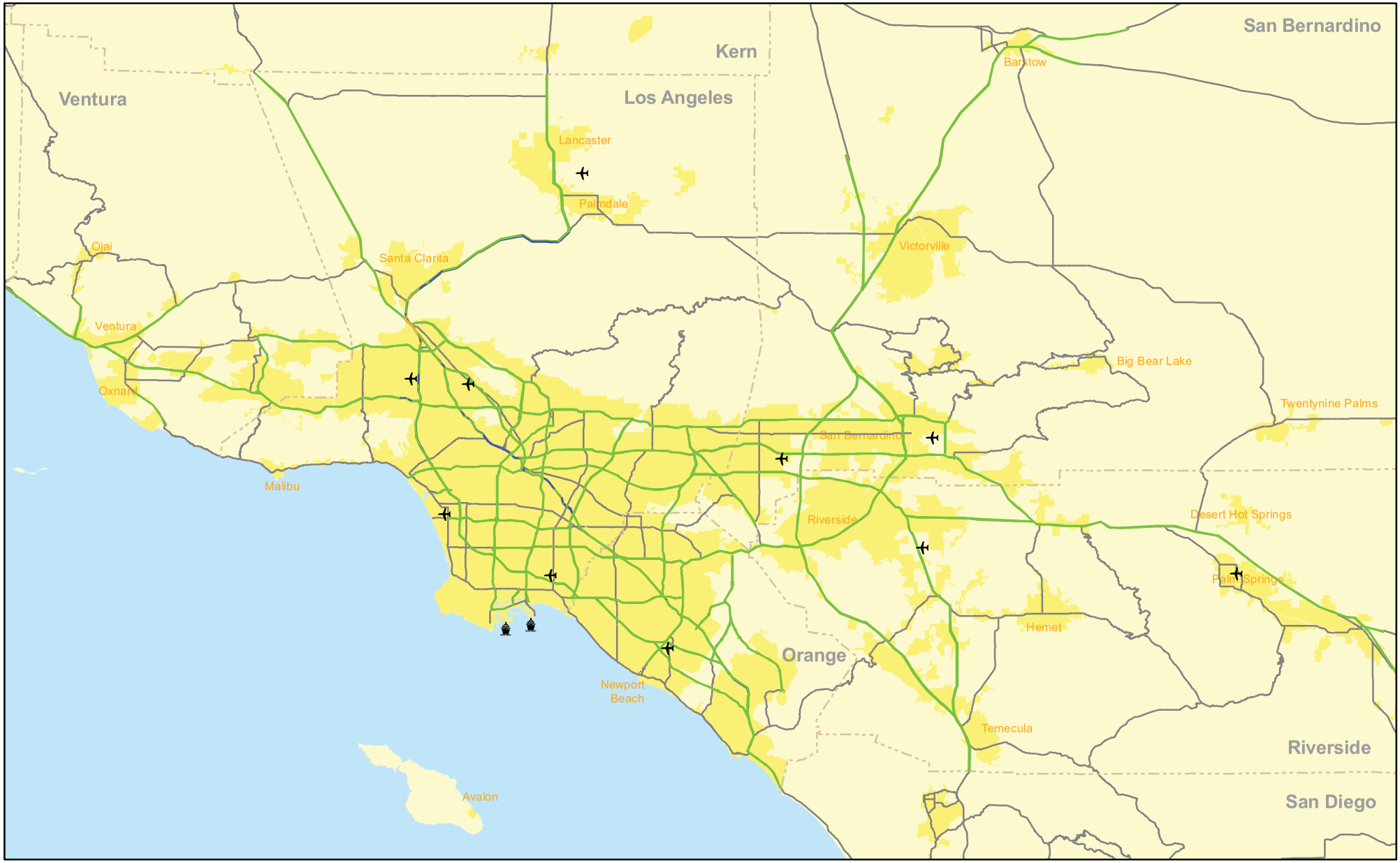
Forecast V/C Ratios on SCAG Region Highways
PM Peak

0 5 10 20 30 40 Miles

10/18/06

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

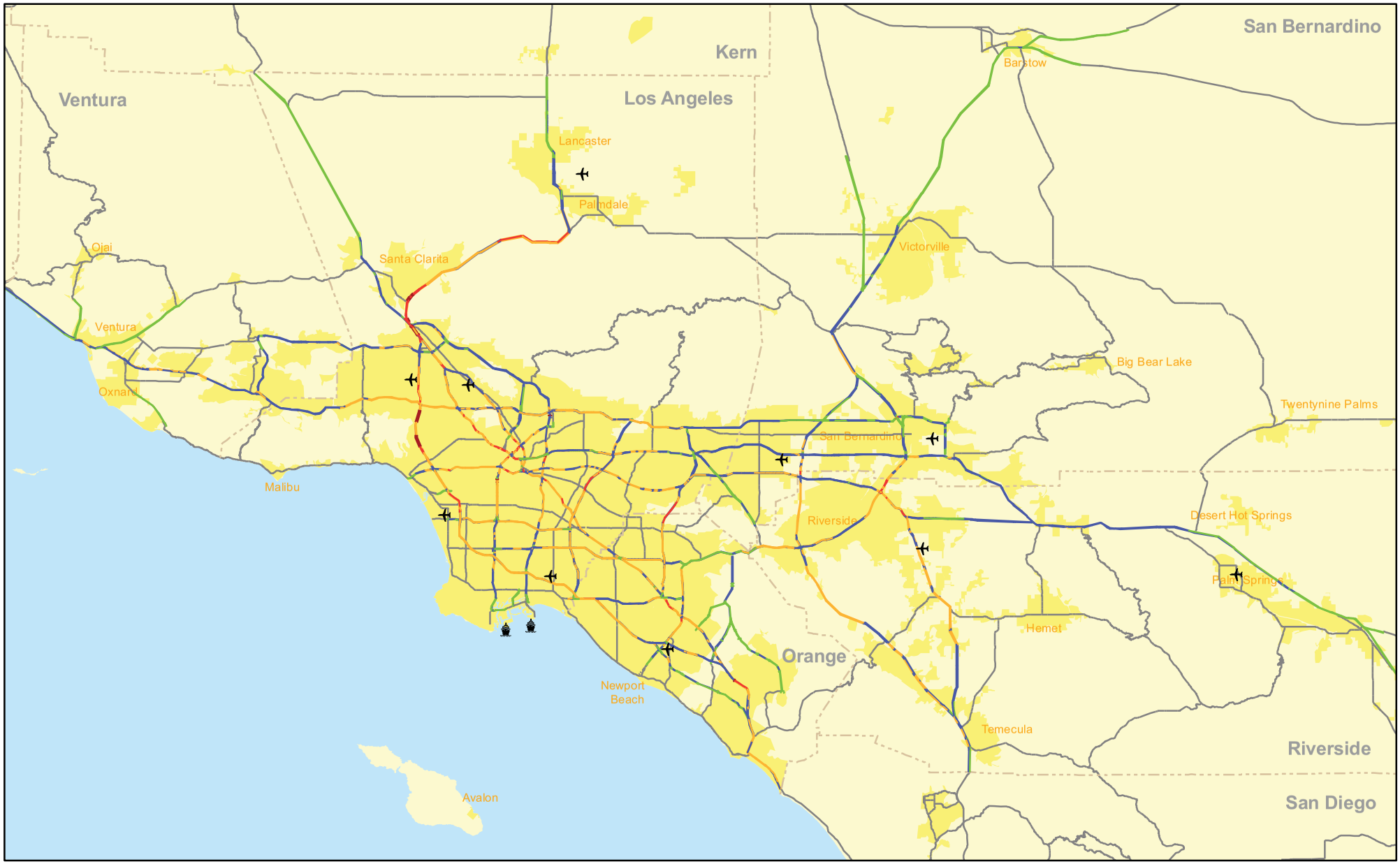
Forecast V/C Ratios on SCAG Region Highways
Night Time

0 5 10 20 30 40 Miles

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

10/18/06



VOLUME / CAPACITY

- 0.00 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.20
- > 1.20

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast V/C Ratios on SCAG Region Highways
Mid Day

0 5 10 20 30 40 Miles

10/18/06

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Miles per Hour

- > 40
- 30 - 40
- 20 - 30
- 15 - 20
- <15

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast Speed on SCAG Region Highways

AM Peak

0 5 10 20 30 40 Miles

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

10/18/06

Miles per Hour

- > 40
- 30 - 40
- 20 - 30
- 15 - 20
- <15

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast Speed on SCAG Region Highways

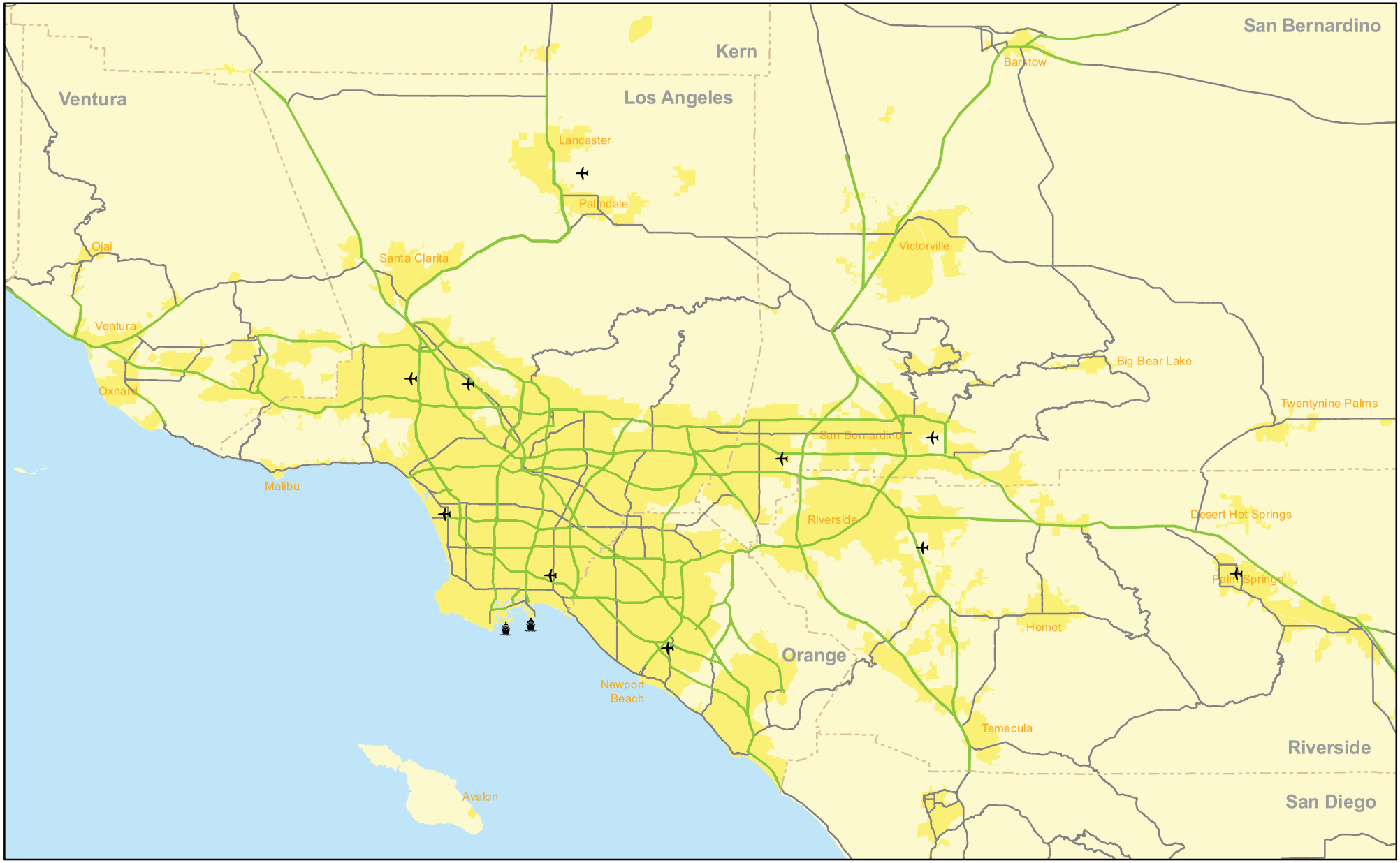
PM Peak

0 5 10 20 30 40 Miles

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

10/18/06



Miles per Hour

- > 40
- 30 - 40
- 20 - 30
- 15 - 20
- <15

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast Speed on SCAG Region Highways

Night Time

0 5 10 20 30 40 Miles

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

10/18/06

Miles per Hour

- > 40
- 30 - 40
- 20 - 30
- 15 - 20
- <15

- Water
- Urban Areas
- County Boundary
- Other Highways
- Ports
- Airports

Year 2030 System Performance

Forecast Speed on SCAG Region Highways

Mid Day

0 5 10 20 30 40 Miles

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

10/18/06

Figures 13 through 21 provide relevant information related to the future performance of the MCGMAP Region's highway system. For instance:

Figure 13 shows substantial truck volumes on significant portions of SR-60, US-101, I-110, I-405, I-5, I-710, SR-91, I-605, I-10, I-15, and I-210. The high volumes, in combination with the port access I-710, does indicate a high level of truck traffic moving into, through, and out of the region.

Figures 14 and 15 show the mobility problems that occur on the highway system during peak hours. The high volume to capacity ratios are concentrated in areas that currently and will continue to be the major connectors between residential areas and employment centers showing a clear concentration around downtown Los Angeles.

The night time volumes do not approach the high level of congestion when compared to the peak hour volumes as shown in Figure 16. The volumes at the intersection of I-405, SR-14 and I-5 demonstrate that the system is exhibiting areas of congestion during night time. The relatively high volumes on I-5 through the core of Los Angeles county are also noteworthy.

The ratios shown in Figure 17, in conjunction with the AM and PM peak figures demonstrate that much of the freeway network is forecast to be congested all day. There is no congestion relief except at night.

Figure 18 through Figure 21 show similar patterns and would lead to the same observations as above. Figure 18 shows the speed forecast on the freeway system during AM peak hours similar to Figures 14 indicating lower speeds on certain segments of I-5, I-15, I-215, I-405, SR-14 and near downtown LA. Figure 19 indicates lower speeds during PM peak hours on greater segments of the freeway when compared to the AM peak hours. Mid day traffic experiences lower speeds at major freeway intersections like the I-5, SR-14 and around downtown LA, near the port, and on some segments of I-405 and I-10 as shown in Figure 21.

For this study, we also looked at the truck volumes on the region's highway system as shown in Table 8 below. The table below helps determine the potential differences in future forecast volumes due to changes in existing volumes.

Table 8
Truck Volumes
Post-Processed Model Runs

Route	Segments	Model Year 2003 – Vehicles [a]		Model Year 2003 – Trucks		Model Year 2030 – Vehicles		Model Year 2030 – Trucks		Existing Year 2003 – Vehicles [b]		Existing Year 2003 – Trucks		Post-Processed Year 2030 – Vehicles [c]		Post-Processed Year 2030 – Trucks	
		N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W
I-10	END to I-405	89,020	79,638	3,898	3,567	93,603	85,746	4,892	4,441	129,842	116,158	3,096	2,833	134,425	122,266	4,089	3,707
I-10	I-405 to I-110	158,234	156,011	7,016	7,386	161,698	157,124	8,161	8,814	132,934	131,066	5,183	5,456	136,398	132,179	6,328	6,884
I-10	I-110 to I-5	162,588	150,750	9,894	9,164	164,656	152,176	12,107	11,596	170,196	157,804	6,862	6,356	172,264	159,231	9,076	8,788
I-10	I-5 to I-710	126,123	113,835	5,883	6,325	127,320	123,820	7,475	8,997	117,210	105,790	3,868	4,160	118,406	115,775	5,461	6,831
I-10	I-710 to I-605	117,773	118,574	5,808	6,401	124,943	125,958	8,535	9,469	112,118	112,882	6,498	7,160	119,289	120,265	9,225	10,228
I-10	I-605 to SR-57	112,068	96,713	7,705	8,779	112,408	100,866	12,668	15,178	113,259	97,741	7,900	9,001	113,599	101,894	12,863	15,400
I-10	SR-57 to I-15	100,975	96,682	11,507	9,496	112,076	106,089	21,655	16,055	127,204	121,796	9,863	8,140	138,304	131,203	20,011	14,699
I-10	I-15 to I-215	84,223	88,534	6,062	7,050	92,981	101,491	10,154	12,902	95,067	99,933	10,007	11,638	103,825	112,890	14,099	17,490
I-101	I-5 to I-10	92,455	105,929	9,094	10,432	98,783	107,680	13,838	12,269	101,596	116,404	4,000	4,589	107,924	118,154	8,745	6,426
I-101	I-10 to I-110	155,865	162,320	11,985	12,584	170,571	172,289	18,466	15,274	134,221	139,779	5,560	5,838	148,926	149,748	12,041	8,528
I-101	I-110 to I-170	160,706	159,682	12,531	13,177	173,880	169,782	18,887	17,068	146,467	145,533	3,772	3,966	159,640	155,634	10,128	7,858
I-101	SR-170 to I-405	153,939	157,843	9,624	9,314	161,027	172,454	12,965	13,812	144,171	147,829	3,932	3,806	151,260	162,439	7,273	8,303
I-101	I-405 to SR-118	137,450	136,630	8,439	9,313	146,641	142,837	11,505	12,528	123,870	123,130	4,885	5,390	133,061	129,338	7,950	8,605
I-105	END to I-405	69,097	68,947	4,696	4,183	74,430	74,209	5,177	4,851	98,607	98,393	5,928	5,281	103,940	103,654	6,410	5,949
I-105	I-405 to I-110	100,426	105,619	7,143	7,415	101,566	108,082	8,590	9,127	96,017	100,983	5,500	5,709	97,158	103,446	6,947	7,421
I-105	I-110 to I-710	95,741	96,725	6,448	6,303	96,861	98,175	7,461	8,622	102,971	104,029	8,782	8,585	104,091	105,480	9,795	10,904
I-105	I-710 to I-605	106,388	96,721	9,345	8,899	107,924	76,125	16,227	11,725	102,664	93,336	8,885	8,260	104,200	72,739	15,767	11,086
I-110	End to I-10	115,088	104,355	1,891	1,649	124,666	110,216	2,468	2,234	24,387	22,113	241	210	33,966	27,974	817	795
I-110	I-10 to I-105	141,289	140,496	11,123	10,797	140,430	140,743	14,837	14,810	146,411	145,589	7,808	7,580	145,551	145,836	11,522	11,593
I-110	I-105 to SR-91	128,871	114,127	9,398	8,718	131,181	117,533	14,124	13,250	165,466	146,534	8,595	7,972	167,776	149,941	13,320	12,504
I-110	SR-91 to I-405	151,400	103,660	11,578	7,885	152,002	106,930	18,580	12,938	141,867	97,133	11,175	7,610	142,469	100,403	18,177	12,664
I-110	I-405 to End	68,729	108,352	6,342	8,879	70,526	112,870	11,157	15,369	71,803	113,197	4,594	6,432	73,599	117,715	9,409	12,922
I-15	I-215 to SR-138	69,556	72,481	8,305	11,385	118,648	122,244	20,358	23,862	62,192	64,808	8,035	11,015	111,285	114,571	20,088	23,492
I-15	I-210 to I-215	68,173	63,568	7,045	8,442	86,213	87,284	16,346	19,794	86,936	81,064	7,871	9,433	104,976	104,780	17,173	20,785
I-15	I-10 to I-210	70,923	79,047	4,805	6,973	101,968	109,379	10,332	12,736	94,583	105,417	8,404	12,196	125,628	135,749	13,931	17,959

Route	Segments	Model Year 2003 – Vehicles [a]		Model Year 2003 – Trucks		Model Year 2030 – Vehicles		Model Year 2030 – Trucks		Existing Year 2003 – Vehicles [b]		Existing Year 2003 – Trucks		Post-Processed Year 2030 – Vehicles [c]		Post-Processed Year 2030 – Trucks	
		N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W
I-15	SR-60 to I-10	87,930	94,711	5,647	6,266	116,444	116,419	10,572	9,656	105,434	113,566	8,512	9,446	133,949	135,273	13,438	12,836
I-15	SR-91 to SR-60	71,645	70,965	5,897	4,769	88,053	87,932	10,163	7,357	89,424	88,576	5,521	4,465	105,832	105,543	9,787	7,053
I-15	SR-74 to SR-91	61,412	60,276	6,555	4,454	91,554	92,669	14,194	7,899	89,831	88,169	5,946	4,040	119,973	120,562	13,584	7,485
I-210	SR-14 to SR-118	87,260	83,252	7,605	6,863	76,653	80,838	11,386	8,258	71,646	68,354	4,982	4,496	61,039	65,941	8,764	5,892
I-210	SR-118 to SR-2	51,536	55,050	6,733	7,469	96,870	93,249	15,319	11,614	83,649	89,351	5,253	4,798	128,983	127,551	15,068	11,385
I-210	SR-2 to SR-134	100,696	81,716	8,842	6,347	104,403	100,576	14,689	11,556	169,472	156,695	9,383	6,735	173,179	175,556	15,230	11,944
I-210	SR-134 to I-605	119,858	124,954	9,605	10,555	126,313	128,682	15,628	18,479	150,305	156,695	7,679	8,439	156,759	160,423	13,702	16,362
I-210	I-605 to SR-57	118,845	108,930	10,458	10,506	117,993	115,306	20,062	22,853	87,135	79,865	3,432	3,448	86,283	86,242	13,036	15,794
I-215	SR-30 to I-15	56,308	39,694	5,116	2,874	92,151	63,559	11,767	4,519	28,740	20,260	2,880	1,618	64,583	44,125	9,531	3,263
I-215	SR-60 to I-10	85,779	90,243	3,843	4,350	114,295	117,592	9,936	10,134	52,631	55,369	5,167	5,849	81,146	82,719	11,260	11,634
I-405	I-5 to SR-133	80,777	87,835	3,779	4,147	92,328	99,302	6,031	6,293	107,791	117,209	4,581	5,027	119,342	128,676	6,833	7,173
I-405	SR-133 to SR-55	108,263	107,752	5,244	5,225	127,991	125,564	8,112	7,909	115,773	115,227	6,827	6,802	135,501	133,039	9,695	9,487
I-405	SR-55 to SR-22	120,979	125,678	9,054	8,909	136,647	155,952	15,028	13,575	135,371	140,629	4,174	4,106	151,039	170,904	10,147	8,772
I-405	SR-22 to I-605	194,751	155,908	15,287	11,736	189,002	178,858	21,716	17,029	159,396	127,604	5,423	4,163	153,646	150,554	11,852	9,456
I-405	I-605 to I-710	128,832	149,856	10,233	16,579	133,948	132,289	14,906	13,286	148,854	173,146	5,431	4,169	153,970	155,578	10,104	876
I-405	I-710 to I-110	125,445	124,707	9,303	9,577	132,230	129,292	13,562	12,807	145,428	144,572	6,032	8,017	152,213	149,157	10,290	11,247
I-405	I-110 to SR-91	115,206	117,939	9,569	9,766	119,040	122,230	12,715	12,275	123,535	126,465	5,729	5,846	127,369	130,756	8,874	8,356
I-405	SR-91 to I-105	120,201	119,610	9,913	9,651	128,647	127,099	13,034	12,193	148,964	148,432	6,039	5,860	157,411	155,921	9,160	8,402
I-405	I-105 to I-10	151,963	154,953	10,748	10,393	149,354	152,610	14,374	13,445	145,568	130,933	6,326	5,839	142,959	128,590	9,952	8,892
I-405	I-10 to US-101	172,148	138,225	10,792	9,472	175,180	151,690	11,707	11,253	159,739	128,261	6,933	6,085	162,770	141,726	7,847	7,866
I-405	US-101 to End	115,335	101,563	6,037	5,442	142,371	126,201	7,410	6,463	120,707	106,293	4,572	4,122	147,742	130,931	5,945	5,143
I-5	LA County Line to I-605	111,312	120,312	14,239	12,732	138,101	147,832	23,321	17,868	112,934	122,066	10,906	9,751	139,723	149,585	19,987	14,887
I-5	I-605 to I-710	149,856	148,586	16,579	15,042	155,890	155,458	25,087	19,219	117,498	116,502	11,042	10,018	123,531	123,374	19,550	14,196
I-5	I-710 to SR-60	164,863	156,772	18,008	16,029	161,925	163,406	25,170	20,490	135,321	128,679	10,643	9,474	132,383	135,313	17,806	13,935
I-5	SR-60 to SR-134	140,432	136,503	12,955	10,938	142,956	142,724	16,674	14,180	147,565	143,435	9,751	8,233	150,088	149,657	13,470	11,475
I-5	SR-134 to SR-118	112,371	118,350	8,726	8,157	127,149	132,547	14,311	12,655	93,512	98,488	8,475	7,922	108,290	112,685	14,060	12,420
I-5	SR-118 to SR-14	112,517	114,320	8,665	8,672	176,510	159,617	17,013	13,387	67,459	68,541	6,016	6,020	131,453	113,838	14,364	10,736
I-5	SR-57 to LA County Line	109,636	118,447	11,547	10,597	124,981	130,022	18,780	14,468	124,978	135,022	9,490	8,710	140,323	146,597	16,723	12,581
I-5	SR-55 to SR-57	153,773	167,544	11,823	12,360	156,485	178,949	17,521	16,369	164,628	179,372	10,764	11,252	167,340	190,777	16,461	15,261
I-5	SR-133 to SR-55	124,574	129,306	10,663	8,970	132,710	150,074	16,375	13,385	168,794	175,206	11,957	10,059	176,930	195,974	17,669	14,474
I-5	I-405 to SR-133	88,975	89,909	8,806	7,315	101,694	104,836	15,214	11,420	126,834	129,042	8,135	6,757	139,554	143,970	14,543	10,863
I-5	SR-73 to I-405	116,230	119,076	9,968	8,517	137,274	143,285	17,914	14,183	138,307	136,785	5,151	4,334	159,351	160,993	13,097	10,000

Route	Segments	Model Year 2003 – Vehicles [a]		Model Year 2003 – Trucks		Model Year 2030 – Vehicles		Model Year 2030 – Trucks		Existing Year 2003 – Vehicles [b]		Existing Year 2003 – Trucks		Post-Processed Year 2030 – Vehicles [c]		Post-Processed Year 2030 – Trucks	
		N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W
I-5	End to SR-73	99,400	94,937	8,929	7,018	135,800	128,552	20,625	13,924	111,503	110,853	5,188	4,269	147,903	144,467	16,884	11,175
I-605	I-405 to SR- 91	106,246	109,920	5,956	5,989	104,774	107,383	8,945	7,693	91,911	95,089	4,317	4,341	90,438	92,552	7,305	6,045
I-605	SR-91 to I-105	140,068	153,396	10,384	10,586	139,885	155,265	14,975	13,824	117,891	129,109	5,663	5,773	117,709	130,979	10,254	9,011
I-605	I-105 to I-5	132,359	127,821	12,553	11,968	127,720	124,879	20,128	17,378	156,686	151,314	10,848	10,671	152,047	148,372	18,423	16,081
I-605	I-5 to SR-60	117,730	116,740	12,869	13,056	115,071	112,813	21,148	20,827	95,903	95,097	11,548	11,716	93,244	91,169	19,827	19,487
I-605	SR-60 to I-10	123,063	102,452	10,741	9,673	111,544	101,262	17,174	17,223	126,056	104,944	14,549	13,102	114,537	103,754	20,982	20,652
I-605	I-10 to End	111,737	106,028	7,112	6,820	110,619	104,670	12,326	12,341	85,689	81,311	9,898	9,491	84,572	79,953	15,111	15,012
I-710	End to I-405	59,642	62,031	12,457	12,716	63,462	65,697	23,431	23,112	87,253	90,747	12,931	13,199	91,073	94,413	23,905	23,595
I-710	I-405 to SR- 91	105,662	102,817	17,653	16,911	109,758	103,070	34,058	33,541	110,487	107,513	19,351	18,537	114,584	107,766	35,756	35,167
I-710	SR-91 to I-105	118,205	130,174	14,494	15,140	123,616	134,410	25,983	25,162	117,549	129,451	18,719	19,553	122,959	133,687	30,207	29,575
I-710	I-105 to I-5	118,877	113,452	11,162	11,161	125,845	118,899	17,122	16,258	84,235	86,434	11,745	11,743	91,203	91,881	17,705	16,841
I-710	I-5 to SR-60	94,419	100,611	6,079	6,324	112,673	110,882	10,860	8,730	64,389	68,611	5,512	5,873	82,642	78,883	10,293	8,279
I-710	SR-60 to I-10	64,243	77,559	4,093	4,251	100,495	99,333	9,452	7,245	60,255	72,745	5,158	6,227	96,507	94,519	10,517	9,221
I-710	I-10 to End	20,008	93,596	1,160	6,862	101,782	93,596	8,542	6,862	12,152	56,848	216	1,281	93,926	56,848	7,599	1,281
SR-134	I-5 to I-210	110,647	100,727	6,166	5,378	113,085	108,779	9,048	9,318	111,498	101,502	2,988	2,720	113,936	109,554	5,870	6,660
SR-134	I-101 to I-5	107,441	107,770	5,832	6,197	113,085	110,503	9,048	9,207	106,337	106,663	2,850	2,858	111,981	109,395	6,066	5,869
SR-55	I-405 to I-5	111,464	111,129	5,604	5,250	120,962	116,644	7,367	6,492	120,180	119,820	7,186	6,734	129,678	125,334	8,950	7,975
SR-55	I-5 to SR-22	100,916	100,386	5,255	5,187	112,372	113,268	7,726	7,226	128,839	128,161	7,631	7,532	140,294	141,044	10,102	9,572
SR-55	SR-22 to END	110,828	105,998	6,385	5,914	124,028	115,820	9,162	8,326	131,362	125,638	7,872	7,291	144,562	135,459	10,649	9,703
SR-57	I-5 / SR-22 to SR-91	103,533	114,195	6,835	7,226	121,293	124,719	10,256	9,144	104,614	115,386	7,272	7,688	122,374	125,911	10,693	9,606
SR-57	SR-91 to SR-60	117,333	114,244	8,381	8,052	131,438	120,647	11,493	10,510	152,001	147,999	10,404	9,996	166,106	154,402	13,516	12,454
SR-57	SR-60 to I-10	97,306	94,313	4,496	4,418	102,101	99,983	6,280	7,811	86,835	84,165	4,718	4,636	91,631	89,834	6,502	8,029
SR-57	I-10 to I-210	87,575	89,073	5,808	5,925	108,540	109,449	10,069	8,378	112,538	114,462	7,967	8,127	133,502	134,838	12,228	10,580
SR-60	End to I-710	143,281	140,374	8,718	8,603	140,256	137,489	10,164	11,131	106,076	103,924	5,116	5,048	103,051	101,038	6,562	7,576
SR-60	I-710 to I-605	138,427	139,395	8,875	10,032	141,498	141,754	11,592	13,617	120,080	120,920	7,546	8,529	123,151	123,279	10,262	12,115
SR-60	I-605 to SR-57	111,748	116,484	9,025	10,390	118,998	117,793	12,512	13,662	104,779	109,221	9,202	10,593	112,030	110,529	12,688	13,866
SR-60	SR-57 to I-15	96,384	104,333	8,650	10,898	114,780	114,299	12,740	14,894	108,524	117,476	10,771	13,569	126,921	127,441	14,860	17,565
SR-60	I-15 to I-215	94,704	67,547	6,155	4,962	109,776	105,513	8,796	10,948	78,798	56,202	8,221	6,629	93,869	94,167	10,862	12,615
SR-91	End to I-710	108,115	101,153	7,621	7,153	111,032	104,307	11,319	10,255	109,010	101,990	7,021	6,589	111,927	105,145	10,719	9,691
SR-91	I-710 to I-605	119,446	128,402	11,374	11,643	123,286	129,334	19,626	20,563	131,568	141,432	12,492	12,788	135,407	142,365	20,745	21,707
SR-91	I-605 to I-5	108,145	121,724	9,644	10,518	114,163	122,910	18,602	19,186	128,437	144,563	12,092	13,188	134,455	145,750	21,050	21,856
SR-91	I-5 to SR-57	107,156	93,716	10,197	10,200	116,260	127,617	17,162	21,863	125,362	109,638	6,802	6,805	134,466	143,540	13,767	18,468
SR-91	SR-57 to SR-241	102,346	113,931	8,970	9,643	136,712	138,493	16,481	19,578	134,393	149,607	6,249	6,842	168,759	174,168	13,761	16,777
SR-91	SR-241 to I-15	108,544	121,311	10,160	12,159	159,292	165,959	22,131	26,023	121,362	135,638	7,616	9,115	172,111	180,285	19,587	22,978

Route	Segments	Model Year 2003 – Vehicles [a]		Model Year 2003 – Trucks		Model Year 2030 – Vehicles		Model Year 2030 – Trucks		Existing Year 2003 – Vehicles [b]		Existing Year 2003 – Trucks		Post-Processed Year 2030 – Vehicles [c]		Post-Processed Year 2030 – Trucks	
		N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W	N/E	S/W
SR-91	I-15 to End	79,823	83,715	5,402	6,047	96,782	102,837	11,310	13,009	96,156	100,844	7,148	8,001	113,115	119,966	13,055	14,963
SR-118	I-405 to SR-23	83,626	93,505	4,003	5,133	98,698	108,516	5,794	7,606	112,363	125,637	11,076	14,204	127,435	140,648	12,867	16,677
SR-170	I-5 to SR-134	108,513	106,604	7,244	7,241	127,895	129,345	12,193	9,813	85,250	83,750	3,339	3,337	104,631	106,491	8,288	5,910

Note: N – North
S – South
E – East
W – West

Source: (a) SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model; (b) Caltrans, Traffic and Vehicle Data Systems Unit, 2004 Truck Volumes; (c) Wilbur Smith Associates, 2007.

Table 9 presents the comparison of traffic volumes between the SCAG Model 2030 and the post-processed traffic volumes. In order to determine post-processed volumes for 2030, Caltrans existing Year 2030 data was added to the volume difference between SCAG 2030 and SCAG 2003 baseline traffic volumes.

Table 9
Traffic Volume Comparison Year 2030

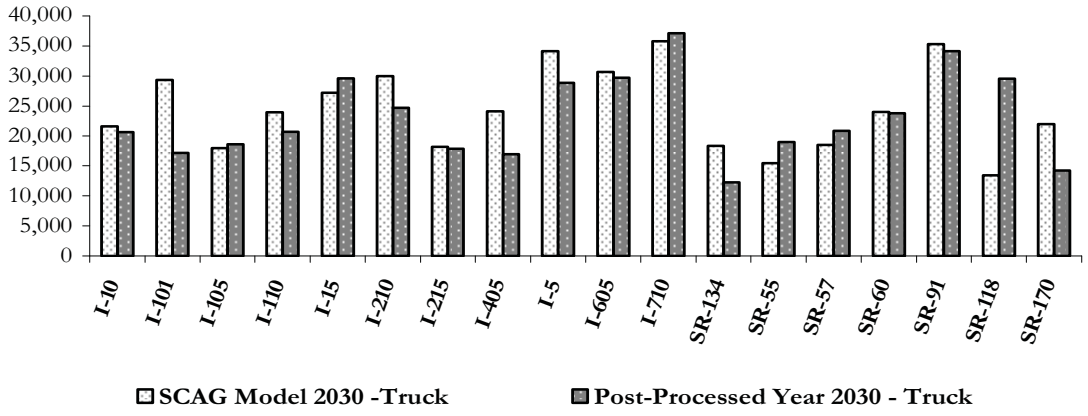
Route	SCAG Model 2030 -Vehicle	SCAG Model 2030 -Truck	Post-Processed Year 2030- Vehicle	Post-Processed Year 2030- Truck
I-10	242,869	21,637	254,027	20,647
I-101	303,189	29,322	283,225	17,171
I-105	184,343	17,945	198,677	18,570
I-110	241,419	23,953	221,046	20,745
I-15	203,135	27,211	236,353	29,602
I-210	208,177	29,969	244,391	24,701
I-215	193,798	18,178	136,286	17,844
I-405	275,257	24,102	289,072	16,943
I-5	285,731	34,129	290,342	28,885
I-605	235,981	30,664	216,554	29,698
I-710	209,074	35,766	192,984	37,134
SR-134	222,726	18,311	222,433	12,232
SR-55	234,364	15,433	272,124	18,984
SR-57	229,542	18,485	254,649	20,902
SR-60	248,431	24,011	223,096	23,794
SR-91	249,855	35,301	283,066	34,160
SR-118	207,214	13,400	268,083	29,544
SR-170	257,239	22,007	211,122	14,197

Source: SCAG 2030 Draft Air Quality Management Plan (AQMP) Baseline model

The above table is summarized below.

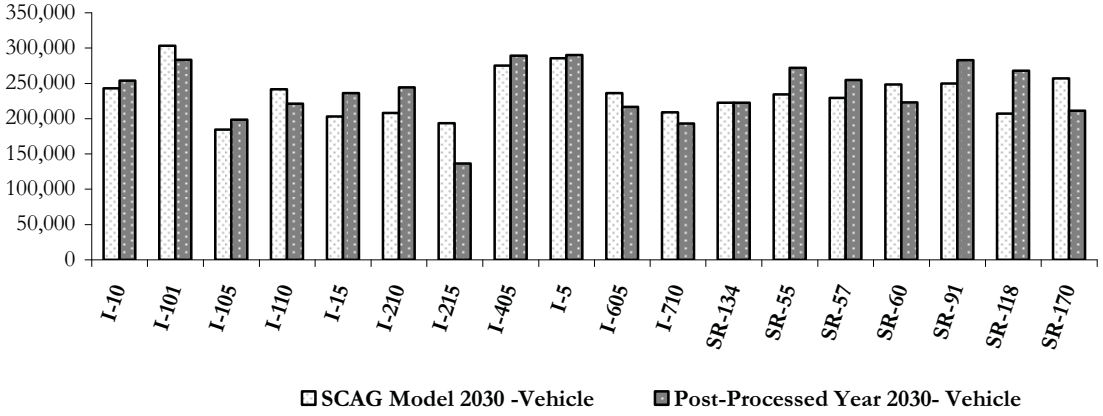
1. In comparison, the SCAG model estimated higher truck volumes on I-10, I-101, I-110, I-210, SR-60, and SR-91 than the post-processed traffic volumes. This indicates that SCAG forecasts more trucks on these freeways under existing conditions than actually present. Figure 22 present truck comparison between SCAG model and the post-processed volumes in 2030.

Figure 22
Total Truck Volume Comparison Year 2030



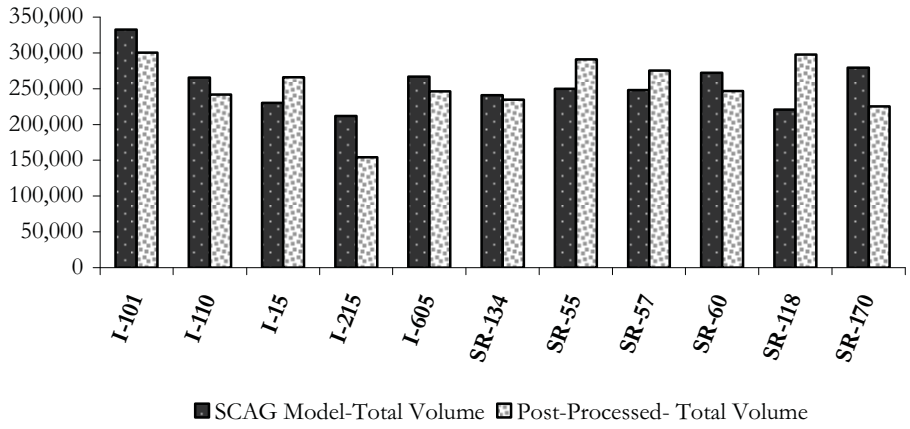
2. Figure 23 shows estimated higher vehicle volumes in 2030 on I-101, I-110, I-605, I-710, and SR-60 based on the SCAG model. This indicates that SCAG forecasts more vehicles on these freeways under existing conditions than actually present.

Figure 23
Total Vehicle Volume Comparison Year 2030



3. Figure 24 shows estimated higher truck and vehicle volumes on I-101, I-110, I-605, SR-134, and SR-60 based on the SCAG model in 2030, while post-processing results in higher truck and vehicle volume on I-15, SR-55, and SR-57 in 2030.

Figure 24
Total Traffic Volume Comparison Year 2030



Summary statistics from the baseline travel demand model run for daily trips are presented below:

- Approximate total truck trips by time period:
  - AM peak: **454,000**
  - PM peak: **685,000**
  - Nighttime (Off-peak): **749,000**
  - Midday: **1,208,000**
- Approximate total truck trips per day: **3,096,000**
- Approximate total traffic vehicle miles of travel (VMT) on SCAG highway network: **508,807,000**
- Approximate total truck VMT on SCAG highway network: **39,482,000**
- Approximate total traffic vehicle hours of travel (VHT) on SCAG highway network: **19,740,000**
- Approximate total truck VHT on SCAG highway network: **1,188,000**

As documented in Tech Memo 4a, truck traffic is forecast to increase significantly, fueled by the increasing growth in the study area's economy. Graphics presented above indicate capacity utilization and identification of congested segments of highway due to the increase in truck traffic based on the SCAG Draft 2030 AQMP Baseline model. Some of the most congested segments that also experience significant delays will be:

- I-5 between SR-118 and SR-14
- I-405 between I-10 and SR-118
- I-15 between SR-91 and SR-74 and through Cajon Pass

- I-215 between SR-74 and SR-60
- SR-14 between I-5 to SR-138
- I-5, US-101, I-10, and I-110 around the vicinity of downtown Los Angeles

Improvements Assumed

In the travel forecasting process, several assumptions have been made regarding capacity improvements to the existing highway system. The proposed capacity improvement projects assumed are listed in the SCAG 2004 RTP as baseline improvements. These assumed improvements consist of only projects in the 2002 Regional Transportation Improvement Program (RTIP) that had federal environmental clearance by December 2002 and committed funding. The list of assumed improvements contains hundreds of projects.

A complete listing for the baseline projects can be found under SCAG's 2004 RTP Technical Appendix I.

2.4 Conclusion

Baseline forecast information shows a substantial volume of vehicles on the MCGMAP study area highways. This includes both freight (truck) and passenger vehicles. Existing corridors of high truck traffic volumes will see substantial increases; for instance, SR-60 from I-710 to its terminus shows an increase of more than 10,000 trucks per day (greater than 100% increase) over existing volumes. This will result in highway segments of severe congestion and delay throughout the MCGMAP study area. Forecasted volumes for AM and PM peak periods will exceed available capacity on highway segments throughout the MCGMAP study area, particularly along corridors carrying high volumes of truck and vehicle traffic. Without improvements and strategies to reduce congestion (either through the provision of additional capacity or by the reduction in forecasted vehicle volumes), the highway system will face increasing delays and congestion.

Section 1.0 – Railway System Performance

1. "Los Angeles-Inland Empire Railroad Mainline Advanced Planning Study"; Los Angeles County Economic Development Corporation (LAEDC), 2002.

2. These figures compare with 255 trains per day through Colton Crossing and 189 trains per day through Cajon Pass forecasted in Table 1.

Section 2.0 – Highway System Performance

1. SCAG 2004 Regional Transportation Plan.

2. Ibid

TECHNICAL MEMORANDUM 5a – ECONOMIC BENEFITS AND COSTS OF GROWTH IN GOODS MOVEMENT MULTI-COUNTY GOODS MOVEMENT ACTION PLAN

Prepared for:

Los Angeles County Metropolitan Transportation Authority (Metro)
Orange County Transportation Authority (OCTA)
Riverside County Transportation Commission (RCTC)
San Bernardino Associated Governments (SANBAG)
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Table of Contents

E.0 EXECUTIVE SUMMARY
- **E.1 Economic Challenge** **E-1**
- **E.2 Starting Pay and Job Ladders** **E-1**
- **E.3 Competitive Position** **E-2**
- **E.4 Macro-Economic Impact** **E-2**

1.0 BACKGROUND
- **1.1 Falling per Capita Income Rank** **1-1**
- **1.2 Manufacturing Sector Difficulties** **1-3**
- **1.3 Loss of Better-Paying, Gain in Weaker Paying Jobs** **1-3**
- **1.4 Manufacturing and Upward Economic Mobility** **1-4**
  - Definition of "Middle Class" & Dilemma if Income Inequality 1-4
- **1.5 Logistics** **1-4**
- **1.6 Goods Movement Framework** **1-5**
  - Major Trade Nodes 1-5
  - Ports 1-6
  - Airports 1-7
  - Railroads 1-8
  - Intermodal Railyards 1-10
  - Trucking 1-10
  - Operation of Logistics Network 1-12

2.0 COMPARISON OF LOGISTICS TO OTHER BLUE COLLAR SECTORS
- **2.1 Logistics** **2-1**
  - Logistics Sectors 2-1
  - Logistics: Mean Annual Pay 2-5
  - Logistics: Payroll Growth 2-5
- **2.2 Manufacturing** **2-7**
  - Manufacturing Job Trend 2-8
  - Logistics Job Trend 2-8
- **2.3 Construction** **2-8**
- **2.4 Other Sectors, Few Education Barriers to Entry** **2-9**
- **2.5 Summary** **2-9**
  - Manufacturing and Logistics 2-9
  - Construction and Logistics 2-9
  - Other Sectors with Few Barriers and Logistics 2-10

3.0 SKILL LADDERS WITHIN LOGISTICS
- **3.1 Analytic Procedures** **3-1**
- **3.2 Wholesale Trade (2005: 407,771 Jobs)** **3-4**
  - Job Ladders by experience and/or Education 3-4
  - Job Ladders by Functional Group 3-8
  - Median Pay by Wholesale Sub-Sector and Functional Group 3-12
  - Wholesale Trade Summary 3-13
- **3.3 Transportation and Warehousing (2005: 254,079 Jobs)** **3-14**
  - Job Ladders by Experience and/or Education 3-15
  - Job Ladders by Functional Group 3-19

Median Pay by Transportation and Warehousing Sector and Functional Group 3-23
Transportation and Warehousing Summary 3-24
4.0 SQUARE FOOTAGE PER JOB
4.1 Analytic Procedures 4-1
Average Square Feet per Job 4-2
Jobs per Square Foot: Over Time 4-3
Summary: Manufacturing vs. Logistics Space per Job 4-4
5.0 DEMAND DRIVERS FOR LOGISTICS
5.1 Southern California Population Growth 5-1
5.2 Southern California Retail Volume per Capita 5-2
5.3 E-Commerce 5-2
5.4 Inventory: Sales Ratio Decline 5-4
5.5 Port Container Volume 5-4
5.6 Port Breakbulk Tonnage 5-6
5.7 Air Cargo Tonnage 5-7
5.8 Local Manufacturing 5-8
6.0 MACRO-ECONOMIC IMPACT OF LOGISTICS
6.1 Macro-Economic Impact Defined 6-1
Time Frame 6-1
Measures of Economic Impact 6-1
6.2 IMPLAN 6-2
6.3 Current Economy 6-3
Logistics Sectors: Size 6-3
Logistics Sectors: Full Impact 6-4
Indirect and Induced Impact of Logistics 6-5
Full Economic Impact of Existing Logistics Sectors 6-7
6.4 Multipliers and Forecasting the Impact of Logistics Sector Growth 6-7
Direct Spending Multiplier 6-8
Employment Multiplier 6-9
Other Impacts 6-10
Logistics Multipliers by Sub-Sector 6-10
Economic Impact Summary 6-13
Other 6-13

REFERENCES R-1

APPENDIX A-1

Exhibits

Exhibit 1 – Schooling Ended at High School or Less, Adults 25 & over, Southern California Counties, 2004 1-1
Exhibit 2 – Per Capita Income Rank, 1969-2003 SCAG Rank of 17 Consolidated Metropolitan Areas 1-1

Exhibit 3 – Wage & Salary Employment, Southern California, Annual Average, 1990-2005 1-2
Exhibit 4 – Manufacturing Employment Change, Southern California, 1990-2005 1-2
Exhibit 5 – Major Gaining & Losing Sectors, Southern California, Size of Job Change, 1990-2005 & 2004, Average pay 1-3
Exhibit 6 – Logistics Employment, Southern California, 1990-2005..... 1-5
Exhibit 7 – Top Ten U.S. Gateways by Total Trade, 2004 (billions) 1-5
Exhibit 7a – Port Volumes, Southern California, West Coast, U.S., 2005..... 1-6
Exhibit 8 – Share of Imported Loaded Containers, Southern California of U.S., 1997-2005..... 1-7
Exhibit 9 – Air Cargo Volume, 2005 & 2030 forecast, Southern California Airports..... 1-8
Exhibit 10 – How Imports Move, Southern California, 2002..... 1-13
Exhibit 11 – Employment by Logistics Sector, Southern California (7-Couties), 2005..... 2-2
Exhibit 12 – Mean Average Pay per Worker by Logistics Sector, Southern California (7-Counties), 2005. 2-5
Exhibit 13 – Change in Payroll by Logistics Sector, Southern California (7-Counties), 2001-2005 2-6
Exhibit 14 – Percent Gain in Payroll by Logistics Sector, Southern California (7-Counties), 2001-2005 2-6
Exhibit 15 – Mean Average Pay per Job Sectors with Few Barriers to Entry, Southern California (7-Counties), 2005 2-7
Exhibit 16 – Change in Blue Collar Payrolls, Southern California (7-Counties), 2001-2005 2-7
Exhibit 17 – Wage & Salary Job Growth, Blue Collar Sectors, Southern California (7-Counties), 1999-2005 2-8
Exhibit 18 – Wholesale Trade, Pay by Experience/Education, Southern California, 3rd Quarter 2005..... 3-5
Exhibit 19 – Wholesale Trade, Pay by Functional Group, Southern California, 3rd Quarter 2005..... 3-8
Exhibit 20 – Median Pay by Functional Group by Wholesale Trade Sub-Sectors, Southern California, 3rd Quarter 2005..... 3-12
Exhibit 21 – Mean Pay, Transportation & Warehousing Sectors OES-Generated vs. ES 202, Southern California, 3rd Quarter 2005..... 3-14
Exhibit 22 – Transportation & Warehousing, Pay by Experience/Education, Southern California, 3rd Quarter 2005..... 3-16
Exhibit 22a – Transportation & Warehousing, Pay by functional Group, Southern California, 3rd Quarter 2005..... 3-19
Exhibit 23 – Median Pay by Functional Group by Transportation & Warehousing Sector, Southern California, 3rd Quarter 2005..... 3-23
Exhibit 24 – Industrial Real Estate Market, Inventory Growth (Sq. Ft.), Southern California, 1991-2005..... 4-1
Exhibit 25 – Major Firms Buy or Lease Space for Expansion, Inland Empire, 1994 to April 2006..... 4-2
Exhibit 26 – Square Feet per Job Manufacturing Sector, Inland Empire, 1994-2006..... 4-3
Exhibit 27 – Jobs per Square Feet Logistics Sector, Inland Empire, 1994-2006 4-3
Exhibit 28 – Forecasted Population Increases, Southern California, 2000-2030 5-1
Exhibit 29 – Per Capita Taxable Retail Sales (constant dollar) Southern California,

Table of Contents

1994-2004 (1984-1986=100) 5-2
Exhibit 30 – E-Commerce Volume (millions) U.S. 2000-2006, Quarterly, Not Seasonally Adjusted 5-3
Exhibit 31 – U.S. Inventory to Sales Ratio, 1985-2006, Months of Inventory on Hand at Existing Sales Levels 5-4
Exhibit 32 – Port Container Traffic, Ports of Los Angeles & Long Beach, 1990-2005 & 2030e (million TEUs) 5-5
Exhibit 33 – U.S. Imports from Asia, 1990-2005 (millions) Adjusted for Changes in Asian Import Prices (2000=100) 5-6
Exhibit 34 – Breakbulk Cargo Growth, Southern California Ports, 1995-2005 (millions) 5-7
Exhibit 35 – Share of Southern California Breakbulk Cargo, Port of San Diego & Port Hueneme, 1995-2005 5-7
Exhibit 36 – Air Cargo Volume Southern California, 1995-2005 & 2030e (million tons) 5-8
Exhibit 37 – Logistics Share of Southern California Economy, 2003 6-3
Exhibit 38 – Direct, Indirect, Induced Impact of No Logistics Sector, 2003 6-5
Exhibit 39 – Full Impact of Logistics Sectors on Southern California Economy, 2003 6-6
Exhibit 40 – Direct, Indirect, and Induced Multipliers from Increased Logistics Activity 6-9
Exhibit 41 – Logistics Sub-Sectors Output and Employment Multipliers 6-11

Southern California's goods movement sectors create considerable impact due to the wide variety of activities involved in moving goods within and through the region. The facilities involved include the region's four ports, its numerous airports led by Los Angeles International Airport (LAX), its two long-haul and four short-haul rail lines, several intermodal railyards, hundreds of cross-docks, and thousands of warehouses. The system is largely tied together by trucks that move nearly all goods the "last mile" to consumers. Trucks also transfer cargo from the ports and airports to the intermodal yards, warehouses, and cross-docks. The activity flowing through every element of this system is at or near (in the case of air cargo) record levels, the facilities and the supporting infrastructure are straining against capacity, and the volumes for every activity are forecasted to increase significantly.[1]

E.1 Economic Challenge

This report examines the role the logistics group of activities plays in generating jobs and economic activity in Southern California, now and in the long run. It begins by looking at the primary challenge facing Southern California's economy. As of 2006, 21.3 million people live in the seven county regions (Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura). By 2030, forecasters expect this number to increase to 26.8 million, with most of the growth resulting from the natural increase in the area's existing population. The region must therefore seriously consider ways to expand its job base. Complicating this need is the fact that 43.8% of the region's adults, age 25 and over, have not attended a single college class.

Historically, manufacturing provided the good entry-level pay and job ladders that allowed many people in this group to work in blue collar jobs and climb into the middle class. This is defined as the income range containing the 12.5% of Southern California's households below ($37,163) and above ($66,099) its 2004 median income of $49,435. With demise of manufacturing as a growth force in Southern California (1990-2005: down 361,300 jobs or -28.2%), an alternate route for upward economic mobility is needed.[2] Thus, the region needs significant job growth, with a considerable portion of that growth aimed at employing these workers. If this challenge is not met, Southern California's income divide will grow. Already, the top 3.5% of the area's households earned 17.6% of its total income in 2004 while the bottom 50% earned just a little more at 18.6%.

E.2 Starting Pay and Job Ladders

Logistics (wholesale trade; trucking; supply chain management; warehousing; couriers; air, sea, and rail transportation) has the essential characteristics that can allow it to replace manufacturing in this role. It offers a median beginning pay at 32.1% above the minimum wage ($8.91 or $18,542 per year) to workers with virtually no training or experience. It also has defined paths by which workers can graduate to median pay levels of well over $40,000 per year, placing them inside the middle class. These estimates make no allowance for the fact that overall pay in logistics sub-sectors appears to run 12.5% to 14.4% <u>above</u> that derived from the general occupational pay scales used to calculate incomes in this report (explanation: pages 3-2 to 3-3).[3]

In wholesale sub-sectors, 80.6% of the jobs require no advanced schooling and another 5.7% require either trade or community college training. In transportation and warehousing sub-sectors, 92.9% of the jobs require no advanced schooling and another 1.1% require trade school training. Taken together, all logistics jobs in 2005 average $47,411 per year, just 2% below all manufacturing jobs ($48,397).[4] Meanwhile, the alternative sectors without educational barriers to entry pay much more modestly: retail trade ($28,840), gaming ($28,385), accommodation ($24,019), agriculture ($22,793) other services (automotive, household and electric repair and maintenance, personal care, laundry, member associations, household workers) ($22,340), eating and drinking ($15,132). In sum, the logistics sector offers Southern California a means of meeting its economic challenge of providing significant job growth and upward income mobility to a vulnerable segment of its workforce.

E.3 Competitive Position

From 1990-2005, the logistics sector grew by 103,400 jobs (18.4%) and is competitively situated to continue growing. In 2005, the ports of Los Angeles and Long Beach were ranked second and third in their dollar volume of U.S. international trade, and LAX was ranked seventh. In container terms, these ports, in combination with the Port of San Diego and Port Hueneme, handled 41.8% of 2005 U.S. imports and 68.4% of all containers reaching the West Coast (including Vancouver). Meanwhile, Southern California's burgeoning population requires a logistics sector that matches its size and growth. The rapid growth of e-commerce is adding to this pressure. Nationally, the advent of "just in time" inventory processes plus the rise of low-cost Asian manufacturing, due to the freeing of competition there, has made international supply chain management a key ingredient in corporate cost control. Southern California's West Coast location and deep water ports create an ideal entry point for Asian goods into the North American market. Companies that manage their inventories from the area have shorter time lags between sales forecasts and goods delivery than those that manage their inventories from Asia, reducing inventory costs by 18%-20%.[5]

A major difficulty for the logistics sector is the fact that it is straining the facilities and supporting infrastructure needed to accommodate its growth. This is highlighted by the challenge that communities face in approving new facilities. From 1994 to 2000, the amount of space needed to support a single job in this field averaged 1,994 square feet. From 2001 to 2006, that figure grew to an average of 2,284 square feet per job. In comparison, the space needed to support a single manufacturing job remained at an average of roughly 1,000 square feet during that entire twelve-year period. These data, in addition to the fact that logistics is growing and manufacturing is in decline, create a dilemma for local policy makers trying to balance land use and blue collar job creation.[6]

E.4 Macro-Economic Impact

One way that the author used to calculate the impact of logistics activity was the use of the IMPLAN model to identify how much of Southern California's economy is directly within them in 2003. This included: $90.7 billion of $1,375 billion in total economic activity in Southern California (6.6%); $63.6 billion of $812.6 billion in economic value created (7.8%); 687,837 of 11,321,518 people employed (6.1%); $52.6 billion of $750.6 billion earned income (7.0%); and $11.1 billion of $62.0 billion in sales taxes, property taxes, fees, licenses, and excise taxes paid to government (17.8%). However, this did not account for activity in other sectors,

since logistics firms buy goods and service from them (indirect effect). It also misses the fact that the incomes paid to workers cause activity to rise throughout the economy (induced effect). Including these, the 2005 impact of logistics rises to: $170.4 billion of $1,375 billion in total economic activity (12.4%); $113.2 billion of $812.6 billion in economic value created (13.9%); 1,441,016 of the 11,321,518 people employed (12.7%); $98.6 billion of $750.6 billion earned income (13.1%); and $14.6 billion of $62.0 billion in tax and fee revenues to government (23.5%).

Note: In estimating the size of the impact of logistics as of 2005, no allowance was made for the fact that without the sector some of the workers and resources used within it might have helped growth other parts of the economy. Such an analysis is essentially impossible as it would require a rewriting of history to examine such a potential outcome including the degree to which workers and resources now devoted to logistics may have left the Southern California or been unemployed if the sector did not exist.

Finally, the report looks at how changes in future logistics activity will impact Southern California's economy. Here, the focus is on the "multipliers" or extent to which increases in logistics activity, caused by money entering the region from elsewhere, will impact the full economy. It found that each new logistics job supports a total of 2.19 new jobs in the economy. A $1.00 increase in logistics activity sets off a total of 1.97 times that amount in the local economy. Similar ratios were determined for the impact of additional jobs or activity in each of the major sub-sectors of logistics.[7] The relevant table is shown below:

Exhibit 41.-Logistics Sub-Sectors Output and Employment Multipliers

Logistics Sector	Direct Impact & Jobs Impact	Indirect Impact	Induced Impact	Total Impact & Jobs Impact	Total Multiplier Jobs Multiplier
Wholesale Trade Only	$1,000,000,000	$239,235,367	$712,566,964	$1,951,802,331	1.95
	7,166	2,009	7,211	16,386	2.29
Air Transportation	$1,000,000,000	$509,515,482	$540,084,339	$2,049,599,821	2.05
	4,541	3,765	5,241	13,547	2.98
Rail Transportation	$1,000,000,000	$307,172,558	$510,291,441	$1,817,463,999	1.82
	3,943	2,283	4,885	11,111	2.82
Water Transportation	$1,000,000,000	$380,790,248	$472,802,455	$1,853,592,703	1.85
	2,147	5,417	4,601	12,165	5.67
Truck Transportation	$1,000,000,000	$520,062,441	$592,974,407	$2,113,036,848	2.11
	9,280	3,630	5,659	18,569	2.00
Couriers	$1,000,000,000	$293,998,557	$591,121,230	$1,885,119,787	1.89
	15,122	1,988	5,621	22,731	1.50
Warehousing & Storage	$1,000,000,000	$244,287,506	$597,373,127	$1,841,660,633	1.84
	11,204	1,763	5,652	18,619	1.66

Source: IMPLAN Model Used with $1,000,000,000 assumption for each logistics sub-sector
Note: Throughout this report, the sources shown are those providing the data for the analysis. The calculations based upon these sources, such as rates of growth, percentage distributions, weighted averages, summations, means and medians are the responsibility of the author.

Southern California faces an economic challenge. In January 2006, the seven county regions (Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura) had 21.3 million people. If it were a separate state, only Texas (23.0 million) would have more people. In an era when income and education are increasingly correlated, the U.S. Census Bureau's 2004 American Community Survey found that 43.8% of the region's adults aged 25 and over had stopped their formal educations without a single college class as shown in Exhibit 1. The range was from 36% in Ventura, Orange, and San Diego counties to 47%-49% in Los Angeles, San Bernardino, and Riverside counties. It was 62.9% in Imperial County in 2000.[8]

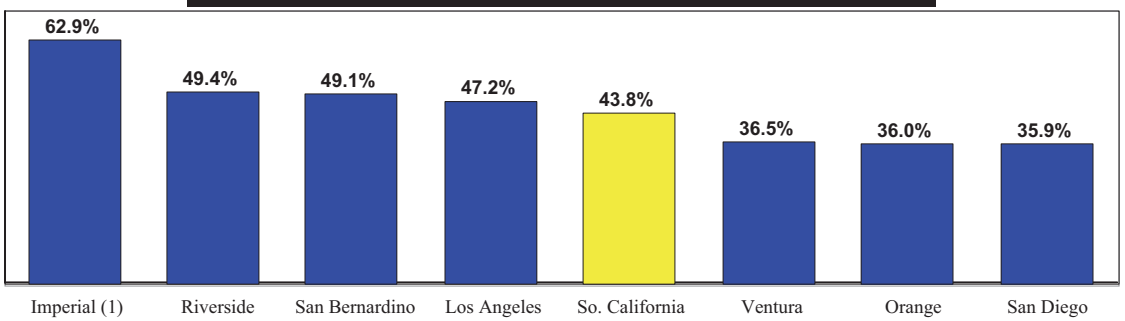


Exhibit 1.-Schooling Ended At High School or Less
Adults 25 & Over, Southern California Counties, 2004

(1) Imperial County for 2000, Not In Southern California Average
Source: American Community Survey, U.S. Census Bureau

1.1 Falling Per Capita Income Rank

These data may help explain a difficulty that has emerged in the region's per capita income ranking. From 1987-2003, the Southern California Association of Governments (SCAG) found that its area has fallen from a rank of fourth in per capita income to 17th and lowest among the seventeen multi-county regions in the U.S.[9] This means that its per capita income growth has not matched that of the other major American regions.

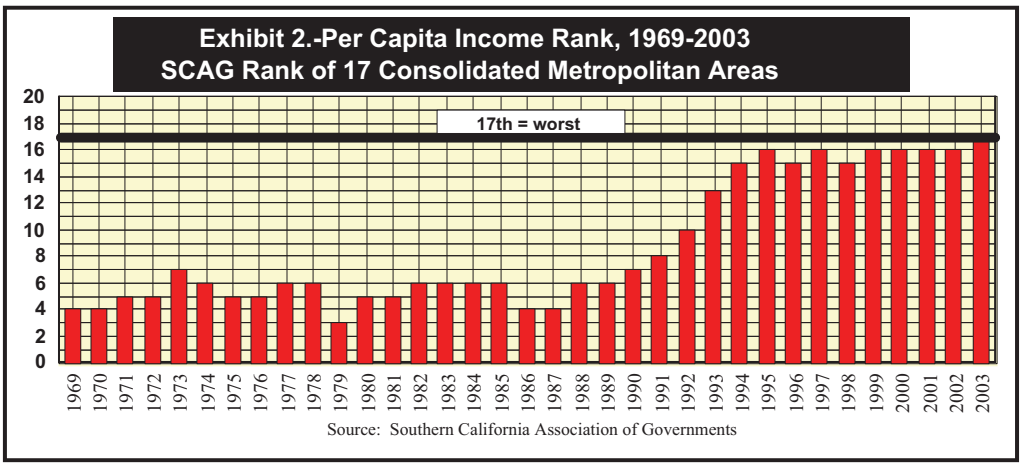
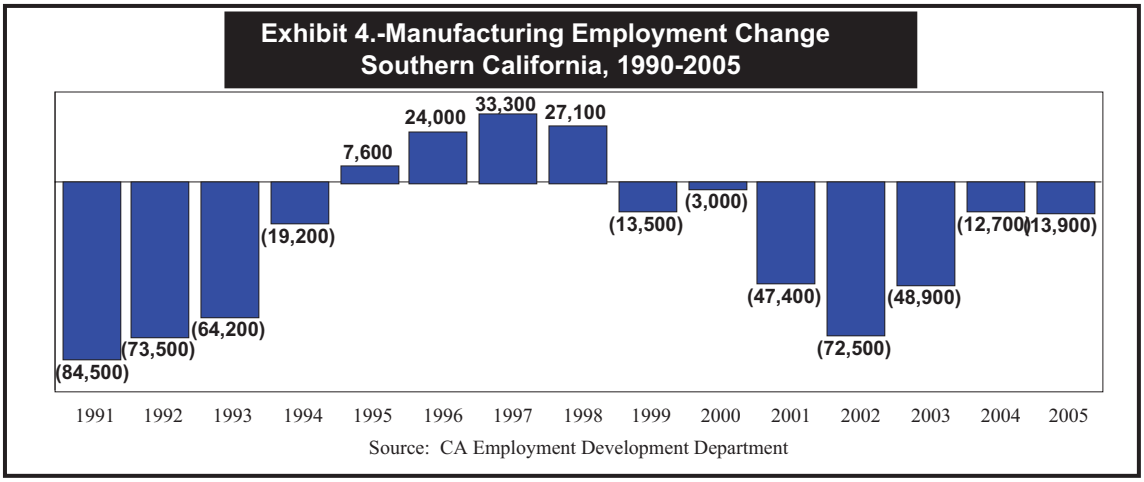


Exhibit 2.-Per Capita Income Rank, 1969-2003
SCAG Rank of 17 Consolidated Metropolitan Areas

Source: Southern California Association of Governments

Exhibit 3 shows that this deterioration began during the severe economic dislocations that accompanied Southern California's post-Cold War recession from 1990-1993. The region lost 488,700 jobs in this period. Much of this reduction occurred in its high paying aerospace/defense manufacturing base. More difficult is the fact that from the low point in 1993 until 2005, the area has added 1,571,800 jobs (*comparing 12-month averages for each year*), a gain of 23.0%. Yet, in this period, the SCAG area fell from 13th to 17th lowest among the 17-multi-county regions in per capita income. Thus, while the region recovered from its job losses, the quality of the new positions was not as great as those being created in other parts of the U.S.



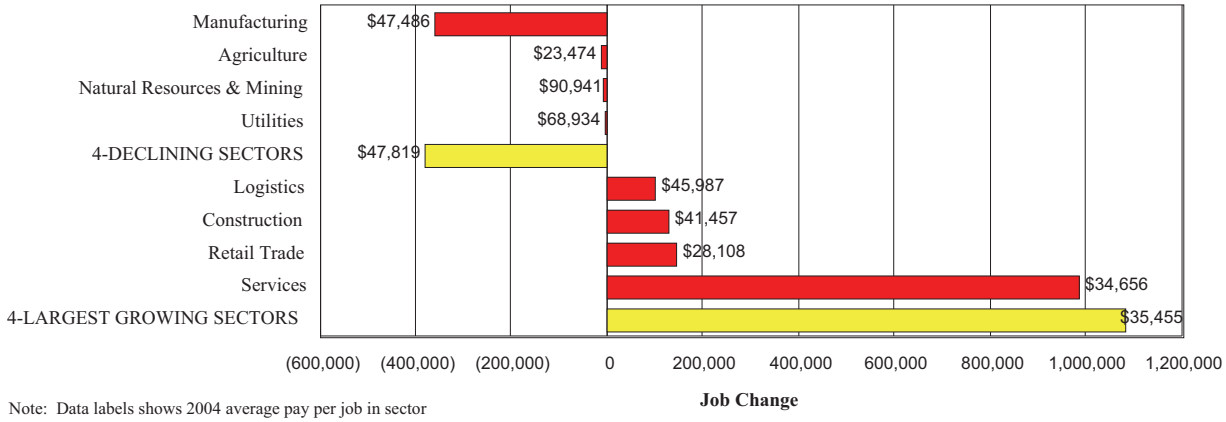
1.2 Manufacturing Sector Difficulties

Difficulties in the manufacturing also help explain what happened over the longer period. From 1990-2005, the sector fell from 1,279,600 to 918,300 jobs, a loss of 361,300 positions or -28.2% as shown in Exhibit 4. In the early 1990's, aerospace/defense jobs were lost. In the late 1990's, there was a high technology recovery that stopped when the tech bubble burst. Since then, the manufacturing decline has occurred because production has increasingly moved to Asia. That has occurred as the Chinese economy has begun a rapid transition from a state-controlled to a competitive model and the Indian economy has been less controlled by its bureaucracy. With their lower wage rates, both have therefore been able to compete and win billions of dollars in U.S. and European manufacturing contracts (see pages 5-5 & 5-6, with Exhibit 33, on Asian import growth). Certainly, this has been major factors in the 211,900 production jobs lost in Southern California during the 1999-2005. Altogether, for the full 1990-2005 period, the loss of manufacturing jobs represented 94.8% of the job decline in Southern California's four shrinking sectors.[10]

1.3 Loss of Better-Paying, Gain In Weaker Paying Jobs

With average manufacturing pay at **$47,486** per job in 2004, the sector has been largely responsible for Southern California's declining sectors, removing 381,000 jobs with an average pay of $47,819. Data labels in Exhibit 5 show average pay per job, and bar length indicates job change. Meanwhile, from 1990-2005, the four sectors adding the most new jobs to Southern California's economy grew by 1,083,000 positions. However, in 2004, their average pay was only **$35,455**. There has thus been a $12,000 difference between the pay in shrinking sectors versus that in the four fastest-growing sectors due to the extent to which lower paying retail trade (*$28,108*) and the full range of service sectors (*$35,455*) played the major roles in the region's job growth. This is likely a major contributing factor for Southern California's falling per capita income ranking.

Exhibit 5.-Major Gaining & Losing Sectors, Southern California
Size of Job Change, 1990-2005 & 2004 Average Pay



Note: Data labels shows 2004 average pay per job in sector
Source: CA Employment Development Department

1.4 Manufacturing and Upward Economic Mobility

When the shrinkage of the manufacturing sector is combined with the fact that 43.8% of Southern California's adults have stopped their formal schooling with high school or less, the economic challenge facing the region starts to come into focus. Historically, manufacturing has provided one of the principal means of upward income mobility for people who have chosen to depend upon workplace experience for their economic success. The sector did this by providing employees with:

- Southern California-based employment
- Blue collar work
- Reasonably good entry-level pay
- Defined skill ladders up which they could move to "middle class" incomes
- The ability to move up those ladders via on-the-job learning
- An environment where new technology added to their productivity and pay

With the manufacturing sector shrinking, that 43.8% of the population faces a challenge in relying upon their physical abilities plus work place experience to provide rising incomes to their families.

Definition of "Middle Class" & Dilemma of Income Inequality

One standard used to measure if a sector is helpful to those who stopped their formal educations at high school or less is the degree to which it provides career paths to the "middle class." The Census Bureau's 2004 American Community Survey found that the median household income of Southern California's seven counties was $49,435. Defining "middle class" as the quartile of households containing 12.5% of households earning on either side of $49,435 put the lower bound at $37,163, with 12.5% of the region's families earning between that amount and $49,435. The upper bound was $66,099 with 12.5% of the area's families earning between that amount and $49,435 figure. If a sector provides career paths bringing single worker families into this range, it is providing workers a route into the middle class. The need to move more families into the middle class is seen in that the bottom 50% of Southern California's households ($49,435 & below) made 18.6% of the area's 2004 income. The top 3.5%, making $200,000 and up, received almost as much: 17.6% of total income.

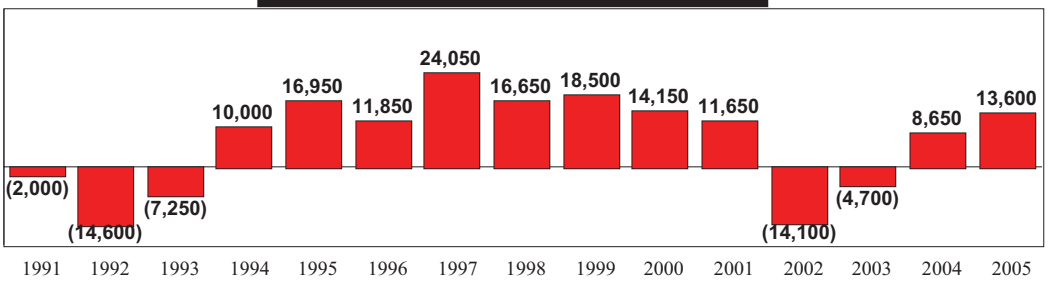
Note: At SCAG's 2007 Economic Conference entitled "The Middle Class on Life Support ... Strategies for Revitalizing Southern California's Economy, Dr. Anil Puri, Dean of the School of Business & Economics at California State University Fullerton delivered a review of definitions of the Middle Class and concluded that $40,000 to $60,000 would be the "middle middle class".

1.5 Logistics

Of the four sectors that have added the most new jobs to the Southern California economy from 1990-2004, logistics offered the highest average pay. This group (Section 2.1 below for detailed description) added 103,400 jobs in this period. The average 2004 pay for the sector's wage and salary was $45,987, or within 3% of manufacturing (Exhibit 5). The following sections discuss in greater depth logistics sector's ability to provide a vehicle for workers to overcome the difficulties brought on by the slowing of manufacturing. Its growth path has cycled with the economy (Exhibit 6). It slowed in the early 1990's due to

the recession/depression in Southern California that accompanied the end of the Cold War. It soared with the local economic recovery and the growth of international trade. There was a pause in the 2002-2003 largely due to the impact on air transportation of the September 11 attacks. It has subsequently moved back on a growth path.

Exhibit 6.-Logistics Employment Southern California, 1990-2005



Source: CA Employment Development Department

1.6 Goods Movement Framework

To further the discussion of the logistics sector, it is helpful to broadly understand how goods move through the U.S. economy and the important role played by Southern California.

Major Trade Nodes

The starting or entry points for supply chains are often outside of the country. By sea, containerized cargo mostly connects to the region through the ports of Los Angeles and Long Beach. Breakbulk cargo goes through those harbors as well as the Port of San Diego and Port Hueneme (Ventura County). International truck traffic connects to the region through San Diego and Imperial counties. The bulk of domestic and international air freight flows through LAX. Ontario International Airport (ONT) was a distant second. In 2004, the Port of Los Angeles (2nd), the Port of Long Beach (3rd), and LAX (7th) ranked in the top ten and accounted for 13.6% of the value of U.S. total trade and 16.5% of imported trade as shown in Exhibit 7.

Exhibit 7.-Top Ten U.S. Gateways By Total Trade, 2004 (billions)

2004 Rank	2003 Rank	Gateway name	Imports	Exports	Total Trade
1	2	John F. Kennedy International Airport, NY	$72.6	$52.7	$125.3
2	1	Port of Los Angeles, CA (water)	105.1	16.4	121.4
3	5	Port of Long Beach, CA (water)	102.8	18.6	121.3
4	3	Detroit, MI (land)	55.6	58.2	113.8
5	4	New York and New Jersey, NY/NJ (water)	90.4	23.1	113.5
6	6	Laredo, TX (land)	51.1	38.4	89.5
7	7	Los Angeles International Airport, CA (air)	34.8	33.9	68.7

Exhibit 7.-Top Ten U.S. Gateways By Total Trade, 2004 (billions)

8	9	Buffalo-Niagara Falls, NY (land)	36.6	31.7	68.3
9	11	Houston, TX (water)	37.2	29.2	66.4
10	8	Port Huron, MI (land)	42.3	23.6	65.9
		TOTAL, ALL GATEWAYS	$1,469.70	$816.5	$2,286.20
		Southern California Share	16.5%	8.4%	13.6%

Source: U.S. Bureau of Transportation Statistics

Ports

As indicated, four ports handle the movement of goods into and out of Southern California. There are essentially two ways to classify the movement of goods through these ports. One is to look at the containerized volume moving through the ports. This is measured in 20-foot equivalent units (TEUs). The other is to look at the volume of breakbulk cargo (non-containerized). It is measured in short tons (2,000 pounds).

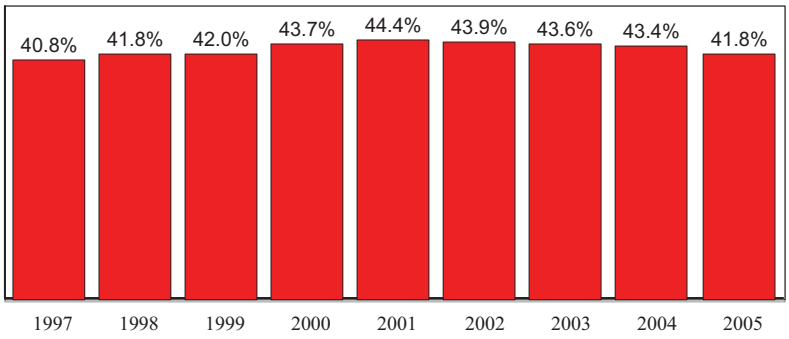
Exhibit 7A.-Port Volumes, Southern California, West Coast, U.S., 2005

	Loaded Containers (*TEUs*)			Breakbulk (*Short Tons*)				
	Imports	Export	Total	General	Lumber/Logs	Autos	Bulk	Total
Los Angeles	3,821,325	1,042,707	4,864,032	3,259,530	13,647	2,186,948	4,565,374	10,025,499
Long Beach	3,354,711	1,023,735	4,378,446	1,249,609	232,658	4,446,609	8,350,281	14,279,157
San Diego	46,010	2,796	48,807	314,593	114,572	2,569,112	1,402,122	4,400,399
Port Hueneme	13,471	3,384	16,855	875,837	0	3,201,174	142,967	4,219,978
So. California	7,235,517	2,072,623	9,308,139	5,699,569	360,877	12,403,843	14,460,744	32,925,033
West Coast (1)	10,584,884	4,241,264	14,826,148	9,519,101	1,731,207	21,674,858	62,475,184	95,400,350
So. Calif. Share	68.4%	48.9%	62.8%	59.9%	20.8%	57.2%	23.1%	34.5%
U.S.	17,290,350	8,577,808	25,868,158					
So. Calif. Share	41.8%	24.2%	36.0%					

Source: Containers from Port Import Export Reporting Service (*PIERS*), collected from vessel manifests and bills of lading. Breakbulk from Pacific Maritime Association as required by the ILWU contract.
Note (1): West Coast container volume includes Vancouver BC. Breakbulk volume does not.

Container volumes show that Southern California's ports handled 9.3 million (62.8%) of the 14.8 million loaded containers moving in and out of West Coast ports in 2005. They also accounted for 36.0% of the U.S. volume of 25.9 million containers. For imports, the region handled 68.4% of West Coast loaded containers and 41.8% of U.S. volume. At the same time, Southern California's ports handled 34.5% (32.9 million tons) of the West Coast's breakbulk cargo volume (95.4 million tons). Interestingly, the Port of San Diego (4.4 million tons) and Port Hueneme (4.2 million tons) played important roles in the breakbulk cargo business but insignificant roles with containers as shown in Exhibit 7A.

Exhibit 8.-Share of Imported Loaded Containers Southern California of U.S., 1997-2005



Source: Port Import Export Reporting Service (PIERS)

An issue of interest is the recent difficulties that shippers have had moving containers through the ports of Los Angeles and Long Beach, causing them to divert traffic elsewhere. While volume at the two ports has continued growing, there was a decline in the share of imported containers handled in Southern California in 2004-2005 from 43.4% to 41.8% as shown in Exhibit 8. This could represent some trade diversion due in part to the Port of Los Angeles being dredged in 2005 to allow the 8,200 TEU ships to dock.

Airports

In 2005, Southern California's air cargo needs were essentially served by five airports. By far the largest were LAX (2.1 million tons), which handled 70.5% of the 3.0 million tons of air cargo, and ONT (575,000 tons), which handled 19.0%, as shown in Exhibit 9. ONT is largely in this position because it hosts the western regional hub for UPS.

Exhibit 9.-Air Cargo Volume, 2005 & 2030 forecast, Southern California Airports

Airport	2005	Share	2030	Share
LAX	2,138,188	70.5%	2,340,000	25.2%
Ontario	575,369	19.0%	2,252,000	24.3%
March JPA	NA	0.0%	1,117,000	12.0%
San Bernardino	NA	0.0%	1,092,000	11.8%
Palmdale	NA	0.0%	1,024,000	11.0%
San Diego	187,706	6.2%	554,600	6.0%
SCLA	NA	0.0%	504,000	5.4%
Long Beach	54,298	1.8%	137,000	1.5%
Palm Springs	100	0.0%	128,000	1.4%
Burbank	53,223	1.8%	87,000	0.9%
John Wayne	24,073	0.8%	43,000	0.5%
Southern California	3,032,957	100.0%	9,278,600	100.0%

Source: 2005 data from each airport. 2030 forecasts from Southern California Association of Governments and San Diego County Regional Airport Authority.

Looking forward, a very different picture emerges. Volume is expected to essentially triple from 3.0 million tons in 2005 to 9.3 million tons in 2030. While LAX will remain the volume leader (2.34 million tons), its share will fall to 25.2% of the regional volume. The airport is already at 91.4% of this forecast. Ontario (2.25 million tons) will stay number two, but its volume will nearly equal that of LAX. It is currently 25.5% of the way to this forecast. Los Angeles World Airways, an agency of the city of Los Angeles that owns both facilities, hopes to have LAX specialize in international cargo and divert other cargo to ONT. In that light, the agency has plans for a major cross-dock soon to be built at ONT.

Interestingly, several major inland airports that currently have little or no air cargo are anticipated by SCAG to handle major quantities of air cargo by 2030. These include joint-use March Air Reserve Base (1.11 million tons), which just became the western regional headquarters of DHL; San Bernardino International Airport (1.09 million tons), which currently has no service; Palmdale (1.2 million tons), which also has no current service; and Southern California Logistics Airport in Victorville, which has intermittent service (504,000 tons).

Railroads

[See Railroad Maps in Technical Memo 4a Freight Demand, Pgs. 1-6 & 1-7]

Southern California is served by two long-haul railroads: Burlington Northern Santa Fe (BNSF) Railway and Union Pacific (UP) Railroad. These two companies combined to move more intermodal cargo than any other rail system in the world. The area is also served by two short-haul lines:[11]

Alameda Corridor

Southern California's long-haul railroad system essentially starts with the Alameda Corridor, which connects the Ports of Los Angeles and Long Beach, moving parallel to the I-710 freeway, to the switching yards of BNSF and UP railroads near downtown Los Angeles. Since the completion of this public-private project in 2002, the line allows rail traffic to leave the ports with no at-grade street crossings along its full 21-mile length.

Burlington Northern Santa Fe Railway

BNSF was formed by the 1995 merger of the Atchison Topeka & Santa Fe Railway and the Burlington Northern Railroad. The company's main line runs from Los Angeles through Orange County to Santa Ana Canyon. From there, it moves through Western Riverside County to San Bernardino and traverses Cajon Pass on its way to Barstow. The line then connects east through Needles to the southwestern states.

Union Pacific Railroad

In its current configuration, UP Railroad is the result of the merger of the UP and Southern Pacific railroads in 1996. The company maintains four major rail corridors:

- The southwestern route that goes from Los Angeles via the San Gabriel Valley to Colton and through San Gorgonio Pass and the Coachella Valley to the southwestern states
- A coastal route that runs from Los Angeles through Ventura County and north through the coastal counties to the Bay Area
- A central valley line running from Los Angeles through Burbank to Palmdale; it then goes on to connect with UP's Central Valley line at Mojave, then proceeds north to Oregon
- A northern route that goes from Colton through Cajon Pass to Barstow and then on to Las Vegas and Salt Lake City, where it connects to mid-western and eastern states

Short Haul

There are also two short-haul lines serving Southern California that are owned by RailAmerica, a specialist in such operations:

- Ventura County Railroad connects Port Hueneme to UP Railroad's coastal route.
- San Diego and Imperial Valley Railroad connects San Diego to San Ysidro and Imperial County.

There are two additional operations:

- Pacific Harbor Line at the ports of Los Angeles and Long Beach
- Los Angeles Junction Railway near downtown Los Angeles

Intermodal Railyards

Whether goods enter Southern California through its four ports or are manufactured in the region, a significant share ultimately leaves the region in landside containers[12] via either BNSF or UP railroads. This is most often true of containers moving beyond 769 miles, the distance at which rail generally has a least-cost shipping advantage.[13] Containers are moved on to container-carrying rail cars in intermodal yards.

On-Dock Intermodal

To reduce transfer time and costs, the ports of Los Angeles and Long Beach have on-dock rail serving most of their container terminals. These facilities allow goods to be placed on railcars in marine containers or transferred from marine to rail containers (transloaded) and then transported along the Alameda Corridor and out of California. Approximately 21% of all containers moving through the Ports of Los Angeles and Long Beach were transferred to and from trains at on-dock rail yards in 2005.[14]

Near-Dock Intermodal

Rail traffic dealing with the ports is also expedited via near-dock rail such as the UP Intermodal Container Transfer Facility (ICTF) located approximately five miles from the ports of Los Angeles and Long Beach. There, containers are lifted on and off of trucks which connect the facility to the harbors. BNSF has been selected to build a second such facility nearby called the Southern California International Gateway. Facilities of this type are needed because existing rail yards are nearing capacity and a location nearer the docks has the potential to reduce truck generated emissions and congestion.

Off-Dock Intermodal

There are several off-dock rail yards near the Ports of Los Angeles and Long Beach. Containers are towed to these facilities by truck and transferred to trains in the yards. BNSF operates facilities in Vernon and Commerce. UP Railroad has yards in East Los Angeles, at the Los Angeles Transportation Center, and in the City of Industry. To serve the growing base of logistics firms in the Inland Empire, BNSF has a large inland facility in San Bernardino and is planning another one, likely in Victorville.

Trucking

Trucking firms are a key element in the logistics system because nearly all goods travel the last mile to their destination by truck, with trucking ton-miles growing faster than other modes.[15] In Southern California, over 75% of truck tonnage moves less than 50 miles, with the average length of haul for a truck at 144 miles. The companies providing trucking service can be classified in numerous ways. Among the important types are:

Full Load

Full load trucking firms like Schneider, JB Hunt, and Swift move full containers cross-country, locally within Southern California, and between originations and intermodal railyards.

LTL

Less-than-a-load trucking firms (LTL) like Yellow Freight Systems generally pick up or deliver products in smaller trucks. These companies operate with cross-docking facilities where products literally move across a dock between larger trucks hauling full containers and smaller trucks connecting to customers. LTLs generally operate inside Southern California and often haul full containers to intermodal rail yards for shipment cross country.

Couriers

A nuance of the LTL business is that undertaken by firms like UPS, FedEx, and DHL. These are fully integrated firms combining truck and air cargo carriers. They use smaller vehicles to deliver packages that have traveled cross-country or internationally via their dedicated fleets of aircraft, interstate trucks, or in containers shipped by rail.

3PL

Third party logistics (3PL) firms like BAX Global and CR England maintain fleets of long distance and LTL trucks that are used to move the merchandise of clients who have outsourced their logistics functions to them. These operations generally maintain warehousing facilities and often contract with rail lines for long distance shipping.

Corporate Fleets

Numerous companies like Stater Brothers Markets and Long Drugs continue to maintain their own local fleets of trucks for delivery of merchandise to their outlets throughout Southern California. Generally, these vehicles operate in conjunction with the company's local warehousing operation.

Independent Truckers

In Southern California, a crucial role in the supply chain is by entrepreneurial truck drivers. These individuals pick-up and deliver containers at the ports and connect them to the region's intermodal yards, warehouses, or cross-docks. Due to difficulties such as turn-around time at the ports, national trucking companies do not provide this link in Southern California's supply chain.

Private Carriage

Another group that carriers a good deal of freight are private carriage operations. These are firms whose primary business is not logistics but maintain trucks as part of their operations and contract with other firms

as part of their business plans. For instance, if a Stater Brothers's truck takes a load from its central warehouse in Colton to their store in Downey, they could contract to pick up a load from a third party in the Downey area and deliver it to an unrelated firm on the way back to Colton. Drivers working in this sector are not included in the truck transportation data as their employers are in other sectors. This lowers the size of the logistics sector and leaves out the wages and salaries of the drivers and the entrepreneurial earnings of private carriage owner-operators.

PierPASS OffPeak Program

With the rising volume of containers moving from the Ports of Los Angeles and Long Beach to various Southern California destinations, a key trucking innovation has been the OffPeak Program. Containers moving during peak traffic hours Monday through Friday (3:00 a.m.-6:00 p.m.) are assessed a fee, while those moving during off-peak hours are not. The result has been to move 30-35% of truck trips from the harbors to off-peak hours, surpassing the goal of 15-20% announced when the program began in July 2005.[16]

Operation of the Logistics Network

When a container ship arrives, longshore workers unload imports and reload the ship with exports and empties. Using cranes capable of reaching across cargo ships 22-containers wide, crane operators lift the boxes onto trailers that will be pulled by yard tractors for dray to the port gate or an on-dock rail line. Most ships typically carry 6,000 TEUs, with the largest now at 8,200. The keels have been laid for 10,000 TEU ships.

Transportation Options

Before an ocean carrier arrives at port, supply chain managers and third party logistics firms have determined the combination of transportation modes for the next segments in the supply chain, given the need to move goods rapidly and reliably. As discussed, their secondary choices include trucks, rail, and air, often via intermodal connections. The complexity of the process exists because each mode can involve a network of logistic firms, freight forwarders, truckers, distribution centers, and other trade workers. Moreover, modes and companies within the support network are under the ownership of different operators, including multiple levels of government. A problem in a single mode, whether caused by infrastructure constraints, labor shortages, or mode management, can slow the entire system.

Transportation Mode Selection

Faced with multiple options and destinations, supply chain managers must consider factors such as product characteristics (weight, bulk vs. packaged, fragility, need for refrigeration, liquid vs. dry) plus time in transit and the amount of safety stock (current inventory) at the destination. Although mode decisions are usually made on a least-cost basis, other factors can prevail such as inventory shortages or end-of-the-month sales that might prompt use of an air carrier instead of rail. The dollar value of goods also plays a role, with lightweight high-value goods more likely to travel by air and bulky lower-cost items by rail or truck.

Transloading

Although the rail lines and trucks can accommodate marine containers, usually 40 feet (2 TEUs), goods may first be transloaded into larger containers for cost savings. This may take place on-dock, at the intermodal railyard, or at a redistribution center or warehouse.

Warehousing and Redistribution

Warehousing and redistribution sites may be located as far as 60 miles inland from the ports. Though the objective may be to send goods out of Southern California, they must first be trucked to these facilities. Once inside, the containers are deconsolidated for short term storage or transloading into domestic trailers or containers. In some cases, the nature of the goods is changed (e.g., a label is added). On occasion, international and domestic goods may be mixed for routing to a final destination. When goods leave these facilities, they may go to their ultimate destination by truck, rail, or air, depending on supply chain factors.

Volumes

A frequently asked question is the degree to which imported goods arriving at the Ports of Los Angeles and Long Beach take various routes on their way to Southern California or national destinations. A 2002 study for the Alameda Corridor Transportation Authority partially addressed this question.[17] The answers are shown in Exhibit 10.

Exhibit 10.-How Imports Move, Southern California, 2002

Imports	TEUs	Share
To Rail to Eastern Destinations	2,343,000	41.7%
To Consolidator to Rail to Eastern Destinations	1,251,000	22.3%
Total Rail to Eastern Destinations	3,594,000	63.9%
To Consolidator to Local or Interstate Trucks	1,931,000	34.3%
To Truck to Local or Interstate Destination	97,000	1.7%
Total Imported TEU	5,622,000	100.0%

Source: BST Associates under contract to Alameda Corridor Transportation Authority

- 2,343,000 TEUs (41.7%) went directly to trains for eastern destinations. These containers created very little work in Southern California.
- 97,000 TEUs (1.7%) went directly to trucks for interstate delivery. They also created very little Southern California employment.

A SCAG commissioned study of port traffic elasticity found that the higher the container fees charged at the ports, the more these forms of trade would be diverted to other locations. The major loss would be the $250-$300 paid to the Pacific Maritime Association and through it to port workers and purveyors. Ultimately, the diversion would free capacity for more of the trade that creates jobs in Southern California. If the fees were invested into transportation infrastructure that increased the speed and reliability of trade

flows through the region, the result would be to increase the amount of trade that does create jobs. The ideal fees and investment would total $180-$200 per container.[18]

Note: Currently, it is trade that leaves the ports by truck to undergo greater processing in Southern California that creates the greatest employment impacts.

- 1,251,000 TEUs (22.3%) went through some form of transloading process before going on to trains for eastern destination. The movement of these containers by trucks and their handling at transloading, warehousing (including possible storage), and intermodal railyards created jobs in Southern California.
- 1,931,000 TEUs (34.3%) went through some form of transloading process before going on to either local or interstate trucks. The movement of these containers to transloading, warehousing, and intermodal railyards created local jobs. So also did the management of them in local warehouses, as did the process of moving them to customers either locally or cross country.
- Of the 3,182,00 TEUs that were processed in the region: 1,942,000 TEUs (61.0%) went to the local facilities of national retailers; 853,000 TEUs (26.8%) were handled by 3PLs; and 387,000 TEUs (12.2%) went to smaller warehousing operations.

One question that arises is the relationship of average pay per worker in the logistics group of sectors versus other sectors with limited educational barriers for workers to obtain employment.

2.1 Logistics

While the logistics group is often referred to as a "sector," it is in fact composed of separate goods movement sectors that, until recently, were not considered closely bound together. The components of the group are thus spread across the recently adopted Northern American Industry Classification System (NAICS). The need to think of them as a "sector" has come about for two reasons. First, rapid changes in supply chain management procedures, technologies, and economics have tightly bound each segment of the logistics process together. Second, the acceleration in Asian imports has increased the importance of the economic and environmental impact of this group of activities. The activities encompassed include firms involved in ordering, receiving, processing, storing, moving, and tracking the flow of goods across multiple modes of transportation.

Logistics Sectors

Ranked by employment as shown in Exhibit 11, the sectors involved, including their payroll and average pay per worker, in the seven counties Southern California area (Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura) are as follows:

NAICS 42 Wholesale Trade

These establishments engage in buying, selling, storing, transporting, and tracking goods that ultimately are used by other firms or divisions. They may be a subsidiary of a retail or production company (e.g, Walmart or Toyota Motor Parts). They may be a dedicated 3PL firm that contracts to handle the movement and storage of merchandise for a single company. They may be involved with the products of multiple companies. In Southern California, many of these operations are involved in international trade. They normally handle durable (NAICS 421) or non-durable (NAICS 422) goods from warehouses. However, merchant wholesalers (NAICS 423 & 424) generally operate from offices and do not actually manage the storage of goods.

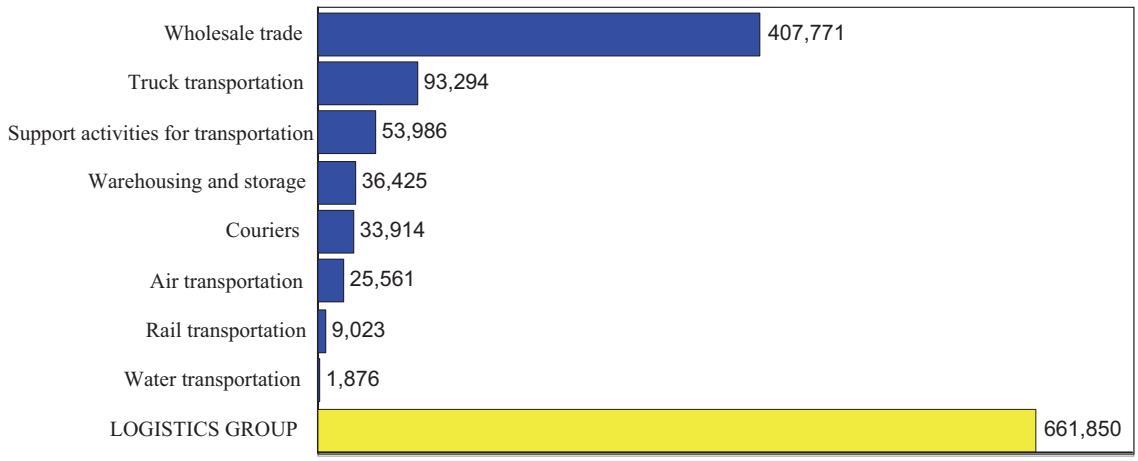
According to the California Employment Development Department (EDD), there were **407,771 workers** in the 16 sub-sectors of NAICS 42 in second quarter 2005.[19] The quarterly payroll was $5,168,836,264 or an average of $50,703 per worker per year. The sector represented 61.6% of employment in the logistics group and 65.9% of its payroll.

NAICS 484 Truck Transportation

These firms move goods within a region or across the country. They include companies that move full container loads of merchandise (e.g., JB Hunt and Schneider). Others collect partial container loads (LTL) in an area and move them to cross-docks where they are transferred to full containers bound for a single

location (e.g., Yellow Freight Systems). These containers then either move cross-country by truck or go to intermodal yards so they can move cross-country by rail. At their destination, the process is reversed.

Exhibit 11.-Employment By Logistics Sector Southern California (7-Counties), 2005



Sources: CA Employment Development Department, U.S. Railroad Retirement Board, U.S. Bureau of Economic Analysis
U.S. Bureau of Economic Analysis, 2002 Economic Census, U.S. Census Bureau

According to EDD, there were 63,847 workers in NAICS 484 in second quarter 2005 (exhibit includes self-employed drivers, see below). The quarterly payroll was $618,143,893 or an average of $38,827 per worker per year. The sector represented 9.6% of jobs in the logistics group and 7.9% of its payroll.

A difficulty with this sector is the large share of drivers moving containers to and from the ports who are not wage and salary employees. A study of port drivers concluded that: "Their pay, while comparable to national figures on workers with a high school diploma at $29,903 [2003], involves working 33% more hours than a typical full-time worker. It is also notable that these drivers are paid substantially lower than the national average for owner operators and employees."[20] (Parenthetical date added.)

The Census Bureau's Non-Employer Statistics for 2003 in the seven Southern California counties identified 29,447 self-employed trucking operations. These data are by sector by county for businesses that have no paid employees and are subject to federal income tax updated each year. "Data are primarily comprised of sole proprietorship businesses filing IRS Form 1040, Schedule C, although some of the data is derived from filers of partnership and corporation tax returns that report no paid employees."[21] Assuming this group averaged the $29,903 earned by port drivers in 2003, and that their incomes grew at just 50% of the 7.96% rate of inflation in the Los Angeles, Anaheim, Riverside Standard Metropolitan Area from 2003-2005 (3.98%), their average 2005 income was $31,093. That yields estimated 2005 annual earnings of $915,583,466 or an average of $228,895,867 per quarter. No change in the number of these entrepreneurs is assumed from 2002-2005 due to lack of data.

Combined, the wage and salary truckers plus independent truckers in NAICS 484 would total **93,294 workers** in 2005 as shown in Exhibit 11. Their combined quarterly payroll would be $847,039,760. Their average income would be $36,317 per worker per year. The sector represented 14.1% of employment in the logistics group and 10.8% of its payroll.

Note: these data are an underestimate of employment in trucking as they do not include drivers working for private carriage operations that are actually in other NAICS codes, as well owner-operators of this type. The data also do not include the influence of the income of these workers. This has the effect of underestimating the size of the logistics sector.

To look further at this issue, data for the seven counties for pay levels and 2004 employment levels data for OES 533032 Truck Drivers, Heavy and Tractor Trailer and OES 533033 Truck Drivers, Light or Delivery Services were reviewed. It was found that there were 130,850 truck drivers across all sectors in 2004. The median pay for Truck Drivers, Heavy and Tractor Trailer was $36,919. It was $23,711 for Truck Drivers, Light or Delivery. The combined median pay was $30,444. The employment figure was larger than the 93,294 for the trucking sector alone, which includes all workers in the sector, not just drivers. The pay level of $36,919 for heavy truck drivers was similar to the average for all workers in the trucking sector. The combined rate including light or delivery trucks of $30,444 was closer to the level found here for entrepreneurial drivers.

NAICS 488 Support Services for Transportation

This eclectic group includes operations involved in such ancillary transportation functions as freight forwarding (management of shipments across several modes of transportation), the loading and unloading of ships and rail cars at ports and intermodal rail yards, motor vehicle towing, air traffic controllers, and firms that provide packaging and labeling services. According to EDD, there were **53,986 workers** in NAICS 488 in second quarter 2005. The quarterly payroll was $661,477,456 or an average of $49,011 per worker per year. The sector represented 8.2% of employment in the logistics group and 8.4% of its payroll.

NAICS 493 General Warehousing and Storage

These are third party warehousing and storage operations that strictly hold general merchandise (e.g., U.S. Logistics Corp.), refrigerated products (e.g., Amerigold Logistics) or farm products (e.g., Osram Sylvania Inc.). This may also be the way that the warehousing branch of a major retailer self-classifies its operation. According to EDD, there were **36,425 workers** in NAICS 493 in second quarter 2005. The quarterly payroll was $362,442,805 or an average of $39,802 per worker per year. The sector represented 5.5% of employment in the logistics group and 4.6% of its payroll.

NAICS 492110 Non-Local Couriers

These companies generally move packages between metropolitan areas and around the world (e.g., UPS, Federal Express, and DHL). They generally pick up packages in smaller vehicles and take them to a facility where they move “across a dock” into fully loaded containers that ultimately reach their destination by air, truck, or rail. These firms may be integrated with an air cargo arm. According to EDD, there were **33,914**

workers in NAICS 492110 in second quarter 2005. The quarterly payroll was $314,856,104 or an average of $37,136 per worker per year. The sector represented 5.1% of jobs in the logistics group and 4.0% of its payroll.

NAICS 481 Air Transportation

These operations include passenger airlines (e.g., Southwest Airlines), cargo airlines (e.g., DHL Airways), and companies integrating both activities (e.g., Korean Air). LAX has cross-docks that allow air cargo shipments to be assembled into air cargo containers headed for specific destinations. A similar facility is planned for ONT. According to EDD, there were **25,561 workers** in NAICS 481 second quarter 2005. The quarterly payroll was $308,389,778, an average of $48,259 per worker per year. The sector represented 3.9% of employment in the logistics group and 3.9% of its payroll.

Note: At *3.9%*, Air Transportation is a small part of the logistics group. At that, its logistics jobs and payroll are overestimated as many jobs deal primarily with passenger service, not air cargo traffic. The difficulty in separating them occurs as belly cargo of passenger aircraft is a major part of the air logistics system. The result of not being able to solely focus on air cargo is to give greater weight to the declines in payroll and employment in this portion of logistics group since it is the air passenger activity that has faltered as the airline industry has consolidated.

NAICS 482 Rail Transportation

As discussed, Southern California has two long distance rail lines: Burlington Northern Santa Fe Railway (BNSF) and Union Pacific Railroad (UP). There are two short-haul lines owned by RailAmerica: Ventura County Railroad (Port Hueneme to UP) and San Diego and Imperial Valley Railroad. The two long-haul railroads operate intermodal yards to which trucking firms either bring or pick-up containers that are moving in and out of the Southland by rail. Most of the work handling containers in intermodal yards is outsourced to firms operating within the yards (e.g., Eagle Intermodal Services).

Railroad employment at the county level is not available through EDD. According to the U.S. Railroad Retirement Board, there were **9,023 railroad workers** in the seven Southern California counties in 2004.[22] The average national pay in 2004 was $69,637 according to the U.S. Bureau of Economic Analysis.[23] Given the unionized condition of this labor force, that is likely a good proxy for Southern California pay scales. If it grew at the 3.2% gain in the U.S. Consumer Price Index from 2004-2005, the rate for 2005 would be $71,871. The 2005 annual payroll would thus be $648,491,675 or an average of $162,122,919 per quarter. The sector represented 1.4% of employment in the logistics group and 2.1% of its payroll.

NAICS 483 Water Transportation

These are the shipping lines that operate out of the Ports of Los Angeles and Long Beach (e.g., American President Lines). They are primarily involved in the movement of containers between Southern California and the Far East. Some, however, move cargo up and down the California coast.

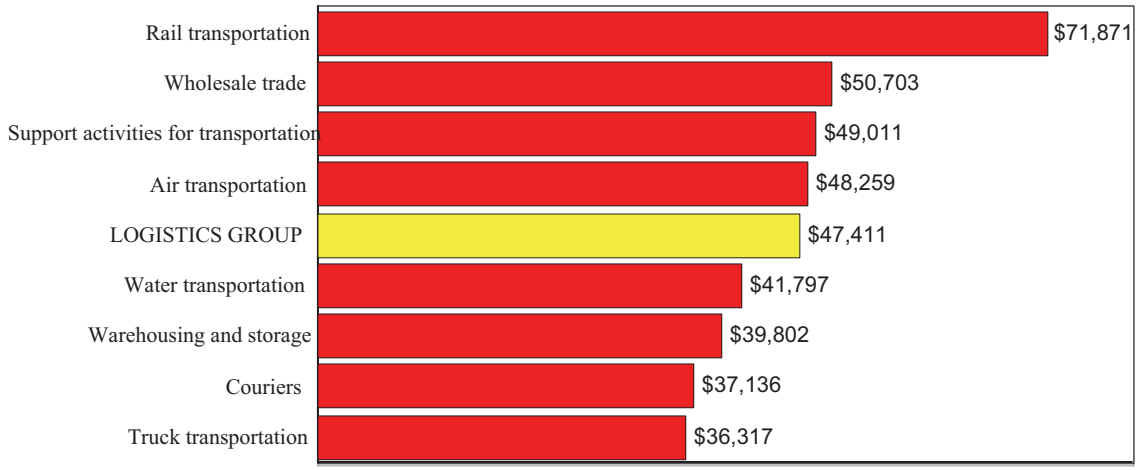
According to EDD, there were **1,876 workers** in NAICS 483 second quarter 2005. The quarterly payroll was $19,602,709 or an average of $41,797 per worker per year. The sector represented 0.3% of employment in the logistics group and 0.2% of its payroll.

Altogether, Southern California's logistics group had **661,850 workers** in second quarter 2005. Quarterly payroll was $7,844,767,794 or an average of $47,411 per worker per year as shown in Exhibit 12.

Logistics: Mean Annual Pay

In the logistics group of sectors, the highest mean annual pay levels were in the small rail transportation sector ($71,871), large wholesale trade ($50,703), and support services sectors ($49,011). The lowest was among truck transportation, including independent drivers ($36,317), couriers ($37,136), and general warehousing and storage ($39,802). The weighted average for the group was **$47,411** as shown in Exhibit 12.

Exhibit 12.-Mean Average Pay Per Worker By Logistics Sector Southern California (7-Counties), 2005

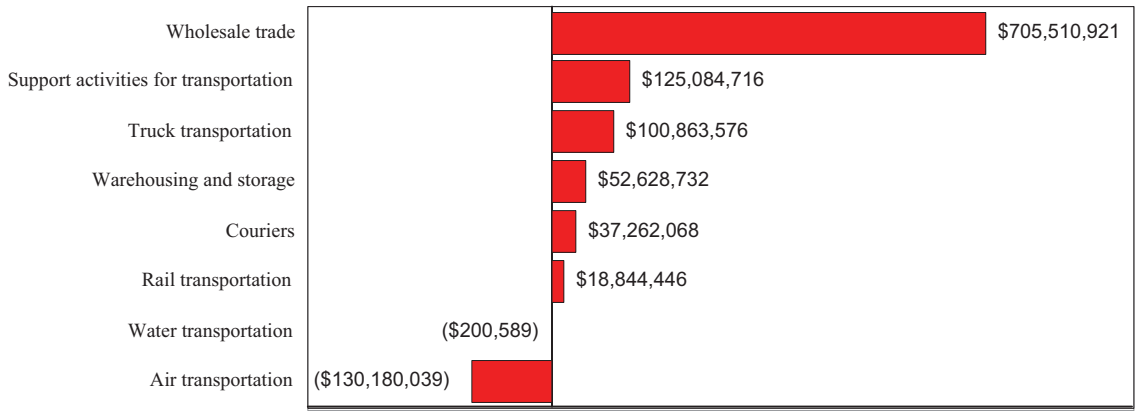


Sources: CA Employment Development Department, U.S. Railroad Retirement Board, U.S. Bureau of Economic Analysis
U.S. Bureau of Economic Analysis, 2002 Economic Census, U.S. Census Bureau

Logistics: Payroll Growth

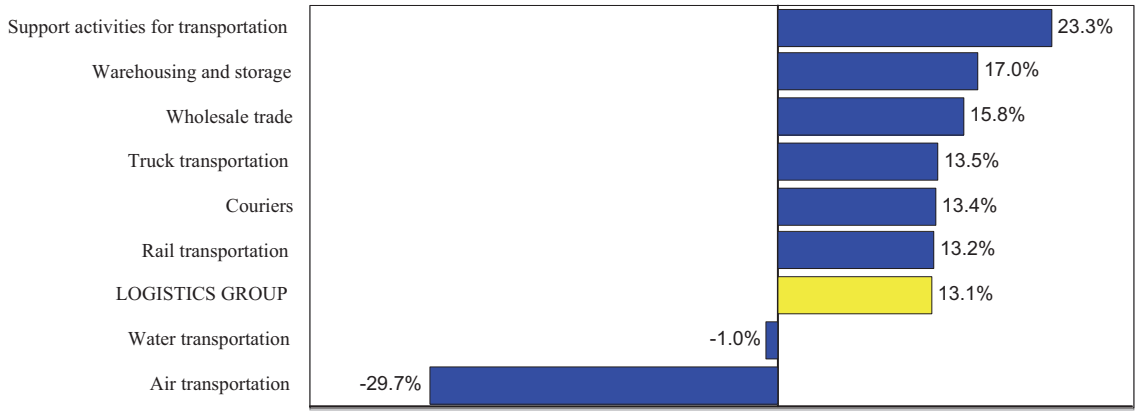
It is instructive to see where changes in payroll within the logistics group have occurred. If the same conventions used above with 2005 information were applied to 2001 data, the results show that the logistics group's total payroll grew from $6.9 billion to $7.8 billion, a gain of roughly $900 million or 13.1%. In that period, the largest gain was in the large wholesale trade sector, which expanded by $705.5 million. The worst performance was in air transportation, which declined $130.2 million due to consolidations in that sector as shown in Exhibit 13.

Exhibit 13.-Change in Payroll by Logistics Sector Southern California (7-Counties), 2001-2005



Sources: CA Employment Development Department, U.S. Railroad Retirement Board, U.S. Bureau of Economic Analysis
U.S. Bureau of Economic Analysis, 2002 Economic Census, U.S. Census Bureau

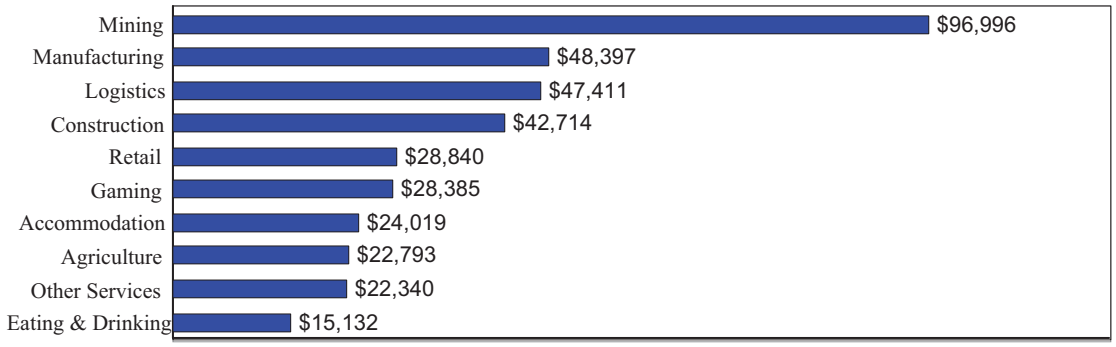
Exhibit 14.-Percent Gain in Payroll by Logistics Sector Southern California (7-Counties), 2001-2005



Sources: CA Employment Development Department, U.S. Railroad Retirement Board, U.S. Bureau of Economic Analysis
U.S. Bureau of Economic Analysis, 2002 Economic Census, U.S. Census Bureau

In calculating payroll growth rates, the decline in air transportation translates into a -29.7% rate, clearly one that inhibited the growth of payroll and average pay scales in the logistics group as shown in Exhibit 14. Meanwhile, the fastest increase was seen in "support activities," up 23.3%. These are the workers performing functions such as running supply chain management systems, undertaking clerical functions in support of the goods movement system, repairing trucks along freeways, lifting containers in intermodal yards, and loading and unloading ships. That sector was followed by the gain in the general warehousing and storage payroll, up 17.0%, and the very large wholesale trade sector, up 15.8%.

Exhibit 15.-Mean Average Pay Per Job Sectors With Few Barriers To Entry Southern California (7-Counties), 2005

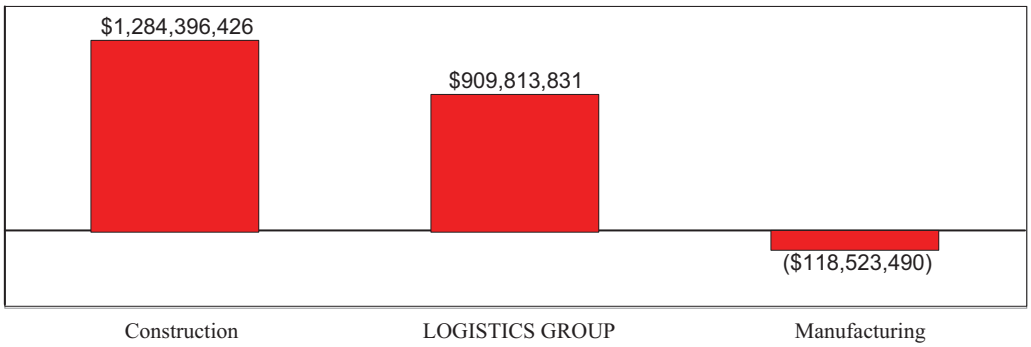


Sources: CA Employ. Develop. Dpt., U.S. RR Retirement Bd, U.S. Bureau of Econ. Analysis
U.S. Bureau of Econ. Analysis, 2002 Econ. Census, U.S. Census Bureau

2.2 Manufacturing

In second quarter 2005, Southern California's seven counties had 917,835 workers employed in the manufacturing sector. The combined quarterly payroll of these firms was $11,105,085,009. The average pay per worker per year was $48,397. At $47,411, the logistics group's average pay was $986 or 2.0% below manufacturing as shown in Exhibit 15.[24] Meanwhile, from 2001-2005, the total manufacturing payroll shrank by -$118,523,490 or -1.2%, while the logistics payroll increased $909,813,831 or 13.1%, as can be derived from Exhibit 16. This occurred in large part because of employment trends in the two sectors as shown in Exhibit 17.

Exhibit 16.-Change in Blue Collar Payrolls Southern California (7-Counties), 2001-2005



Sources: CA Employment Development Department, U.S. Railroad Retirement Board, U.S. Bureau of Economic Analysis
U.S. Bureau of Economic Analysis, 2002 Economic Census, U.S. Census Bureau

Exhibit 17.-Wage & Salary Job Growth, Blue Collar Sectors Southern California (7-Counties), 1990-2005

Source: CA Employment Development Department

Manufacturing Job Trend

Manufacturing wage and salary employment went from 1,279,600 jobs in 1990 down to 918,300 jobs in 2005, a decline of 361,300 positions or -28.2%. The sector has been impacted by the loss of aerospace and defense jobs in the early 1990s, the technology implosion of the late 1990s, and the migration of jobs to Asia and out of California in the 2000s (*see Exhibit 4 page 1-2 for annual job changes to show timing of sector's ebbs and flows*).

Logistics Job Trend

Logistics wage and salary employment went from 551,200 jobs in 1990 up to 654,300 jobs in 2005.[25] That has been a gain of 103,100 or 18.7%, as shown in Exhibit 17. Job growth in the sector has been positively impacted by the advent of just-in-time inventory control, the rise of e-commerce, and the increase in Asian trade. It has been negatively affected by increases in the productivity of facilities and the capacity issues affecting the flow of goods entering Southern California through Los Angeles and Long Beach harbors plus LAX and ONT airports. Job growth has also been inhibited by airline consolidation (*see Exhibit 6 page 1-5 for annual job changes to show timing of sector's ebbs and flows*).

2.3 Construction

In second quarter 2005, Southern California's seven counties had 482,081 wage and salary construction jobs. The combined quarterly payroll in the sector was $5,147,873,747. The average pay per worker per year was $42,714. At $47,411, average pay in the logistics group was $4,697 or 11.0% above the construction sector as shown in Exhibit 15. From 2001-2005, the total construction payroll increased by $1,284,396,426 or 33.2%. That was more than the $909,813,831 increase in the logistics payroll as shown in Exhibit 16. Construction has benefited from strong long-term job growth. From 1990-2005, the sector went from 352,250 to 480,650 jobs, up 128,400 (36.5%). That was faster than the logistics growth of 103,100 jobs (18.7%) as shown in Exhibit 17.

2.4 Other Sectors, Few Education Barriers to Entry

There are a variety of other sectors with limited barriers to workers obtaining jobs in them (Exhibit 15, page 2-6). Two are blue collar: mining ($96,996) pays well but had just 6,655 workers in 2005; agriculture pays modestly ($22,793) and is shrinking with urbanization. The others are service sectors that are growing with the population but pay well below the blue collar group, other than agriculture: retail trade ($28,840), gaming ($28,385), accommodation ($24,019), other services (automotive, household and electric repair and maintenance, personal care, laundry, member associations, household workers) ($22,340), eating and drinking ($15,132).

2.5 Summary

Comparing the logistics group to the manufacturing and construction sectors, as well as to pay in other expanding sectors with limited barriers to entry, results in the following:

Manufacturing and Logistics

Average pay per worker in the logistics sector was $47,411 in 2005, including entrepreneurial truck drivers. That was 2.0% below the manufacturing sector ($48,397). However, the manufacturing sector lost 361,300 jobs from 1990-2005, a decline of 28.2%. In that period, the logistics group added 103,100 jobs or 18.7%. More recently, from 2001-2005, manufacturing's total payroll declined $118,523,490 or -1.2%. During this time, the logistics payroll grew $909,813,821 or 13.1%. In the current decade, the national trend towards the off-shoring of production is hurting the manufacturing sector but aiding the logistics sector.

Construction and Logistics

Average pay per worker in the logistics sector was $47,411 in 2005, including entrepreneurial truck drivers. That was 11.0% above the construction sector ($42,714), though that sector's entrepreneurial, casual and immigrant workers were not studied. Both sectors have seen positive long term job trends. Construction added 128,400 jobs from 1990-2005, up 36.5%. As indicated, the logistics group added 103,100 jobs or 18.7% in that period. In the more recent 2001-2005 period, construction's total payroll grew $1,284,396,426 or 33.2%, while the logistics payroll grew $909,813,821 or 13.1%. Ultimately, the increases occurring in residential and retail construction will impact growth in logistics activity. The added population and consumer spending will increase the volume of goods moving within Southern California. E-commerce deliveries to the expanded base of households will also contribute to this.

Note: The fact that non-wage and salary workers were not included in the construction figures likely meant that this sector's pay was over-estimated as the casual, immigrant and self-employed workers in the sector are most probably paid below the levels of those making wages and salaries. As a result, the logistics groups pay advantage over construction is very likely more than that shown here.

Other Sectors with Few Barriers and Logistics

Except for the small mining sector (*$96,996*), the other sectors that have few barriers for workers to obtain jobs within them offer substantially less pay (*$15,132-$28,840*) than logistics (*$47,411*).

Two other issues with respect to the logistics group of sectors are the extent to which they offer entry-level pay that is well above the minimum wage ($6.75 per hour) as well as opportunities for workers to advance into better-paying positions within the group through on-the-job learning or community college/trade school courses.

3.1 Analytic Procedures

To establish these facts a 10-step process was used:

1. The fundamental data source was the Occupational Employment Statistics (OES) that result from surveys conducted by EDD under contract to Bureau of Labor Statistics (BLS).[26] The most recent data is for 3rd quarter 2005 pay levels. The OES data covers over 500 occupational codes within each of the standard metropolitan areas (SMA) that make up Southern California.[27]
2. For each OES code, in each Southern California area, data were provided on 2004 total employment as well as the 3rd quarter 2005 mean, median, entry-level (mean of the first 1/3 of the wage distribution), and experienced-level (mean of the top 2/3 of the wage distribution).
3. Southern California-wide pay levels were determined by finding the weighted averages of the mean, median, entry-level, and experienced-level pay scales for each occupational code. The weighting for each OES code was based upon the total 2004 employment provided by EDD for each OES code in each county.
4. Industry Staffing Patterns for each of 16 sub-sectors of wholesale trade and each of seven sectors of trucking and warehousing were obtained from EDD.[28] These data show the occupations by OES codes that make up the labor force in each sector of California's economy. One of eight training or educational levels required to work in each OES code is also available (see #6). To allow an estimate of the job pattern within each sub-sector, EDD provides 2002 California employment by OES code within each sub-sector. Using the job pattern (*2005 not available*) implies that the Southern California's firms emulate those for the state and that there was not a significant change in the pattern between 2002 and 2005.
5. Where an OES-coded occupation was shown to exist in one or more of the sectors within the logistics group, the 3rd quarter 2005 Southern California weighted averages for the mean, median, entry-level, and experienced-level pay scales for that OES code were applied to it.

   IMPORTANT NOTE: This process implicitly assumed that firms in each logistics sub-sector must compete for workers in Southern California and thus must pay at least the average mean, median, entry-level, and experienced-level pay for an OES-coded occupation to obtain them. This assumption requires a cross-check on the final outcome of the process to determine if the average pay levels for all workers in an OES code overestimate or underestimate OES pay levels within the logistics group of sectors (see #8 below).

6. As indicated in #4, EDD divides the OES codes into the eleven levels of education and/or length of on-the-job training defined by BLS.[29] Eight apply to logistics:
   - **Bachelor's degree or higher and some work experience.** These occupations generally require work experience in an occupation requiring a bachelor's or higher degree. Most occupations in this category are managerial occupations that require work experience in a related non-managerial occupation.
   - **Bachelor's degree.** These occupations require the completion of at least four but not more than five years of full-time academic study beyond high school resulting in a bachelor's degree.
   - **Associate's degree.** These occupations require the completion of at least two years of full-time academic study beyond high school.
   - **Post-secondary vocational education.** These occupations require completion of vocational school training.
   - **Long-term on-the-job-training.** These occupations require more than 12-months of on-the-job training or combined work experience and formal classroom instruction for workers to develop the skills needed for average job performance.
   - **Moderate-term on-the-job-training.** In these occupations, workers can develop average job performance after 1-12 months of combined on-the-job experience and informal training.
   - **Work experience.** These occupations require skills obtained through work experience in a related occupation.
   - **Short-term on-the-job-training. In these** occupations, workers can develop skills needed after a short demonstration or up to one month of on-the-job experience and instruction.

   These levels were used to build skill ladders for the logistics sector.[30] To do so, the weighted average of mean, median, entry-level, and experienced-level pay for those OES codes that fall into each of the eight levels of education and training, within each of the sub-sectors, were derived. Here, the weighting was the 2002 California employment level for the OES code in the sub-sector as provided by EDD (*2005 not provided*).

7. To consolidate the skill ladder across the full group of 16 wholesale trade sub-sectors, and, separately, for the full group of seven transportation and warehousing sectors, weighted average pay levels across the sectors in these two groups were derived for each education/training level. Here, the weighting was also based upon the 2002 California employment within the eight educational levels inside each sector. This final calculation provides a picture of the overall ability of someone in these two broad portions of the economy to migrate up the job ladder via more on-the-job training or education.

8. A cross-check on the outcome of this process was available by looking at the overall mean pay levels that emerged from this process. For instance, for the wholesale trade group, the mean pay level that emerged was **$44,326,** as shown in Exhibit 18 below. However, using the 3rd quarter 2005 ES 202 payroll for all of wholesale trade and dividing it by the total number of workers in the sector, the actual figure was **$50,703,** as shown in Exhibit 12 above, a result 14.4% higher than the level derived here. Similarly, for transportation and warehousing jobs, the mean pay using the methodology here was **$36,093,** as shown in Exhibit 22 below. However, the ES 202 data[31]

showed the actual figure to be **$40,556** or 12.4% higher. This difference could come from two sources:

- It could mean that the goods movement sectors actually pay more than the OES pay levels assumed here. This would be the case since the pay levels used here are averages for OES occupations in the full Southern California economy, not just logistics.
- It could mean that the 2002 California distribution of jobs by OES code derived by the EDD's survey of 113,000 establishments was biased to the lower side of the pay scale compared to the actual pattern in Southern California.

Given the size of EDD's sample, and the fact that the logistics industry's technologies and forms are the result of national, not local economic forces, the first explanations appears to be the more likely. That result would mean that workers in the logistics sectors are, on average, paid better than equally skilled workers throughout the economy. Recent work on entry-level logistics jobs in San Bernardino County have documented this fact.[32]

9. A second way to look at skill ladders is functionally. This is the case as there is more than one track up which people can move to higher levels of responsibility and income. To allow a look into this fact, the OES codes were classified by this analyst as being part of one of six functional groups within logistics portion of the economy:
   - **Warehousing, Field, or Maintenance Operations**. The OES codes for occupations in this group were those largely involving non-office jobs conducted at a fixed site such as a warehouse facility.
   - **Trucking Operations.** These OES codes involve moving goods or maintaining vehicles needed to do so.
   - **Administrative & Administrative Support.** These are the OES codes for general management as well as such white collar functions as clerical and inventory control.
   - **Sales, Marketing, and Customer Support.** These are the OES codes for jobs involved in merchandising goods and performing such customer support functions as tracking goods and undoing problems as they arise in the often lengthy supply chain.
   - **Craft or Repair Positions.** These are the OES codes for skilled craftsmen and equipment repairers as well as those in skilled jobs who produce goods.
   - **Finance & Information Systems.** These are the OES codes for those undertaking various financial or information functions.

   Using procedures similar to those described above, the weighted average of mean, median, entry-level, and experienced-level pay for those OES codes that fall into each of the six functional groups were derived. Here, again, the weighting was the 2002 California employment level for the OES code in the sub-sector as provided by EDD.

10. For the full array of wholesale trade sub-sectors, and, separately, transportation and warehousing sectors, weighted average pay levels were derived for each of the six functional groups. Here, the weighting was again based upon the California 2002 employment within each group inside each

sector. This calculation provides a picture of the strength of pay within each function performed within each portion of the logistics economy.

3.2 Wholesale Trade (*2005: 407,771 Jobs*)

As indicated, in 3rd Quarter 2005, the ES 202 data showed that the wholesale trade sector had a mean annual income of $50,703 for its 407,771 jobs, as shown in Exhibits 11 and 12. Using Southern California average pay scales for the many OES job categories that EDD identifies as part of the sector, the methodology used here derived a mean of $44,326, as shown in Exhibit 18. The actual pay scales in the sector were thus 14.4% above the calculated mean, based upon all wage and salary workers in each OES category. The conclusion (please refer to section 5.3.1, step #8) is that the earnings estimates used in this analysis are likely conservative ones.

Job Ladders by Experience and/or Education

Given that caveat, EDD's data reveals the following experience and/or education skill ladder profile of wholesale trade for the 86.3% of the sector's workers who require either no formal training after high school (80.6%) or completion of either community college or trade school (5.7%) for their jobs:

Short Term On-the-Job Training (43.9% of Wholesale Trade Jobs)

In 3rd quarter 2005, those workers who came to the wholesale trade group of sectors and developed skills requiring only a short demonstration or up to one month of on-the-job experience and instruction earned a median income of $11.65 per hour or $24,236 per year. The mean for employees at this level of training was $12.79 or $26,597 per year. Workers whom EDD defines as experienced (mean of the top 2/3 of the wage distribution) earned $14.71 or $30,593 per year. At the low end, workers entered the sector at $8.91 per hour or $18,542 per year. That rate was $2.16 per hour or 32.1% above the minimum wage ($6.75).

Note: Truck drivers fall within this group. To further identify facts about this important group, regardless of whether they are in logistics or other sectors, OES data for the seven counties for pay levels and 2004 employment levels for OES 533032 Truck Drivers, Heavy and Tractor Trailer and OES 533033 Truck Drivers, Light or Delivery Services were reviewed. It was found that there were 130,850 truck drivers across all sectors in 2004. The median pay for Truck Drivers, Heavy and Tractor Trailer was $36,919 putting them well above the $24,236 median for all workers with short term on-the-job training. It was $23,711 for Truck Drivers, Light or Delivery putting them just below the median for all workers in this category.

Exhibit 18.-Wholesale Trade, Pay By Experience/Education, Southern California, 3rd Quarter 2005

	Share	Median		Mean		Experienced		Entry	
Work Experience & Bachelor's or Higher	7.5%	$44.14	$91,803	$50.11	$104,236	$60.69	$126,230	$27.61	$57,421
Bachelor's Degree	6.3%	$27.87	$57,975	$29.79	$61,968	$35.20	$73,226	$18.96	$39,434
Post-Secondary Vocational Education	4.7%	$19.85	$41,279	$21.16	$44,014	$24.89	$51,763	$13.56	$28,209
Associate's Degree	1.2%	$21.05	$43,781	$23.60	$49,082	$28.22	$58,702	$14.07	$29,274
Long-Term On-the-Job Training	4.5%	$27.80	$57,829	$30.76	$63,983	$37.54	$78,081	$16.90	$35,158
Moderate-Term On-the-Job Training	5.6%	$21.49	$44,694	$23.34	$48,556	$27.77	$57,758	$14.43	$30,023
Work Experience Related Occupation	26.3%	$20.37	$42,377	$23.19	$48,230	$28.32	$58,904	$12.92	$26,880
Short-Term On-the-Job Training	43.9%	$11.65	$24,236	$12.79	$26,597	$14.71	$30,593	$8.91	$18,542
Wholesale Trade Sector	100.0%	$19.17	$39,882	$21.31	$44,326	$25.42	$52,874	$12.95	$26,932
No Schooling after High School	80.6%	$15.67	$32,590	$17.41	$36,219	$20.66	$42,980	$10.88	$22,634
Trade or Community College	5.7%	$26.43	$54,971	$29.30	$60,951	$35.64	$74,137	$16.33	$33,960
Bachelor's or More	13.7%	$36.72	$76,382	$40.85	$84,968	$49.07	$102,067	$23.66	$49,221

Source: CA Employment Development Department, Occupational Employment Survey, 3rd Quarter 2005; Industry Staffing Patterns, 2005 (*see Appendix A for OES Codes in each educational group by sector*)

Note: These figures do not include any allowance for the apparent 14.4% differential between pay in the wholesale trade sector and pay in the same OES codes for Southern California's economy as a whole. **For instance, at that differential, the lowest entry level rate of $8.91 per hour would be $10.20 per hour or $21,210 per year (*see footnote 31 documenting this fact in San Bernardino County*).**

In any case, it is possible for essentially unskilled workers to earn a modest living even if they do not progress beyond the entry level jobs in the wholesale trade sector. Examples of these occupations include:

- Laborers and Freight, Stock, and Material Movers, Hand Operations
- Customer Service Representatives
- Shipping, Receiving, and Traffic Clerks
- Truck Drivers, Heavy and Tractor-Trailer
- Industrial Truck and Tractor Operators
- Packers and Packagers, Hand Operations
- Team Assemblers
- Office Clerks, General
- Order Clerks
- Stock Clerks and Order Fillers

Work Experience (26.3% of Wholesale Trade Jobs)

Those workers who came to the wholesale trade group of sectors with skills obtained through work experience in a related occupation or who move into such positions through their experience within the sector earned a median income of $20.37 per hour or $42,377 per year in 3rd quarter 2005. The mean for employees at this level was $23.19 or $48,230. Workers whom EDD defines as experienced earned $28.32 per hour or $58,904 per year. People just entering these occupations earned $12.92 per hour or $26,880 per year.

Many of the occupational codes in this category represent the first rung of management. The positions are thus occupied by people who have come up through the ranks. Samples of the relevant jobs include:

- First-Line Supervisors/Managers of Transportation
- First-Line Supervisors/Managers of Mechanics, Installation
- First-Line Supervisors/Managers of Production/Operation
- First-Line Supervisors/Managers of Helpers, Laborers
- Inspectors, Testers, Sorters, Samplers, and Weighers
- Cost Estimators
- Managers, All Other

Moderate Term On-the-Job Training (5.6% of Wholesale Trade Jobs)

Those workers who enter wholesale trade occupations in which workers can develop average job performance after 1-12 months of combined on-the-job experience and informal training earned a median income of $21.49 per hour or $44,694 per year in 3rd quarter 2005. The mean for workers at this level was $23.34 or $48,556. Employees whom EDD defines as experienced earned $27.77 per hour or $57,758 per year. People just entering these occupations earned $14.43 per hour or $30,023 per year.

Many of the occupational codes in this category represent positions that require increased responsibility and/or specific skills. Often they require knowledge of the industry that can be acquired on the job. In some cases, their function is to represent the firm with customers. This function includes sales as well as trouble shooting the supply chain when it fails to deliver goods in a timely fashion. Examples include:

- Sales Representatives, Wholesale and Manufacturing
- First-Line Supervisors/Managers of Office and Administrative
- Dispatchers, except Police, Fire, and Ambulance
- Conveyor Operators and Tenders
- Crane and Tower Operators
- Bookkeeping, Accounting, and Auditing Clerks
- Executive Secretaries and Administrative Assistants
- Packaging and Filling Machine Operators and Tenders
- Painters, Transportation Equipment

Long Term On-the-Job Training (4.5% of Wholesale Trade Jobs)

Those workers who enter wholesale trade occupations that require more than 12 months of on-the-job training or combined work experience and formal classroom instruction to develop the skills needed for average job performance earned a median income of $27.80 per hour or $57,829 per year in 3rd quarter 2005. The mean for workers at this level was $30.76 or $63,983. Workers whom EDD defines as experienced earned $37.54 per hour or $78,081 per year. Those workers just entering these occupations earned $16.90 per hour or $35,158 per year.
Many of the occupational codes in this category represent people who must keep warehouse and transportation equipment operational and repair it when necessary. Examples are:

- Maintenance and Repair Workers, General
- Machinists
- Bus and Truck Mechanics and Diesel Engine Specialists
- Heating, Air Conditioning, and Refrigeration Mechanics
- Mobile Heavy Equipment Mechanics, except Engines
- Maintenance Workers, Machinery
- Chemical Equipment Operators and Tenders
- Outdoor Power Equipment and Other Small Engine Mechanics
- Precision Instrument and Equipment Repairers, Other

Associate of Arts or Post-Secondary Technical Education (5.7% of Wholesale Trade Jobs)

Employees who enter wholesale trade occupations that require the completion of at least 2 years of full-time academic study beyond high school <u>or</u> completion of vocational school training earned a median income of $26.43 per hour or $54,971 per year in 3rd quarter 2005. The mean for workers at this level was $29.30 or $60,951. Workers whom EDD defines as experienced earned $35.64 per hour or $74,137 per year. People just entering these occupations earned $16.33 per hour or $33,960 per year as derived from combined data for Trade and Community College categories in Exhibit 18.

Many of the occupational codes in this category represent people who perform skilled white or blue work within the sector. Examples include:

- Graphic Designers
- Market Research Analysts
- Public Relations Specialists
- Technical Writers
- Chemical Technicians
- All Other drafters, Engineering, and Mapping Technology
- Sales Representatives, Wholesale and Manufacturing
- Electric Motor, Power Tool, and Related Repairers
- Printing Machine Operators

Job Ladders by Functional Group

A second way to classify EDD's OES data is according to the functions performed within the sector. Doing so allows a look at average pay levels that workers can achieve if they stay within these functional groups, as shown in Exhibit 19.

Exhibit 19.-Wholesale Trade, Pay By Functional Group, Southern California, 3rd Quarter 2005

Functional Group	2002 Jobs	Median		Mean		Experienced		Entry	
Fixed Site Operations	30.3%	$15.60	$32,446	$17.47	$36,342	$20.61	$42,867	$11.12	$23,131
Trucking or Field Operations	9.1%	$14.87	$30,938	$15.85	$32,958	$18.40	$38,262	$10.75	$22,361
Administration & Admin. Support	16.9%	$19.19	$39,910	$21.01	$43,704	$24.48	$50,918	$13.42	$27,918
Sales & Customer Support	27.6%	$23.17	$48,196	$26.79	$55,717	$33.07	$68,795	$14.16	$29,461
Craft & Repair	6.4%	$19.60	$40,762	$20.30	$42,223	$23.46	$48,800	$13.88	$28,866
Finance & Information	9.6%	$22.74	$47,307	$24.07	$50,060	$28.22	$58,702	$15.86	$32,980
Wholesale Trade Sector	100.0%	$19.17	$39,882	$21.31	$44,326	$25.42	$52,874	$12.95	$26,932

Source: CA Employment Development Department, Occupational Employment Survey, 3rd Quarter 2005; Industry Staffing Patterns, 2005 (*see Appendix A for OES Codes in each functional group by sector*)

Fixed Site Operations (30.3% of Wholesale Trade Jobs)

Those workers who are in OES codes for occupations involving non-office jobs conducted at a fixed site in wholesale trade earned a median income of $15.60 per hour or $32,446 per year in 3rd quarter 2005. The mean for workers at this level was $17.47 or $36,342. Employees whom EDD defines as experienced earned $20.61 per hour or $42,867 per year. People just entering these occupations earned $11.12 per hour or $23,131 per year.

The occupational codes in this category represent people who handle, inspect, track, and inventory inside wholesale goods facilities. It also includes support personnel like maintenance, janitorial, and security people, plus operations managers. Examples include:

- Laborers and Freight, Stock and Material Movers, Hand
- General and Operations Managers
- Stock Clerks and Order Fillers
- Packers and Packagers, Hand
- Maintenance and Repair Workers, General
- Janitors and Cleaners, except Maids and Housekeeping
- Shipping, Receiving, and Traffic Clerks
- First-Line Supervisors/Managers of Production/Operation
- Inspectors, Testers, Sorters, Samplers, and Weighers
- Production, Planning, and Expediting Clerks

Trucking Operations (9.1% of Wholesale Trade Jobs)

Those workers who are in OES codes for wholesale trade occupations involving moving goods, maintaining vehicles, or managing these functions earned a median income of $14.87 per hour or $30,938 per year in 3rd quarter 2005. The mean for employees at this level was $15.85 or $32,958. Workers whom EDD defines as experienced earned $18.40 per hour or $38,262 per year. People just entering these occupations earned $10.75 per hour or $22,361 per year.

The occupational codes in this category represent people who handle, inspect, track, inventory inside wholesale goods facilities. It also includes support personnel like maintenance, janitorial, and security people plus operations managers. Examples include:

- Truck Drivers, Heavy and Tractor-Trailer
- Truck Drivers, Light or Delivery Services
- Industrial Truck and Tractor Operators
- First-Line Supervisors/Managers of Transportation
- Automotive Service Technicians and Mechanics
- Cleaners of Vehicles and Equipment
- Bus and Truck Mechanics and Diesel Engine Specialists
- Automotive Body and Related Repairers
- Motor Vehicle Operators, All Other
- Painters, Transportation Equipment

Administration and Administrative Support (16.9% of Wholesale Trade Jobs)

Those workers who are in OES codes for wholesale trade occupations involving general management as well as white collar functions like clerical and inventory control earned a median income of $19.19 per hour or $39,910 per year in 3rd quarter 2005. The mean for employees at this level was $21.01 or $43,704. Workers whom EDD defines as experienced earned $24.48 per hour or $50,918 per year. People just entering these occupations earned $13.42 per hour or $27,918 per year. The pay levels in this group are impacted by a disproportionate number of positions requiring college degrees.

The occupational codes in this category represent the senior managers of wholesale operations, plus the people directly supporting them, as well as people involved in clerical functions involving tasks such as purchasing and inventory control. Examples include:

- Office Clerks, General
- Cashiers
- Order Clerks
- File Clerks
- Executive Secretaries and Administrative Assistants
- First-Line Supervisors/Managers of Office and Administration
- Chief Executives

- Purchasing Agents, excluding Wholesale, Retail, and Farm
- Receptionists and Information Clerks
- Secretaries, except Legal, Medical, and Executive
- Wholesale and Retail Buyers, except Farm Products

Sales and Customer Support (27.6% of Wholesale Trade Jobs)

Those workers in wholesale trade OES codes involved in merchandising goods and performing customer support functions like tracking goods and undoing supply chain problems earned a median income of $23.17 per hour or $48,196 per year in 3rd quarter 2005. The mean for people at this level was $26.79 or $55,717. Employees whom EDD defines as experienced earned $33.07 per hour or $68,795 per year. Those workers just entering these occupations earned $14.16 per hour or $29,461 per year. Workers at most levels of the sales and customer service function earn higher incomes than others with similar education or experience.

The occupational codes in this category represent every level of the sales or customer support function. These individuals maintain contact with customers both to sell products/services to them and solve supply chain problems for them. The latter is becoming an increasingly important function due to the length of the supply chain, which for Southern California-based operations often extends from Asia to the East Coast. Examples include:

- Sales Representatives, Wholesale and Manufacturing, Not Scientific or Technical
- Sales Representatives, Wholesale and Manufacturing, Scientific or Technical
- Customer Service Representatives
- Telemarketers
- Driver/Sales Workers
- First-Line Supervisors/Managers of Retail Sales Work
- Sales Managers
- Marketing Managers

Craft and Repair (6.4% of Wholesale Trade Jobs)

Those employed in wholesale trade OES codes who are craftsmen and equipment repairers or those in skilled positions producing goods earned a median income of $19.60 per hour or $40,762 per year in 3rd quarter 2005. The mean for workers at this level was $20.30 or $42,223. People whom EDD defines as experienced earned $23.46 per hour or $48,800 per year. Those workers just entering these occupations earned $13.88 per hour or $28,866 per year.

The occupational codes in this category mostly represent skilled positions for which workers have had to complete formal training beyond high school at either a trade school or a community college. A few positions requiring 4-year degrees are also included:

- Machinists

- Welders, Cutters, Solderers, and Brazers
- First-Line Supervisors/Managers of Mechanics, Installers, and Repairers
- Carpenters
- Electricians
- Electrical and Electronic Engineering Technicians
- Printing Machine Operators
- Electrical and Electronic Equipment Assemblers
- Engineers, All Other
- Engineering Managers

Finance and Information (9.6% of Wholesale Trade Jobs)

Those workers in wholesale trade OES codes who undertake various levels of financial or information functions earned a median income of $22.74 per hour or $47,307 per year in 3rd quarter 2005. The mean for employees at this level was $24.07 or $50,060. Workers whom EDD defines as experienced earned $28.22 per hour or $58,702 per year. People just entering these occupations earned $15.86 per hour or $32,980 per year.

The occupational codes in this category involve people who handle the books of the operation as well as maintaining and adapting its information systems. The second function has become crucial in modern logistics facilities due to their heavy dependence on information technology to increase the speed, reliability, and efficiency of their operations:

- Bookkeeping, Accounting, and Auditing Clerks
- Payroll and Timekeeping Clerks
- Billing and Posting Clerks and Machine Operators
- Accountants and Auditors
- Financial Managers
- Computer Support Specialists
- Computer Systems Analysts
- Computer Programmers
- Computer Software Engineers
- Network and Computer Systems Administrators

Exhibit 20.-Median Pay by Functional Group by Wholesale Trade Sub-Sectors Southern California, 3rd Quarter 2005

Wholesale Sub-Sector	Fixed Site Operations	Trucking Operations	Administration & Admin. Support	Sales & Customer Support	Craft & Repair	Finance & Information	Total
Electric	$39,378	$27,092	$42,208	$55,411	$54,909	$50,754	$47,660
Commercial	$35,076	$29,165	$42,488	$54,720	$54,376	$53,691	$46,550
Agents & Brokers	$29,298	$30,698	$40,627	$49,926	$54,029	$45,648	$42,618
Motor Vehicle	$35,792	$29,075	$43,246	$41,704	$46,465	$45,566	$38,529
Machinery	$40,558	$31,611	$36,397	$48,874	$43,308	$42,982	$42,382
Chemical	$38,690	$32,163	$39,023	$53,201	$47,768	$44,242	$42,284
Alcohol	$37,439	$32,188	$43,828	$47,480	NA	$53,684	$41,675
Wholesale Trade	$32,446	$30,938	$39,910	$48,196	$40,762	$47,307	$39,882
Plumbing	$33,366	$29,315	$36,454	$48,338	$42,455	$40,280	$39,085
Paper	$36,099	$30,850	$36,507	$44,697	$32,385	$38,621	$38,755
Metals & Minerals	$36,944	$32,823	$43,078	$48,825	$30,633	$42,581	$38,487
Lumber	$32,700	$32,682	$42,693	$51,884	$32,668	$40,998	$37,974
Apparel	$32,550	$26,813	$38,064	$46,670	$25,006	$43,800	$36,819
Misc. Non-Durable	$28,528	$30,534	$35,965	$44,190	$30,010	$44,621	$35,403
Misc. Durable	$27,541	$32,569	$38,053	$46,860	$36,325	$46,090	$34,924
Furniture	$29,001	$32,427	$35,570	$47,137	$24,042	$38,726	$34,675
Grocery	$28,534	$31,457	$39,262	$38,328	$22,948	$42,813	$32,836

Source: CA Employment Development Department, Occupational Employment Survey, 3rd Quarter 2005; Industry Staffing Patterns, 2005 (see *Appendix A for OES Codes in each functional group by sector*)
NOTE: Highest & Lowest Pay shaded for each functional group

Median Pay by Wholesale Sub-Sector and Functional Group

Exhibit 19 shows the median pay by wholesale sub-sector and functional group. Another way to view the OES data is to break it down by functional group for each of the 16 sub-sectors of wholesale trade as shown in Exhibit 20. To do this, median pay scales were used, as they have the advantage of not being pulled to the high side by disproportionately high-paying jobs:

Overall Median Pay

Overall, the highest total median pay was in the electrical goods wholesale sector ($47,660; $22.91 per hour). The lowest was in grocery wholesaling ($32,836; $15.79 per hour). These contrasted with a median for the entire group of 16 sectors of $39,882 or $19.17 per hour.

Fixed Site

The highest median pay for fixed site functions was in machinery wholesaling ($40,558; $19.50 per hour). The lowest was in miscellaneous durable wholesaling ($27,541; $13.24 per hour). The overall median was $32,446 ($15.60 per hour).

Trucking Operations

The highest median pay for the trucking function was in the metals and minerals wholesaling ($32,823; $15.78 per hour). The lowest was in apparel wholesaling ($26,813; $12.89 per hour). The overall median was $30,938 ($14.87 per hour).

Administration and Administrative Support Operations

The highest median pay for the administrative function was among the alcohol wholesale sector ($43,828; $21.07 per hour). The lowest was in furniture wholesaling ($35,570; $17.10 per hour). The overall median was $39,910 or $19.19 per hour.

Sales and Customer Support

The highest median pay for the sales and customer support function was in the electrical goods wholesale sector ($55,411; $26.64 per hour). The lowest was in grocery wholesaling ($38,328; $18.43 per hour). The overall median was $48,196 or $23.17 per hour.

Craft and Repair

The highest median pay for the craft and repair function was in the electrical goods wholesale sector ($54,909; $26.40 per hour). The lowest was in grocery wholesaling ($22,948; $11.03 per hour). The overall median was $40,762 ($19.60 per hour).

Finance and Information

The highest median pay for the finance and information functions was in the commercial wholesale sector ($53,691; $25.81 per hour). The lowest was in paper wholesaling ($38,621; $18.57 per hour). The overall median was $47,307 or $22.74 per hour.

Wholesale Trade Summary

On the question of whether the logistics group of sectors can deliver entry-level pay scales well above the minimum wage to workers without formal educations, the data indicates the answer is “yes” with regards to the wholesale trade group. Some 43.9% of jobs in the sector require “short-term on-the-job training.” Entry level pay of $8.91 ($18,542) is 32.1% above the $6.75 minimum wage in California. These figures make no allowance for the 14.4% differential between pay in the wholesale sector and pay for the same OES codes

for Southern California's economy as a whole. Meanwhile, the median pay in this group was $11.65 per hour ($24,236), and experienced pay was $14.71 per hour ($30,593).

It was further shown that there are both educational and functional skill ladders up which workers in the field can move to higher incomes. In the wholesale sector, 80.6% of the jobs require no advanced schooling and another 5.7% require either trade or community college training. Finally, the differences between the various sub-sectors were shown, with median pay levels in the vast majority of cases over $30,000 per year.

3.3 Transportation and Warehousing (*2005: 254,079 Jobs*)

Earlier, data were presented on 3rd Quarter 2005 employment and mean pay levels for the 254,079 jobs in Southern California's various transportation and warehousing sectors, using ES 202 data (Exhibits 11-12). For the full region, the mean pay scales for the OES job categories that EDD identifies within these sectors, the methodology used here derived weighted average mean pay scales as shown in Exhibit 21, column #1. These are shown along with the actual 2005 mean pay levels derived from ES 202 data as shown in column #2. Again, the early ES 202 data show that actual pay in these sectors is generally higher than that estimated using OES job categories and job levels. As discussed earlier (Section 3.1 Analytic Procedures #8), this is very likely because mean pay for the OES occupations in the logistics group tends to be more than mean pay for the same positions in all of Southern California:

Exhibit 21.-Mean Pay, Transportation & Warehousing Sectors OES-Generated vs. ES 202, Southern California, 3rd Qrtr. 2005

Sector	Mean Pay Using OES Pay Levels	ES 202 For Sector	Difference	ES 202 Advantage
Rail Transportation	$49,128	$71,871	NA	NA
Sea Transportation	$43,987	$41,797	($2,190)	-5.0%
Air Transportation	$41,979	$48,259	$6,280	15.0%
All Support Functions	$41,225	$49,011	$7,786	18.9%
Truck Transportation	$36,890	$38,827	$1,937	5.2%
Transportation & Warehousing	$36,093	$40,556	$4,463	12.4%
Warehousing	$33,580	$39,802	$6,222	18.5%
Courier	$31,184	$37,136	$5,952	19.1%

(1) Short-haul only. Rail not included in transportation & warehousing to allow comparison
Source: CA Employment Development Department, Occupational Employment Survey, 3rd Quarter 2005; Industry Staffing Patterns, 2005

- **Truck transportation** (93,294 jobs). The mean based upon area-wide OES pay levels for jobs in this sector was $36,890 per year. The ES 202 showed that actual mean pay was $38,727 per year. That was $1,937 per year or 5.2% higher.

- **Support activities** (53,986 jobs). These are workers in firms supporting trucking (road repair), railroad (cranes), air cargo (load/unload), and ocean-shipping (stevedores) lines, plus workers in independent supply chain management firms. The mean pay for jobs in the sector, based upon Southern California-wide OES pay levels, was $41,225 per year. The ES 202 showed an actual mean pay level of $49,011 per year. That was $7,786 per year or 18.9% higher.

- **Warehousing** (36,425 jobs). The mean based upon Southern California-wide OES pay levels for jobs in the sector was $33,580 per year. The ES 202 showed an actual mean pay level of $39,802 per year. That was $6,222 per year or 18.5% higher.

- **Couriers** (33,914 jobs). The mean based upon Southern California-wide OES pay levels for jobs in the sector was $31,184 per year. The ES 202 showed an actual mean pay level of $37,136 per year. That was $5,952 per year or 19.1% higher.

- **Air transportation** (25,561 jobs). The mean based upon Southern California-wide OES pay levels for jobs in the sector was $41,979 per year. The ES 202 showed an actual mean pay level of $48,259 per year. That was $6,280 per year or 15.0% higher.

- **Sea transportation** (1,876 jobs). The mean based upon Southern California-wide OES pay levels for jobs in the sector was $43,987 per year. The ES 202 showed an actual mean pay level of $41,797 per year. This small group was the only case where the OES methodology yielded a higher pay than the actual figure from the ES 202 data. The ES 202 figure was $2,190 less per year or 5.0% lower.

- **Rail transportation** (9,023 jobs). The mean based upon Southern California-wide OES pay levels for jobs in the sector was $49,128 per year. The actual mean pay level from data supplied by the Railroad Retirement Board was $71,871 per year. However, the second figure includes long-haul railroad workers while the first does not. For that reason, the two sets of information are not comparable.

- **Transportation & Warehousing Group.** For the full group of transportation and warehousing sectors (railroad excluded due to data incompatibility), the mean based upon Southern California-wide OES pay levels for jobs in the group was $36,093 per year. The ES 202 showed an actual mean pay level of $40,556 per year. The ES 202 figure was $4,463 per year or 12.4% higher.

Job Ladders by Experience and/or Education

Given that caveat, EDD's data reveals the following experience and/or education skill ladder profile of transportation and warehousing sectors for the 93.9% of the sector's workers who require either no formal training after high school (92.9%) or completion of either community college or trade school (1.0%) for their jobs, as shown in Exhibit 22.

Short Term On-the-Job Training (74.0% of Transportation & Warehousing Jobs)

In 3rd quarter 2005, those workers who came to the transportation and warehousing group of sectors and developed skills requiring only a short demonstration or up to one month of on-the-job experience and instruction earned a median income of $13.56 per hour or $28,209 per year. The mean for people at this level of training was $14.49 or $30,146 per year. Workers whom EDD defines as experienced (mean of the top 2/3 of the wage distribution) earn $16.62 or $34,579 per year. At the low-end, employees entered the sector at $10.17 per hour. That rate was $3.42 per hour or 50.6% above the minimum wage ($6.75).

Exhibit 22.-Transportation & Warehousing, Pay By Experience/Education
Southern California, 3rd Quarter 2005

	Share	Median		Mean		Experienced		Entry	
Work Experience & Bachelor's Degree or Higher	4.4%	$41.13	$85,547	$45.50	$94,638	$54.96	$114,324	$25.41	$52,850
Bachelor's Degree	1.6%	$25.04	$52,074	$26.28	$54,666	$30.20	$62,821	$18.20	$37,857
Work Experience	4.9%	$22.35	$46,488	$23.85	$49,604	$28.23	$58,717	$15.09	$31,386
Associate's Degree	0.0%	$0.00	NA	$0.00	NA	$0.00	NA	$0.00	NA
Post-Secondary Vocational Education	1.0%	$17.25	$35,880	$17.81	$37,054	$20.38	$42,384	$12.69	$26,403
Long-Term On-the-Job Training	4.2%	$20.25	$42,126	$23.92	$49,762	$28.09	$58,426	$15.61	$32,466
Moderate-Term On-the-Job Training	9.8%	$17.74	$36,897	$19.04	$39,607	$22.42	$46,639	$12.28	$25,547
Short-Term On-the-Job Training	74.0%	$13.56	$28,209	$14.49	$30,146	$16.62	$34,579	$10.17	$21,146
Transportation & Warehousing Sector	100.0%	$16.13	$33,560	$17.40	$36,189	$20.21	$42,031	$11.68	$24,291
No Schooling After High School	92.9%	$14.77	$30,716	$15.89	$33,052	$18.36	$38,196	$10.89	$22,659
Trade or Community College	1.1%	$17.25	$35,880	$17.81	$37,054	$20.38	$42,384	$12.69	$26,403
Bachelor's Or More	6.1%	$36.78	$76,506	$40.31	$83,841	$48.28	$100,412	$23.46	$48,800

Source: CA Employment Development Department, Occupational Employment Survey, 3rd Quarter 2005; Industry Staffing Patterns, 2005 (*see Appendix A for OES Codes in each educational group by sector*)
Note: These figures do not include any allowance for the apparent 12.4% differential between pay in the transportation and warehousing group of sectors and pay in the same OES codes for Southern California's economy as a whole. For instance, at that differential, the lowest entry level rate of $8.91 per hour would be $11.42 per hour.

In any case, it is possible for essentially unskilled workers to earn a modest living even if they do not progress beyond the entry level jobs in the Wholesale Trade sector. Examples of these occupations include:

- Truck Drivers, Heavy and Tractor-Trailer
- Truck Drivers, Light or Delivery Services

- Tank Car, Truck, and Ship Loaders
- Laborers and Freight, Stock, and Material Movers, Hand
- Stock Clerks and Order Fillers
- Industrial Truck and Tractor Operators
- Cleaners of Vehicles and Equipment
- Payroll and Timekeeping Clerks
- Cargo and Freight Agents
- Sailors and Marine Oilers

Moderate Term On-the-Job Training (9.8% of Transportation & Warehousing Jobs)

Those workers who entered transportation and warehousing occupations in which workers can develop average job performance after 1-12 months of combined on-the-job experience and informal training earned a median income of $17.74 per hour or $36,897 per year in 3rd quarter 2005. The mean for employees at this level was $19.04 or $39,607. Workers whom EDD defines as experienced earned $22.42 per hour or $46,639 per year. Those just entering these occupations earned $12.28 per hour or $25,547 per year.

Many of the occupational codes in this category represent positions that require increased responsibility and/or specific skills. Often, they require knowledge of the industry that can be acquired on the job. In some cases, their function is to represent the firm with customers. This function includes sales as well as trouble shooting the supply chain when it fails to deliver goods in a timely fashion. Examples include:

- Bookkeeping, Accounting, and Auditing Clerks
- Sales Representative, Wholesale and Manufacturing, except Technical and Scientific Products
- Conveyor Operators and Tenders
- Computer Operators
- First-Line Supervisors/Managers of Office and Administrative Support Workers
- Dispatchers, except Police, Fire, and Ambulance
- Cutting and Slicing Machine Setters, Operators, and Tenders
- Transportation Workers, All Other

Long Term On-the-Job Training (4.2% of Transportation & Warehousing Jobs)

Those people who enter transportation and warehousing occupations that require more than 12 months of on-the-job training or combined work experience and formal classroom instruction for workers to develop the skills needed for average job performance earned a median income of $20.25 per hour or $42,126 per year in 3rd quarter 2005. The mean for employees at this level was $23.92 or $49,762. Workers whom EDD defines as experienced earned $28.09 per hour or $58,426 per year. Those just entering these occupations earned $15.61 per hour or $32,466 per year.

Many of the occupational codes in this category represent people who are highly skilled and operate and maintain very complex equipment used in either transportation or warehousing. Examples are:

- Bus and Truck Mechanics and Diesel Engine Specialists
- Avionics Technicians
- Airline Pilots, Copilots, and Flight Engineers, Commercial Pilots
- Aircraft Mechanics and Service Technicians
- Machinists
- Petroleum Pump System Operators, Refinery Operators, and Gaugers
- Maintenance Workers, Machinery
- All Other Drafters, Engineering, and Mapping Technologists
- First-Line Supervisors/Managers of Non-Retail Sales Workers
- Maintenance and Repair Workers, General

Post Secondary Education (1.0% of Transportation & Warehousing Jobs)

Workers entering transportation and warehousing occupations that require completion of vocational school training earned a median income of $17.25 per hour or $35,880 per year in 3rd quarter 2005. The mean for employees at this level was $17.81 or $37,054. Workers whom EDD defines as experienced earned $20.38 per hour or $42,384 per year. People just entering these occupations earned $12.69 per hour or $26,403 per year. Note: There were no jobs requiring an associate's degree.

There were relatively few occupations in this group. Examples include:

- Executive Secretaries and Administrative Assistants
- Avionics Technicians
- Sheet Metal Workers
- Welders, Cutters, Solderers, and Brazers
- Data Entry Keyers
- Secretaries, except Legal, Medical, and Executive

Work Experience (4.9% of Transportation & Warehousing Jobs)

Those workers who came to the transportation and warehousing group of sectors with skills obtained through work experience in a related occupation or who move into such positions through their experience within the sector earned a median income of $22.35 per hour or $46,488 per year in 3rd quarter 2005. The mean for employees at this level was $23.85 or $49,604. Workers whom EDD defines as experienced earned $28.23 per hour or $58,717 per year. People just entering these occupations earned $15.09 per hour or $31,386 per year.

Many of the occupational codes in this category represent the first rung of management. Those positions are thus occupied by people who have come up through the ranks. Other occupations involved time learning complex equipment or functions include:

- First-Line Supervisors/Managers of Production and Operating Workers

- First-Line Supervisors/Managers of Trans and Material-Moving Vehicle Operators
- First-Line Supervisors/Managers of Helpers, Laborers, and Material Movers, Hand
- Transportation Attendants, except Flight Attendants and Baggage Porters
- Rail Yard Engineers, Dinkey Operators, and Hostlers
- Locomotive Engineers
- Captains, Mates, and Pilots of Water Vessels
- Aircraft Cargo Handling Supervisors
- Compliance Officers, except Agricultural, Construction, Health-Safety, and Transportation
- Inspectors, Testers, Sorters, Samplers, and Weighers

Job Ladders by Functional Group

A second way to classify EDD's OES data is by group jobs involved in functional activities within the sector. Doing so allows a look at average pay levels that workers can achieve if they stay within these functional groups as shown in Exhibit 22A.

Exhibit 22A.-Transportation & Warehousing, Pay By Functional Group
Southern California, 3rd Quarter 2005

Functional Group	2002 Jobs	Median		Mean		Experienced		Entry	
Fixed Site Operations	35.4%	$14.31	$29,762	$15.70	$32,653	$18.29	$38,049	$10.47	$21,773
Trucking or Field Operations	43.5%	$16.20	$33,703	$17.13	$35,620	$19.71	$41,000	$11.96	$24,877
Administration & Admin. Support	14.0%	$19.32	$40,189	$20.95	$43,576	$24.40	$50,761	$13.42	$27,908
Sales & Customer Support	4.4%	$17.50	$36,410	$20.05	$41,702	$24.31	$50,562	$11.53	$23,982
Craft & Repair	0.6%	$20.27	$42,165	$21.24	$44,179	$24.44	$50,836	$14.18	$29,485
Finance & Information	2.0%	$20.29	$42,199	$21.46	$44,635	$25.02	$52,050	$14.34	$29,817
Total	100.0%	$16.13	$33,560	$17.40	$36,189	$20.21	$42,031	$11.68	$24,291

Source: CA Employment Development Department, Occupational Employment Survey, 3rd Quarter 2005; Industry Staffing Patterns, 2005 (*see Appendix A for OES Codes in each functional group by sector*)

Fixed Site Operations (35.4% of Transportation & Warehousing Jobs)

Those workers who are in OES codes for occupations involving non-office jobs conducted at a fixed site in transportation and warehousing earned a median income of $14.31 per hour or $29,762 per year in 3rd quarter 2005. The mean for employees at this level was $15.70 or $32,653. Workers whom EDD defines as experienced earned $18.29 per hour or $38,049 per year. People just entering these occupations earned $10.47 per hour or $21,773 per year.

The occupational codes in this category represent people who handle, inspect, track, and inventory inside warehousing facilities. It also includes support personnel like maintenance, janitorial, and security people, plus operations managers. Examples include:

- Laborers and Freight, Stock, and Material Movers, Hand
- Stock Clerks and Order Fillers
- Transportation, Storage, and Distribution Managers
- Shipping, Receiving, and Traffic Clerks
- Inspectors, Testers, Sorters, Samplers, and Weighers
- Production, Planning, and Expediting Clerks
- Cargo and Freight Agents
- Weighers, Measurers, Checkers, and Samplers, Recordkeeping
- Material Moving Workers, All Other
- Maintenance Workers, Machinery
- Conveyor Operators and Tenders
- Tank Car, Truck, and Ship Loaders

Vehicle Operations (43.5% of Transportation & Warehousing Jobs)

Those workers who are in OES codes for transportation and warehousing occupations involving moving goods, maintaining vehicles, or managing these functions earned a median income of $16.20 per hour or $33,703 per year in 3rd quarter 2005. The mean for people at this level was $17.13 or $35,620. Employees whom EDD defines as experienced earned $19.71 per hour or $41,000 per year. Those workers just entering these occupations earned $11.965 per hour or $24,877 per year.

The occupational codes in this category represent people who handle or maintain a wide variety of transportation vehicles. Examples include:

- Truck Drivers, Heavy and Tractor-Trailer
- Truck Drivers, Light or Delivery Services
- Industrial Truck and Tractor Operators
- Cleaners of Vehicles and Equipment
- Bus and Truck Mechanics and Diesel Engine Specialists
- Aircraft Mechanics and Service Technicians
- Airline Pilots, Copilots, and Flight Engineers
- Sailors and Marine Oilers
- Avionics Technicians
- Captains, Mates, and Pilots of Water Vessels
- Rail Yard Engineers, Dinkey Operators, and Hostlers
- Ship Engineers
- Locomotive Engineers

Administration and Administrative Support (14.0% of Transportation & Warehousing Jobs)

Those workers who are in OES codes for transportation and warehousing occupations involving general management as well as white collar functions like clerical and inventory control earned a median income of

$19.32 per hour or $40,189 per year in 3rd quarter 2005. The mean for people at this level was $20.95 or $43,576. Employees whom EDD defines as experienced earned $24.40 per hour or $50,761 per year. Those workers just entering these occupations earned $13.42 per hour or $27,908 per year. The pay levels in this group are impacted by a disproportionate number of positions requiring college degrees.

The occupational codes in this category represent the senior managers of transportation and warehousing operations, plus the people directly supporting them as well as people involved in clerical functions involving inventory control. Examples include:

- First-Line Supervisors/Managers of Office and Administrative Support Workers
- Receptionists and Information Clerks
- Executive Secretaries and Administrative Assistants
- Office Clerks, General
- Compliance Officers, except Agricultural, Construction, Health-Safety, and Transportation
- Purchasing Managers
- Employment, Recruitment, and Placement Specialists
- Order Clerks
- File Clerks
- Wholesale and Retail Buyers, except Farm Products

Sales and Customer Support (4.4% of Transportation & Warehousing Jobs)

Those workers in transportation and warehousing OES codes involved in merchandising goods and performing customer support functions like tracking goods and undoing supply chain problems earned a median income of $17.50 per hour or $36,410 per year in 3rd quarter 2005. The mean for people at this level was $20.05 or $41,702. Workers whom EDD defines as experienced earned $24.31 per hour or $50,562 per year. Those employees just entering these occupations earned $11.53 per hour or $23,982 per year. Workers at most levels of the sales and customer service function earn higher incomes than others with similar education or experience.
The occupational codes in this category represent every level of the sales or customer support function. These individuals maintain contact with customers both to sell products/services to them and solve supply chain problems for them. The latter is becoming an increasingly important function due to the length of the supply chain, which for Southern California-based operations often extends from Asia to the East Coast. Examples include:

- Customer Service Representatives
- Sales Managers
- Driver/Sales Workers
- Marketing Managers
- Sales and Related Workers, All Other
- Sales Representatives, Wholesale and Manufacturing, except Technical and Scientific Products
- Telemarketers

Craft and Repair (0.6% of Transportation & Warehousing Jobs)

A small number of workers in transportation and warehousing OES codes are craftsmen and equipment repairers or those in skilled positions producing goods. They earned a median income of $20.27 per hour or $42,165 per year in 3rd quarter 2005. The mean for employees at this level was $21.24 or $44,179. People whom EDD defines as experienced earned $24.44 per hour or $50,836 per year. Those workers just entering these occupations earned $14.18 per hour or $29,485 per year.

The occupational codes in this category mostly represent skilled positions for which workers have had to complete formal training beyond high school at a trade school. A few positions requiring 4-year degrees are also included:

- Petroleum Pump System Operators, Refinery Operators, and Gaugers
- Sheet Metal Workers
- Machinists
- Welders, Cutters, Solderers, and Brazers
- Marine Engineers and Naval Architects
- All Other Drafters, Engineering, and Mapping Technologists

Finance and Information (2.0% of Transportation & Warehousing Jobs)

Those workers in transportation and warehousing OES codes who undertake various levels of financial or information functions earned a median income of $20.29 per hour or $42.199 per year in 3rd quarter 2005. The mean for employees at this level was $21.46 or $44,635. Workers whom EDD defines as experienced earned $25.02 per hour or $52,050 per year. Those just entering these occupations earned $14.34 per hour or $29,617 per year.

The occupational codes in this category involve people who handle the books of the operation as well as maintain and adapts its information systems. Again, the second function has become crucial in modern logistics due to their heavy dependence on information technology to increase the speed, reliability, and efficiency of their operations:

- Bookkeeping, Accounting, and Auditing Clerks
- Accountants and Auditors
- Financial Managers
- Computer Support Specialists
- Bill and Account Collectors
- Computer Systems Analysts
- Payroll and Timekeeping Clerks
- Cost Estimators
- Computer Operators
- Computer Programmers

Median Pay by Transportation and Warehousing Sector and Functional Group

Another way to view the OES data is to break it down by functional group for each of the seven sectors of transportation and warehousing, as shown in Exhibit 23. To do this, median pay scales were used, as they have the advantage of not being pulled to the high side by disproportionately high pay scales:

Exhibit 23.-Median Pay by Functional Group by Transportation & Warehousing Sector Southern California, 3rd Quarter 2005

Wholesale Sub-Sector	Fixed Site Operations	Vehicle Operations	Administration & Admin. Support	Sales & Customer Support	Craft & Repair	Finance & Information	Median Pay
Rail Transportation	$70,170	NA	$44,338	NA	$39,227	NA	$49,015
Sea Transportation	$37,414	$37,957	$44,715	$33,041	$71,884	NA	$39,785
All Support Activities	$41,369	$33,723	$42,134	$37,505	$52,605	$39,827	$38,742
Air Transportation	$31,349	$46,558	$43,369	$74,928	$56,352	$43,916	$36,126
Truck Transportation	$27,469	$36,045	$40,401	$41,632	NA	NA	$34,968
Transport/Warehousing	$29,762	$33,703	$40,189	$36,410	$42,165	$42,199	$33,560
Warehousing	$25,688	$33,270	$46,554	$29,847	$31,926	$45,611	$30,578
Couriers	$28,127	$26,898	$31,907	$42,099	$70,899	$40,646	$28,503

Source: CA Employment Development Department, Occupational Employment Survey, 3rd Quarter 2005; Industry Staffing Patterns, 2005 (*see Appendix A for OES Codes in each functional group by sector*)
NOTE: Highest & Lowest Pay shaded for each functional group

Median Pay

Over all, the highest overall median pay was in the rail transportation sector ($49,015; $23.56 per hour). The lowest was in the courier sector, due to the large number of part time workers ($28,503; $13.70 per hour). These contrasted with a median for the entire group of 7 sectors of $33,560 or $16.13 per hour.

Fixed Site

The highest median pay for the fixed site function was in rail transportation ($70,170; $33.74 per hour). The lowest was in warehousing ($25,688; $12.35 per hour). The overall median was $29,762 ($14.31 per hour).

Vehicle Operations

The highest median pay for the vehicle operations function was in the air transportation ($46,558; $22.38 per hour). The lowest was in courier ($26,898; $12.93 per hour). The overall median was $33,703 ($16.20 per hour).

Administration and Administrative Support Operations

The highest median pay for the administrative function was in the public warehousing sector ($46,554; $22.38 per hour). The lowest was among couriers ($31,907; $15.34 per hour). The overall median was $40,189 or $19.32 per hour.

Sales and Customer Support

The highest median pay for the sales and customer support function was in the air transportation sector ($74,928; $36.02 per hour). The lowest was in warehousing ($29,847; $14.35 per hour). The overall median was $36,410 or $17.50 per hour.

Craft and Repair

The highest median pay for the small craft and repair function was in the sea transportation sector ($71,884; $34.56 per hour). The lowest was in warehousing ($31,926; $15.35 per hour). The overall median was $42,165 ($20.27 per hour).

Finance and Information

The highest median pay for the finance and information functions was in warehousing ($45,611; $21.93 per hour). The lowest was in the support group ($39,827; $19.15 per hour). The overall median was $42,199 or $20.29 per hour.

Transportation and Warehousing Summary

Can the transportation and warehousing portion of logistics deliver entry-level pay scales well above the minimum wage to workers without formal educations? Again, the data indicates the answer is “yes.” Some 74.0% of jobs in the group require “short-term on-the-job training.” Entry-level pay of $10.17 ($21,146) is 50.6% above the $6.75 minimum wage in California. These figures make no allowance for the 12.4% differential between pay in the transportation and warehousing group and pay in the same OES codes for Southern California’s economy as a whole. Meanwhile, the median pay in this group was $13.56 per hour ($28,209), and experienced pay was $16.62 per hour ($34,579).

It was further shown that there are both educational and functional skill ladders up which workers in the field can move to higher incomes. In the transportation and warehousing sectors, 92.9% of the jobs require no advanced schooling and another 1.1% required trade school training. Finally, the differences between the various sub-sectors of transportation and warehousing were shown with median pay levels in the vast majority of the cases over $30,000 per year.

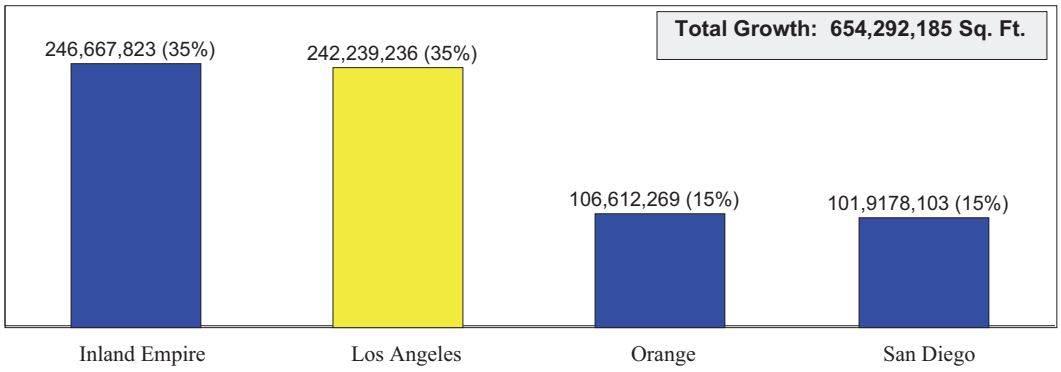
An issue that has frequently arisen among communities where logistics companies are seeking to locate facilities is the number square feet of space needed to generate one job. This question arises as the facilities are frequently very large, and communities are concerned about the number of jobs created when they allow industrially zoned land to be developed.

4.1 Analytic Procedures

This is not an area of economics where a great deal of consistent information is available. Typically, analysts studying economic development have assumed that the number of square feet of space per job to be much lower than the experience with logistics in Southern California. For instance, a December 2004 study of redevelopment in Massachusetts stated: "Direct employment projections are based on industry standard space demands: 250 square feet per office employee, 350 square feet per flex space employee, and **650 square feet per warehouse distribution employee**."[33]

More typically, all types of industrial space are lumped into a single square feet per worker estimate. Thus, worksheets provide to the National Association of Office and Industrial Properties (NAIOP) Research Foundation to study the economic impact of industrial development states: "Persons working in the industrial building(s) at 900 square feet per worker."[34]

Exhibit 24.-Industrial Real Estate Market, Inventory Growth (Sq. Ft.)
Southern California, 1991-2005



Source: Grubb & Ellis

However, the issue of "square feet per job" of logistics building space emerged in San Bernardino and Riverside counties (Inland Empire) during the early 1990s, when the region began to see very rapid development of its industrial land. At that time, the Inland Empire Economic Partnership (IEEP) was asked to create a database tracking major projects in order to develop factual information to track this issue. The database was started in January 1994, and Economics & Politics, Inc., has maintained it since that date. The experience within the Inland Empire is relevant here, since, from 1991-2005, the area has seen 220 million square feet of industrial space created or 34% of Southern California's increase in space as shown in Exhibit 24. That was just less than the 232 million square feet created in Los Angeles County (35%).

Average Square Feet per Job

In the 1994-2006 period, 1,366 projects were tracked using information from the major brokerage firms operating in the Inland Empire, as well as information otherwise made available to Economics & Politics, Inc., or the IEEP, as shown in Exhibit 25. These projects have involved 172,843,408 square feet of gross industrial space. Altogether, some 123,435 jobs were added to the region's economic base at the time the projects in this database were announced. Across all types of projects, over the full time period, the database showed that one job required 1,400 square feet of space. However, this fact hides significant differences between the sector groups:

Exhibit 25.-Major Firms Buy or Lease Space for Expansion
Inland Empire, 1994 to April 2006

Sector	Firms	Percent	Jobs	Workers	Percent	Workers/Firm
Manufacturing	692	50.7%	Manufacturing	49,542	40.1%	71.6
Distribution	498	36.5%	Distribution	55,017	44.6%	110.5
Service	163	11.9%	Service	15,254	12.4%	93.6
Govt. Agencies	13	1.0%	Govt. Agencies	3,622	2.9%	278.6
TOTAL	1,366	100.0%	TOTAL	123,435	100.0%	90.4
Source	**Firms**	**Percent**	**Other**	**Square Feet**	**Percent**	**Feet/Worker**
Migrate from LA/OR	313	22.9%	Manufacturing	47,503,196	27.5%	959
New Growth	529	38.7%	Distribution	119,188,022	69.0%	2,166
New To Inland Empire	842	61.6%	Service	4,109,990	2.4%	269
Expand Locally	524	38.4%	Govt. Agencies	2,042,200	1.2%	564
TOTAL	1,366	100.0%	TOTAL	172,843,408	100.0%	1,400

Source: CB Richard Ellis, Grubb & Ellis, Cushman & Wakefield, Lee & Associates, IEEP, Economics & Politics, Inc.

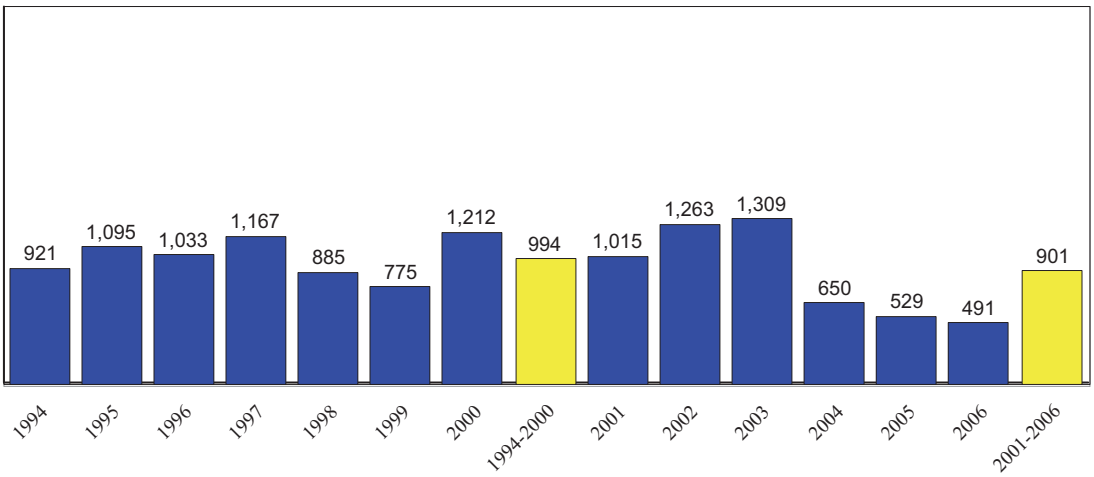
The inland migration of firms was in response to lack of space in coastal areas as well as lower costs, newer facilities and lower labor costs in the inland area. The data come from inland commercial brokers and newspaper articles on the migrating firms. Though no analyst has studied what has happened to space freed in coastal areas as firms have moved, the extremely low vacancy rates in Los Angeles (*1.5%*) and Orange (*3.5%*) counties strongly implies it has been put to other uses.

Manufacturing firms took 47,503,196 square feet of space (27.5% of the total). The firms indicated their intention to initially open with 49,542 jobs. The ratio was one job per **959 square feet** of space.

Logistics firms took 119,188,022 square feet of space (69.0% of the total). The firms indicated their intention to initially open with 55,017 jobs. The ratio was one job per **2,166 square feet** of space. The square foot of space needed for one job in logistics was thus 2.26 times the amount needed in manufacturing or a little more than double.

Office firms and government agencies took 6,152,190 square feet of space (3.6% of the total). They indicated their intention to initially open with 18,876 jobs. The ratio was thus one job per **326 square feet** of space.

Exhibit 26.-Square Feet Per Job
Manufacturing Sector, Inland Empire, 1994-2006

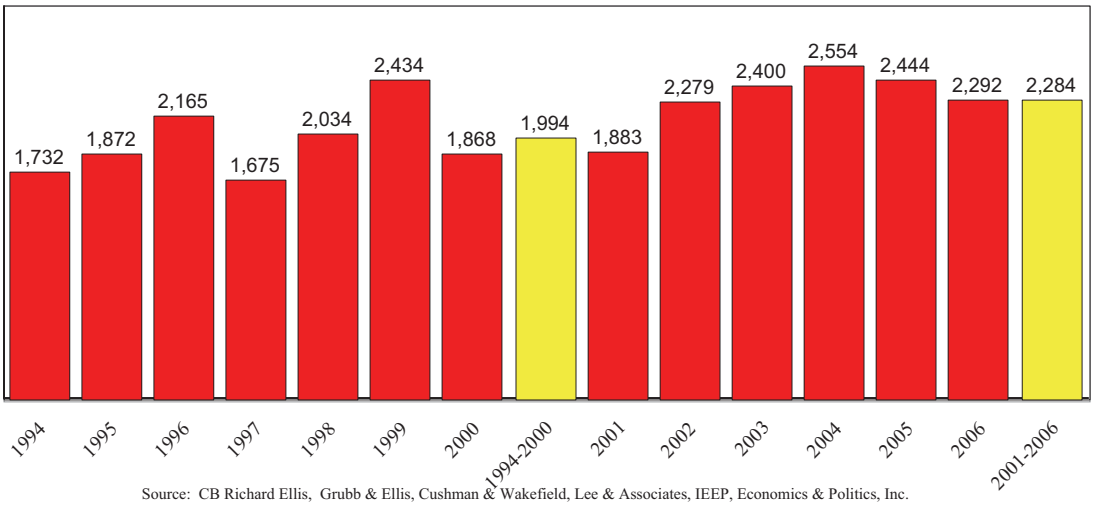


Source: CB Richard Ellis, Grubb & Ellis, Cushman & Wakefield, Lee & Associates, IEEP, Economics & Politics, Inc.

Jobs per Square Foot: Over Time

Over the past 12 years, there have been changes in space utilization by companies. This has been particularly relevant to manufacturers and logistics and distribution firms as shown in Exhibit 26 and Exhibit 27.

Exhibit 27.-Jobs Per Square Feet
Logistics Sector, Inland Empire, 1994-2006



Source: CB Richard Ellis, Grubb & Ellis, Cushman & Wakefield, Lee & Associates, IEEP, Economics & Politics, Inc.

Manufacturing

From 1994-2000, manufacturers created 41,400 new jobs in the Inland Empire. In this period, the amount of industrial space for each new job in the sector varied from 1,000 to 1,300 square feet, with an average of 994 square feet. From 2001-2005, manufacturing stopped growing in the inland region, adding a net of just 100 jobs. In the two-county region, the amount of space taken by manufacturers shrank to an average of 901 square feet per job, including a steep fall to 564 square feet per job from 2003 to 2006. The conclusion from these data is that a healthy manufacturing sector generally requires **900-1,000 square feet of space to support one job** as shown in Exhibit 26.

Logistics

As with the balance of Southern California, the Inland Empire's logistics firms have expanded consistently since 1994. In the 1994-2000 period, the area saw the sector add 28,200 jobs. For this period, the industrial space per job averaged 1,994 square feet. From 2001-2005, another 23,500 new logistics jobs were created. In the 2001-2006 period, **2,284 square feet of space per job** were required, a 14.5% increase over the earlier period. In 2006, the 2,292 square feet per job was roughly at that level, as shown in Exhibit 27.

Summary: Manufacturing vs. Logistics Space per Job

Ready comparison of the square footage per job required in manufacturing and logistics has become more difficult due to the sudden decline in the health of the manufacturing sector. Two observations appear relevant:

Logistics Firms Asking Workers to Handle Greater Amounts of Space

This is seen by the fact that the average square footage per job increased 14.5% when comparing 1994-2000 (1,994 sq. ft.) and 2001-2006 (2,284 sq. ft.).

Logistics Firms Need Over Twice the Space per Job as Manufacturers

This is seen in that manufacturing firms generally have needed 900-1,000 square feet per job, while logistics firms have averaged over 2,284 square feet per job. At the maximum in 2004, the newly occupied facilities had 2,554 square feet per worker.

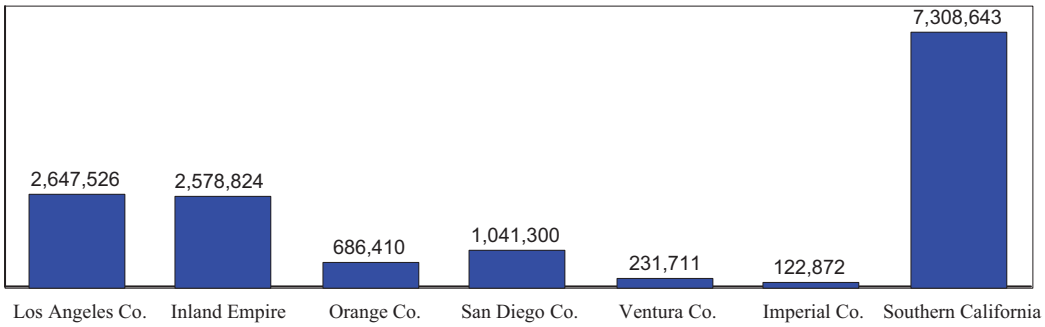
The fact that logistics facilities are using up to 2½ times the space per job as manufacturers has caused many communities to state a preference for manufacturing over distribution development in their industrial areas. The problem with this strategy is the fact that Southern California's manufacturers have lost 361,300 jobs from 2001-2005, while logistics firms have gained 103,400.

Any strategy dealing with economic development, infrastructure construction, or environmental mitigation that concerns the rising flow of goods through Southern California must take into account the degree to which the recent rapid growth in volume is likely to continue over the long run. Here, the long run is defined as through 2030, since that is the ending date for the currently adopted Regional Transportation Programs by SCAG and the San Diego Association of Governments (SANDAG). Determining the extent to which the volume of goods moving through the region will likely continue requires a review of the various factors that are driving that volume.

5.1 Southern California Population Growth

A principal driver of growth within Southern California's logistics sector is the continuing expansion of the region's population. This is the case because the higher the population, the greater the volume of domestic and international cargo that must flow through the local logistics system to local consumers.

Exhibit 28.-Forecasted Population Increases Southern California, 2000-2030



Source: Southern California Association of Governments & San Diego Association of Governments

The population forecasts adopted by SCAG and SANDAG as part of their Regional Transportation Programs (RTP) indicate that the region will go from 19,477,342 people in 2000 to 26,785,985 in 2030, a gain of 7,308,643 people or 25.1% as shown in Exhibit 28. That is nearly 200,000 more people than currently live in Orange, San Diego, Ventura, and Imperial counties combined (7,123,087). This represents a compound annual growth rate of 1.07%. Importantly, this forecast depends much more heavily on the natural increase of the local population (births over deaths) than it does upon immigration. Thus, in discussing its part of the forecast, SCAG indicated that: "Population growth resulted from large net increases in three population groups: aging 'Baby Boomers,' their young children 'the echo-boomers', and immigrants, mostly from Mexico, Central America and Southeast Asia. **The natural increase through births accounted for most of the population gain in the Region, as births over deaths accounted for two-thirds of population gain**."[35]

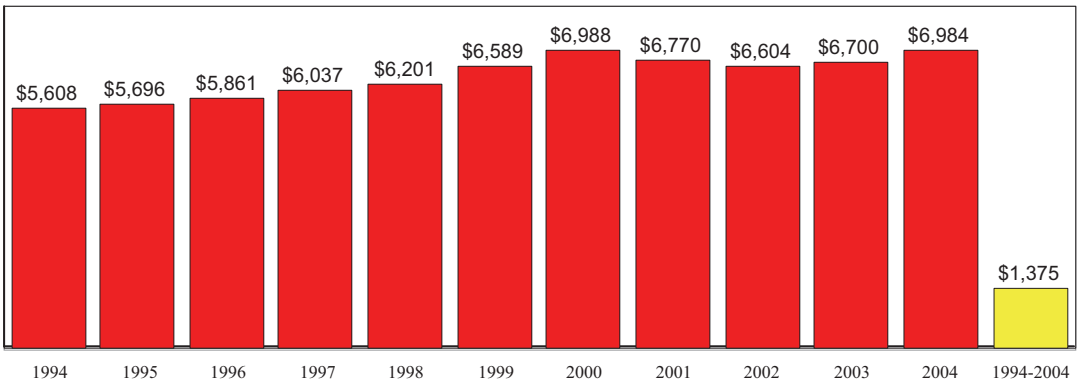
As has often occurred in Southern California, the area's population growth is already ahead of the forecasts. From 2000-2006, 1,836,476 people have been added to the population in Southern California, reaching a total of 21,313,818 (a 9.4% gain).[36] In six years, the region has thus added 25.1% of the total people expected to be added in a 30-year period. As a result, the early draft work on the 2008 RTP for

SCAG has its portion of the Southern California region growing by 6,889,086 from 2000-2030 rather than the 6,267,343 found in the agency's 2004 RTP. That would be 621,743 or 9.9% more than the current forecast.[37]

5.2 Southern California Retail Volume Per Capita

There are two forces that raise the volume of goods moving to local households in Southern California. One is the size of the population. As noted above, the compound annual rate of growth from 2000-2030 was estimated at 1.07% in the RTPs. The second is the constant dollar volume of retail sales per capita. This refers to the amount of retail sales for each person in the region, adjusted for inflation. As such, it provides an estimate of the per capita physical volume of goods moving through the region. From 1994-2004, the California Board of Equalization data shows that this volume has grown from $5,608 to $6,984, up $1,375 or 24.5%.[38] This occurred despite the pause due to the recession that impacted consumers from 2001-2003. On a compound annual basis, the growth was 2.01% over this eleven year period. This finding is consistent with the idea that, except during periodic recessions, the standard of living of the average person gradually improves, allowing him or her to acquire more goods in succeeding years.

Exhibit 29.-Per Capita Taxable Retail Sales (constant dollar)
Southern California, 1994-2004 (1984-1986=100)



Sources: CA Board of Equalization, CA Department of Finance, U.S. Bureau of Labor Statistics

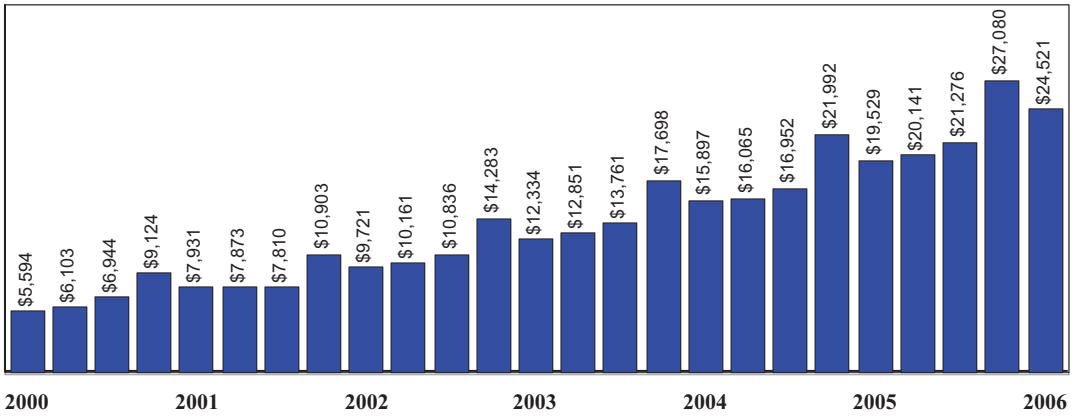
For the goods movement system, the rising volume of retail volume per capita is another reason that local logistics firms and the local transportation network must be prepared to handle an increased flow of domestic and international goods headed for local households.

5.3 E-Commerce

Another factor impacting the logistics firms and the goods movement infrastructure in Southern California is the increasing tendency of American households to purchase goods on-line and have them delivered directly to their homes. This e-commerce phenomenon started to become an important part of American consumer habits in 2000. From 1st quarter 2000 to 1st quarter 2006, the national e-commerce volume went

from $5.6 billion to $24.5 billion, as shown in Exhibit 30. The compound annual rate of growth in this period was an extremely aggressive 27.9%. From 1st quarter 2005 to 1st quarter 2006, that rapid growth continued, with e-commerce sales up 25.6%. The per capita level was $90.46 in fourth quarter 2005.

Exhibit 30.-E-Commerce Volume (millions)
U.S., 2000-2006, Quarterly, Not Seasonally Adjusted



Source: Estimated Quarterly U.S. Retail Sales (Not Seasonally Adjusted), U.S. Census Bureau, 2006

This phenomenon will likely continue growing rapidly for a very long period of time. This is seen by the fact that the share of total U.S. retail sales involving e-commerce was 0.8% in 1st quarter 2000. Despite the aggressive expansion of this form of retail activity, the share was up to just 2.7% in 1st quarter 2006 ($24.5 billion of $906.5 billion).[39]

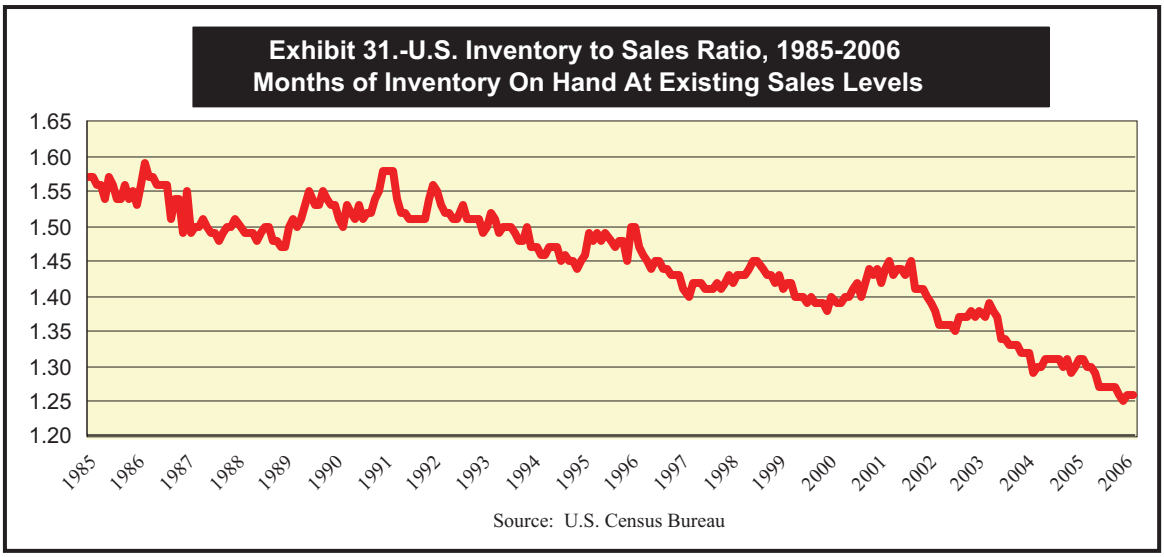
E-commerce is undoubtedly affecting the amount of air cargo moving through Southern California's transportation system. Airports are affected because a good deal of e-commerce is carried by dedicated air cargo planes flown for firms like UPS, FedEx and DHL. Intermodal rail yards are impacted because these companies ship goods cross-country by rail when that is less expensive and still meets their time schedules. For instance, the principal customer of Burlington Northern Santa Fe Railway's (BNSF) intermodal yard in San Bernardino is the UPS package handling facility at Ontario International Airport (ONT).[40]

Once containers reach local airports and intermodal yards, they must move to cross-docking facilities. Where rail is used, trucks must tow the containers along freeway routes to these cross-docks. Packages are then removed from the containers and loaded onto smaller trucks for delivery to local homes and businesses.

Given the acceleration in the volume of e-commerce, plus the rising number of people and retail trade in Southern California, this form of activity will have an increasing impact on the area's transportation infrastructure and associated environmental impacts.

5.4 Inventory: Sales Ratio Decline

In the early 1990s, the rising sophistication of information technology and advances in laser scanners created a revolution in the way retailers and manufacturers handled their inventories. Rather than borrowing money and buying inventories they hoped they would need, firms began ordering goods only after inventories were clearly disappearing. This "just in time" process made supply chain managers key players in allowing corporations to contain their inventory costs. It has forced the goods movement sectors to begin acting as an integrated industry. With the rise of the Asian economies and the stretching of inventory supplying lines across the Pacific Ocean, this process has made Southern California the key U.S. region in the goods movement business.



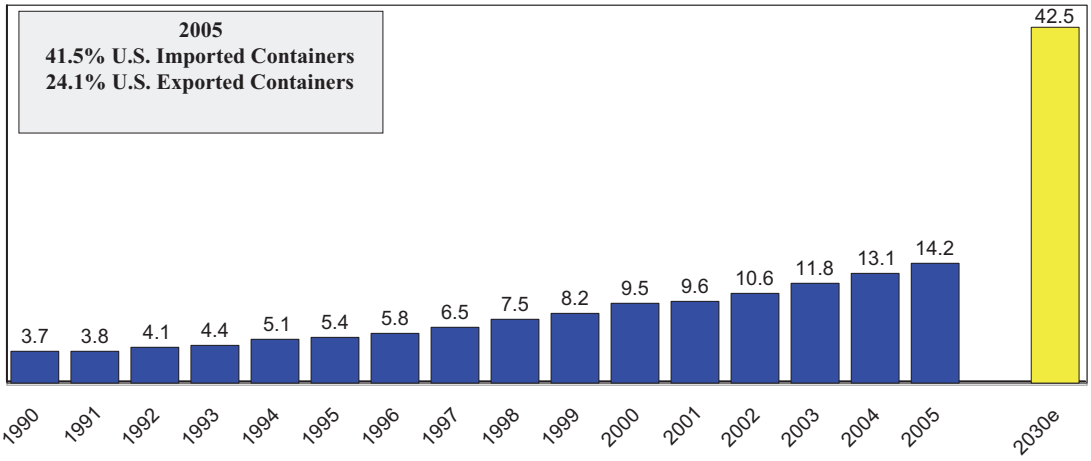
In 2006, the process continues. This is seen by the fact that the inventory to sales ratio in the U.S. continues to fall. When "just in time" processes were first being adopted, companies were maintaining an average of 1.58 months' worth of inventory relative to their sales levels. Now this ratio has reached new lows at 1.26 months' worth of inventory, as shown in Exhibit 31. That is a 20.3% reduction in the volume of inventories sitting on shelves. It is the reason why the top 10 firms trying to rapidly move Asian imports through the Ports of Los Angeles and Long Beach are all major retailers: Wal-Mart Stores, Inc., The Home Depot, Inc., Target Corporation, Lowe's Companies, Kmart Corporation, IKEA International A/S, Payless Shoe Source, Inc., Pier 1 Imports Inc., Big Lots Inc., Toys 'R Us, Inc., Limited Brands, Inc., and Michaels Stores.

5.5 Port Container Volume

For the "just in time" process to work efficiently, an important development was the standardization of container sizes and processes. As a result, a huge share of domestic and international trade now moves in these large boxes. From 1990-2005, the Ports of Los Angeles and Long Beach saw their volume increase

from 3.7 million TEUs in 1990 to 14.2 million TEUs in 2005. The growth has been particularly aggressive since 2000, when volume went from 9.5 million to 14.2 million TEUs, an average annual increase of 8.47%, as shown in Exhibit 32. The 2005 volume included 9,242,478 TEUs of imported containers (41.5% of U.S. volume), 2,066,443 TEUs (24.1% of U.S. volume) of exported containers, and 2,928,001 exported empty containers.[41]

Exhibit 32.-Port Container Traffic
Ports of Los Angeles & Long Beach, 1990-2005 & 2030e (million TEUs)



TEU=20 foot equivalent container units
Source: Port Import Export Reporting Service; forecast: Moffatt & Nichol Engineers

Looking ahead, unpublished internal studies performed for the Port of Long Beach by Moffatt & Nichol Engineers and JWD Group in support of the on-going Middle Harbor Environmental Impact Report forecasts that volume will reach 42,500,000 TEUs by 2030. That would represent a compound annual growth rate of 4.47% or just more than half the rate experienced from 2000-2005.

The major driver of port imports is the growing level of imports into the United States due to the acceleration in the production of low-cost Asian goods. From 1990-2005, the volume of Asian imports into the U.S. (annual value adjusted for changes in Asian import prices) have grown 4.5 times from $151.8 billion to $676.3 billion, as shown in Exhibit 33. They are up 1.5 times from 2000-2005. This has primarily been caused by the acceleration of Chinese imports, which grew 22.1 fold from 1990-2005 and 2.8 fold from 2000-2005. In light of the fact that Asian trade of this kind represents a newly emergent international force, it is likely that it will be playing out for a very long time. Therefore, the handling of imported merchandise will remain an important force in Southern California's economy.

Exhibit 33.-U.S. Imports from Asia, 1990-2005 (millions)
Adjusted For Changes In Asian Import Prices (2000=100)

Country	1990	2000	2005	Growth Factor 1990-2005	Growth Factor 2000-2005
China	$12,551	$100,723	$277,359	22.1	2.8
Japan	$73,875	$147,512	$156,035	2.1	1.1
Korea	$15,227	$40,592	$49,468	3.2	1.2
Taiwan	$18,670	$40,788	$39,365	2.1	1.0
Malaysia	$4,343	$25,749	$38,083	8.8	1.5
Thailand	$4,356	$16,501	$22,477	5.2	1.4
India	$2,633	$10,762	$21,251	8.1	2.0
Singapore	$8,073	$19,313	$17,082	2.1	0.9
Indonesia	$2,752	$10,440	$13,578	4.9	1.3
Philippines	$3,199	$14,033	$10,450	3.3	0.7
Australasian	$3,663	$6,483	$8,294	2.3	1.3
Vietnam	$0	$827	$7,492	NA	9.1
Pakistan	$502	$2,182	$3,676	7.3	1.7
New Zealand	$986	$2,095	$3,565	3.6	1.7
Bangladesh	$444	$2,435	$3,043	6.9	1.2
Sri Lanka	$443	$2,016	$2,354	5.3	1.2
Cambodia	$0	$831	$1,996	NA	2.4
Brunei	$24	$386	$636	26.3	1.6
Nepal	$60	$231	$126	2.1	0.5
Laos	$5	$10	$5	1.0	0.5
Bhutan	$0	$1	$1	8.2	0.8
Burma	$32	$474	$0	0.0	0.0
Asia	$151,839	$444,384	$676,335	4.5	1.5
2000-2005			8.76%		
1990-2005			10.47%		

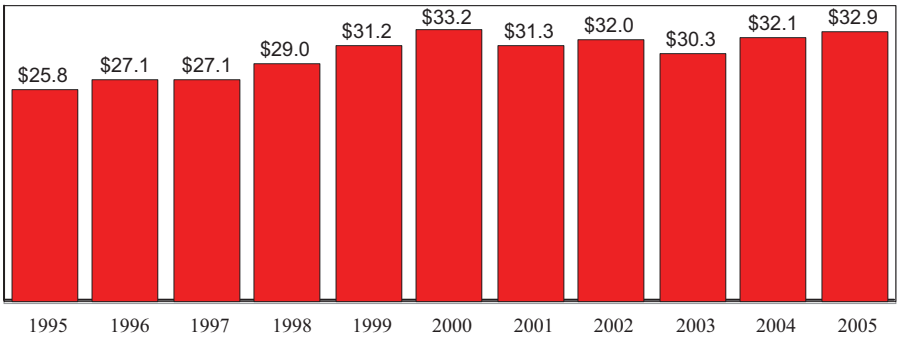
Source: U.S. Trade in Goods (*Imports, Exports, and Balance*) by Country, U.S. Census Bureau

5.6 Port Breakbulk Tonnage

With containerized shipping becoming the dominant method of moving trade, it is not surprising to find that the volume of breakbulk cargo moving through Southern California's four harbors has not grown as fast as container traffic. From 1995-2005, volume has gone from 25.8 million tons to 32.9 million tons, a gain of 7.1 million tons or 27.5%, a compound annual rate of 2.5%. However, volume is down 314,521 tons from the record of 33.2 million in 2000, as shown in Exhibit 34. Breakbulk cargo includes such items as vehicles, lumber, bananas and pineapples, and petroleum. One day, it might include a product like ethanol.

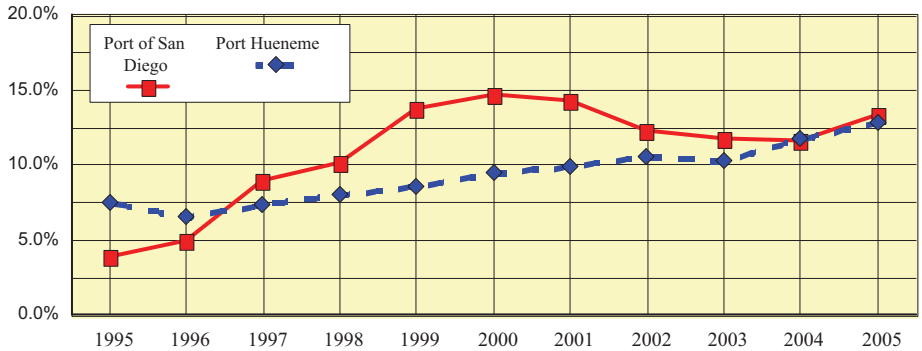
An important consideration for breakbulk cargo is the growing role in this trade being played by the Port of San Diego and Port Hueneme. From 1995-2005, the Port of San Diego has seen its share of Southern California's breakbulk tonnage increase from 3.9% to 13.4%. However, the share is down from a high of 14.7% in 2000. At the same time, the share handled by Port Hueneme went from 7.5% in 1995 to a record 12.8% in 2005, as shown in Exhibit 35. These facts are consistent with the fact that containerized cargo is putting significant pressure on the Ports of Los Angeles and Long Beach opening up the possibility of seeing an increasing distribution of breakbulk cargo to Southern California's other two ports.

Exhibit 34.-Breakbulk Cargo Growth Southern California Ports, 1995-2005 (millions)



Source: Pacific Maritime Association

Exhibit 35.-Share of Southern California Breakbulk Cargo Port of San Diego & Port Hueneme, 1995-2005



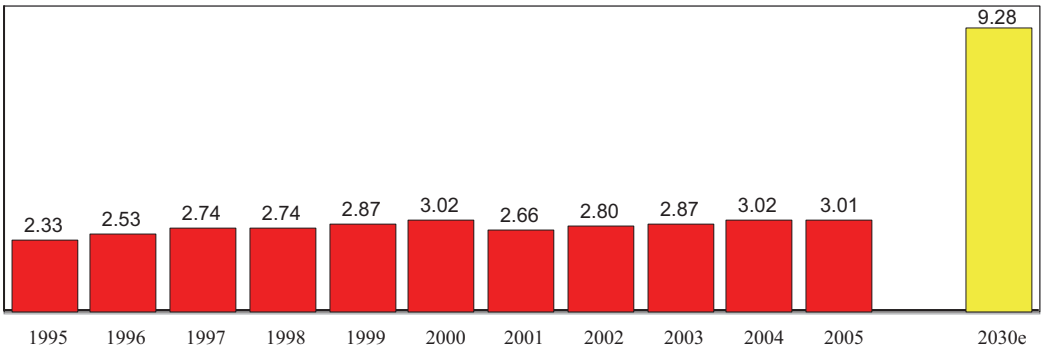
Source: Pacific Maritime Association

5.7 Air Cargo Tonnage

Like other airport-related operations, Southern California's air cargo was significantly impacted by the September 11 attacks. From 1995-2000, air cargo tonnage at airports from San Diego International through LAX grew at a 5.3% compound annual rate, growing from 2.33 million tons to 3.02 million, up 692,000 tons or 29.7%. In 2001, trade fell 357,500 tons to 2.66 million, a drop of 11.8%. From 2001-2005, air cargo has

been growing at a compound annual rate of 3.1%, growing from 347,000 tons to 3.01 million, up 13.0%. However, volume was down slightly in 2005 from 3.02 million tons the prior year, as shown in Exhibit 36.

Exhibit 36.-Air Cargo Volume
Southern California, 1995-2005 & 2030e (million tons)



Note (1): San Diego estimated 1995-1998 based upon 8.5% growth rate
Source: Each Airport, Southern California Association of Governments

Looking forward, industry professionals working with SCAG have concluded that air cargo will increase its rate of growth to a compound annual rate of 4.6% from 2005-2030. This will cause volume to triple to 9.29 million tons by 2030. If this forecast is realized, this sector will also have a buoying impact on the logistics group of sectors.

5.8 Local Manufacturing

Only one force impacting the volume of Southern California's goods movement volume and the pressure on its transportation infrastructure is in decline. That is the local manufacturing sector. It was shown earlier that from 1990-2005, this sector's employment decreased from 1,279,600 to 918,300 jobs, down 361,300 positions or -28.2%. (See Section 1.1, Exhibit 4) As indicated, much of the economic difficulty facing workers who have not gone beyond high school can be traced to the shrinkage of this sector.

From the standpoint of logistics, the slowing of local manufacturing cuts in two ways. Certainly it means that fewer goods are moving from Southern California producers to local warehouses and stores. That reduces pressure on the transportation network and decreases the number of jobs handling this merchandise. However, the lack of local production means that many goods used by local consumers must now enter the region from elsewhere. Some items come from other states by rail, truck, or air. A significant volume enters Southern California through its ports and airports. As a result, the reduction of local production has created increased demand for logistics jobs. On balance, it has probably led to a net increase in pressure on the region's transportation network.

6.1 Macro-Economic Impact Defined

How important is the logistics group of sectors to the total volume of economic activity in Southern California's economy?

Time Frame

There are two time frames for looking at this question:

Current Economy

Determine the extent to which the total level of economic activity in today's 7-county Southern California economy is attributable to the current size and range of activities in the goods movement sectors.

Future Economy

Determine how the future size of the region's overall economy would be affected by changes in volume of various logistics sectors.

Measures of Economic Impact

In either case, there are four conventional measures of total economic impact:

Total Economic Activity

This is the total amount of direct spending in an economy coming from a study sector that would not occur without it, as well as the indirect spending that is set off when this money is received and used by the study sectors suppliers and service providers, plus the induced spending this combination of money flows sets off because households have additional income to spend.

Total Value Added

This measure is akin to the U.S. Gross Domestic Product. It adds up the value created by each company to give an estimate of the total value created in an economy and by each sector. It differs from total sales activity since it eliminates the double counting that occurs when one firm's products are reused by another firm. For instance, if one firm sells flour and another buys it to make and sell bread, the sum of their sales would count the flour twice. Value added would subtract the flour's value from the second firm's sales. Value added allows an understanding of the share of the total value created in the economy that comes from logistics.

Total Jobs

For those concerned with employment, this provides a measure of how the logistics sectors impact the number of wage and salary and self-employed jobs in the economy. The impact includes both wage and salary and self-employed jobs.

Income

For those worried about household spending power, this gives a measure of how the logistics sectors impact the dollar amount of household spending power that comes through employee, proprietor, and property (e.g., corporate profits and rent) income.

Indirect Business Taxes

For those wishing to measure the impact that the logistics sector has on the sales taxes, property taxes, fees, licenses, and excise taxes paid to government, this provides a measure of this effect.

6.2 IMPLAN

A standard method of determining the impact of a sector is to use an input-output model of the study area economy. This model was developed at the University of Minnesota and is widely used in California for determining the economic and fiscal impacts of changes in a region's economy.[42] In this case, that study area is composed of the Southern California counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura. The IMPLAN organization provides 2003 data on the levels of employment and payroll in each sector of these counties as well as on how each sector of the region's economy interacts with every other sector. This information is based upon information generated by the U.S. Bureau of Economic Analysis. The model allows the seven county regions to be aggregated into a single economy. This process generated estimates that Southern California in 2003 was characterized by:

- Wage and Salary Jobs and Self-Employment: 11,321,518
- Total Personal Income: $652.4 billion
- Population: 20,323,861
- Households: 6,963,723

Note: There are two basic models used by economists to measure economic impact: IMPLAN and RIMS II developed by the U.S. Bureau of Economic Analysis (*BEA*). They yield very similar results because IMPLAN is based upon RIMS II and uses the basic data BEA annually updates for economic impact work in areas across the nation. IMPLAN is preferred by analysts because it is offered in a software framework that makes it more efficient to use. The third alternative would be to create a Southern California input-output model from scratch … which would be prohibitively expensive for most projects.

6.3 Current Economy

What is the current size of the logistics group of sectors in relation to the 7-county Southern California economy?

Logistics Sectors: Size

One way to measure impact of the logistics sectors is their combined size relative to Southern California's economy in 2003. This is a partial impact measure as it does not show the extent to which activity in the sector is responsible for activity in other sectors that depend upon it, as shown in Exhibit 37. It overstates "impact" as it does not answer the question of what other activities might have absorbed the workers and resources that were devoted to logistics, assuming that workers and resources did not end up unemployed or leave the area. As it is impossible to rewrite two decades of economic history, the best that can be said about such alternatives is that the slowing of the manufacturing sector has left a large share of the region's workers who have stopped their educations at high school or less with limited employment options. If the 687,837 people working in logistics in 2003 (*2005 pay: $47,411*) had needed to find work in other sectors, it would likely have be those with few educational barriers to entry. As shown (*Exhibit 15 page 2-6*), this would be limited to construction (*$42,714*) which is likely operating at capacity, plus agriculture (*$22,793*) and several population-serving sectors with relatively low 2005 annual average pay including: retail trade (*$28,840*), gaming (*$28,385*), accommodation (*$24,019*), other services (*automotive, household and electric repair and maintenance, personal care, laundry, member associations, household workers*) (*$22,340*), plus eating and drinking (*$15,132*). If they could not find work in these sectors, the other alternative would have been for the workers and other resources to leave Southern California or remain idle.

Exhibit 37.-Logistics Share of Southern California Economy, 2003

Activity	Full Economy	Full Economy No Logistics	Logistics Share	Percent Share
Economic Activity	$1,375,317,451,279	$1,284,650,259,262	$90,667,190,016	6.6%
Value Added	$812,662,857,216	$749,033,013,513	$63,629,838,928	7.8%
Employment	11,321,518	10,633,681	687,837	6.1%
Income	$750,618,332,001	$698,046,780,608	$52,571,546,809	7.0%
Employee Income	$448,056,070,268	$414,233,307,450	$33,822,760,088	7.5%
Proprietor Income	$75,336,482,236	$71,845,848,522	$3,490,633,569	4.6%
Other Property Income	$227,225,779,497	$211,967,624,636	$15,258,153,152	6.7%
Indirect Business Taxes	$62,044,525,215	$50,986,232,905	$11,058,290,946	17.8%

Source: IMPLAN Model, Southern California's seven counties

Logistics Sectors: Full Impact

A second way to measure impact of the logistics sectors on Southern California's economy in 2003 is to look at the degree to which removing them would reduce the size of the overall economy. This gives an indication of the extent to which activity in other sectors is dependent upon activity in the combined logistics sectors. Again, this is a partial analysis as it does not show the offset if workers and resources had been able to move into the other sectors likely to absorb them by 2003. Here, the offsets would likely be much less than the impact of logistics for two reasons. First, the sectors to which they would have been qualified to work instead of logistics pay from 39% to 68% less per job. Second, most are almost entirely local population-serving sectors, giving them small indirect and induced impacts upon the economy (*see "impacts explained" below*).

Procedure

The following procedure was used to estimate the impact of eliminating the logistics sectors:

The Southern California IMPLAN model was run, assuming reductions in the logistics sectors equal to their 2003 input-output volume, employment, and value added.

The results of the run showed the extent to which shrinkage in the logistics sector equal to its size would create **indirect and induced reductions** in the various sectors of the regional economy. As some of these **indirect and induced** effects reflect changes inside the logistics sectors themselves, that impact was subtracted out to look only at the effects on the balance of the economy.

The logistics reduction was divided into the total reduction including logistics to see the multiple by which the economy would fall without the logistics group.

Indirect Impacts Explained

When a cutback occurs in a sector, the purchases that firms in that sector were making from other sectors are also reduced. This is the indirect impact of the reduction. Thus, a logistics firm may buy fuel and accounting services from local providers. If the logistics firm disappears, those indirect impacts disappear.

Induced Impacts Explained

When a cutback occurs in a sector, the incomes that went to households from that sector, as well as to other sectors with which it does business, are no longer paid. Because incomes have fallen, the general spending reaching various sectors of the economy also falls. This is the induced impact of the reduction. Thus, a logistics firm pays its workers as do the fuel and accounting firms that deal with it. If the logistics firm disappears, those incomes disappear as does the spending throughout the economy that the families that did not receive that income would have made.

An example may help explain these phenomena. After World War II, the U.S. Navy used to pay its fleet in $2.00 bills when they reached a U.S. port. The sailors would spend money on the economy, thus indirectly

helping the firms that received their money. They knew the U.S. Navy was responsible because of the $2.00 bills they were receiving. When they paid their employees, this gave people the funds to spend supporting their families. Often, this was also in $2.00 bills which showed up in venues that had nothing to do with the sailors. However, those stores also knew that the ultimate source of their revenue was the money the U.S. Navy brought to the port.

Indirect and Induced Impact of Logistics

Using these procedures and concepts, the following is the result, as shown in Exhibit 38.
Economic Activity: If the $90.7 billion in economic activity associated with logistics had not occurred, there would have been $79.7 billion less indirect and induced activity in other parts of the economy. Combined, the economy would have had $170.4 billion fewer transactions. That was 1.88 times the economic activity in the sector itself.

Value Added: If the $63.6 billion in value added associated with logistics had not occurred, there would have been $49.5 billion less indirect and induced activity in other parts of the economy. Combined, the economy would have had $113.2 billion less value created. That was 1.78 times the value added from the sector itself.

Exhibit 38.-Direct, Indirect, Induced Impact of No Logistics Sector, 2003

Activity	Logistics Reduction	Indirect Reduction	Induced Reduction	Indirect/Induced Reductions	Total Reduction	Multiple
Economic Activity	$90,667,190,016	$22,761,908,986	$56,967,781,859	$79,729,690,845	$170,396,880,861	1.88
Value Added	$63,629,838,928	$12,369,287,323	$37,160,158,749	$49,529,446,073	$113,159,285,001	1.78
Employment	687,837	174,553	578,626	753,179	1,441,016	2.09
Income	$52,571,546,809	$11,555,061,766	$34,448,772,298	$46,003,834,063	$98,575,380,872	1.88
Employee Income	$33,822,760,088	$6,875,660,063	$21,187,629,895	$28,063,289,957	$61,886,050,045	1.83
Proprietor Income	$3,490,633,569	$1,417,713,527	$2,762,695,437	$4,180,408,964	$7,671,042,533	2.20
Other Property Income	$15,258,153,152	$3,261,688,176	$10,498,446,966	$13,760,135,142	$29,018,288,294	1.90
Indirect Business Taxes	$11,058,290,946	$814,225,573	$2,711,386,479	$3,525,612,052	$14,583,902,998	1.32

Source: IMPLAN Model, Southern California's seven counties

Wage and Salary Jobs and Self-Employment: If the 687,837 employed persons associated with logistics had not had work, the sector's indirect and induced impact on other parts of the economy would have meant that 753,179 other people would not have jobs. Combined, the economy would have had 1,441,016 fewer wage and salary jobs and self-employed people. That was 2.09 times the jobs associated with the sector itself.

Income: Without the logistics sectors, $52.6 billion in income would not have been paid to people associated with the group. In addition, $46.0 billion in income would not have been earned elsewhere in the economy, as the indirect and induced would not have occurred. Combined, people would have earned $98.6 billion less income. That was 1.88 times the income loss from the sector itself.

- **Employee Income:** Without the logistics sectors, $33.8 billion in income would not have been paid to workers associated with the group. In addition, $28.1 billion in income would not have been earned elsewhere in the economy, since the indirect and induced impacts would not have been created. Combined, people would have been paid $61.9 billion less in wages and salaries. That was 1.83 times the income loss from the sector itself.
- **Self Employment Income:** Without logistics sectors, $3.5 billion in income would not have been paid to entrepreneurs associated with the group. In addition, $4.2 billion in income would not have been earned by proprietors elsewhere in the economy, as the indirect and induced impacts would not have occurred. Combined, these business owners would have earned $7.7 billion less income. That was 2.20 times the income loss from the sector itself.
- **Other Property Income:** Without the logistics sectors, $15.3 billion in corporate profits, rents, and other property income would not have been paid to people associated with the group. In addition, $13.8 billion in such income would not have been earned elsewhere in the economy, as the indirect and induced impacts would not have occurred. Combined, these property owners would have earned $29.0 billion less income. That was 1.90 times the income loss from the sector itself.

Indirect Business Taxes: Without the logistics sectors, $11.1 billion in sales taxes, property taxes, fees, licenses and excise taxes would not have been paid to government. In addition, government would have lost another $3.5 billion in revenue since the indirect and induced activity would not occur in other parts of the economy. Combined, the government would not have seen $14.6 billion in indirect business taxes. That was 1.32 times the tax loss in the sector itself.

Exhibit 39.-Full Impact of Logistics Sectors on Southern California Economy, 2003

Activity	Full Economy	Logistics Reduction	Other Sectors Indirect/Induced	Total Reduction	Share of Economy
Economic Activity	$1,375,317,451,279	$90,667,190,016	$79,729,690,845	$170,396,880,861	12.4%
Value Added	$812,662,857,216	$63,629,838,928	$49,529,446,073	$113,159,285,001	13.9%
Employment	11,321,518	687,837	753,179	1,441,016	12.7%
Income	$750,618,332,001	$52,571,546,809	$46,003,834,063	$98,575,380,872	13.1%
Employee Income	$448,056,070,268	$33,822,760,088	$28,063,289,957	$61,886,050,045	13.8%
Proprietor Income	$75,336,482,236	$3,490,633,569	$4,180,408,964	$7,671,042,533	10.2%
Other Property Income	$227,225,779,497	$15,258,153,152	$13,760,135,142	$29,018,288,294	12.8%
Indirect Business Taxes	$62,044,525,215	$11,058,290,946	$3,525,612,052	$14,583,902,998	23.5%

Source: Exhibits 37-38

Full Economic Impact of Existing Logistics Sectors

Putting these results together, the following are the full impacts of the logistics sectors on Southern California's economy, as shown in Exhibit 39.

Economic Activity: $170.4 billion of the region's $1,375.3 billion in economic transactions occurred because of the logistics group, a **12.4%** share.

Value Added: $113.2 billion of the region's $812.7 billion in total value created occurred because of the logistics group, a **13.9%** share.

Employment: 1,441,016 of the region's 11,321,518 wage and salary and self-employment jobs existed because of the logistics group, a **12.7%** share.

Income: $98.6 billion of the region's $750.6 billion in total income was earned due to the logistics group, a **13.1%** share. This included:

- **Wage & Salary Income:** $61.9 billion of the region's $448.1 billion in wage and salary income or **13.8%** existed because of logistics.
- **Self-Employment Income:** $7.7 billion of the region's $75.3 billion in proprietorship income or **10.2%** existed because of logistics.
- **Property Income:** $29.0 billion of the $227.2 billion in corporate profit, rent, and other property income or **12.8%** existed because of logistics.

Indirect Business Taxes: $14.6 billion of the region's $62.0 billion in sales taxes, property taxes, fees, licenses, and excise taxes paid to government occurred because of the logistics group, a **23.5%** share.

Note: The importance of logistics to indirect business taxes likely comes about because direct sales of taxable items from warehousing firms is a major growing source of sales taxes in those communities with high concentrations of such facilities.[43]

Note: The full impacts described do not include any offsets if workers and resources could have found their way into other sectors willing to employ them as opposed to leaving or not coming to the region or remaining idle.

6.4 Multipliers and Forecasting the Impact of Logistics Sector Growth

How will changes in the logistics sector impact the 7-county Southern California economy? The key is to determine the multiple by which $1.00 reaching Southern California's economy through its logistics sectors causes the economy to increase as the money changes hands locally. A corollary is to find the extent to which one new job that is financed by funds entering Southern California's logistic sector, in turn, supports jobs elsewhere in the economy. These ratios are referred to in an economist's shorthand as "multipliers."

The primary use of the IMPLAN model is to forecast these kinds of impacts. The model uses its input-output equations to determine the direct impact of the new dollars flowing into an economy and the indirect and induced effects created as the money circulates through it.

Here, an analogy to an Old Western gold mining town might be helpful. There, the direct effect came about as outside monies came to the town's miners in exchange for gold. The miners, in turn, created the secondary tier of the town's economy when they re-spent the money locally:

- Indirect effects occurred when the mines purchased tools at the general store.
- Induced effects occurred when the miners and general store employees bought food, went to the barber shop, paid the sheriff, or went to the saloon.

The bigger the flow of "outside" money to the gold mines, the larger the "secondary" tier of indirect and induced activity that occurred in a town. However, when the mines went dry, the flow of "outside" dollars dried up, and the secondary tier of indirect and induced effects disappeared, creating a ghost town.

Assumptions: To facilitate calculations, assume that the logistics sector's activity increases 10% above its 2003 level ($90.7 billion) or $9.1 billion. Further, assume that this increase comes entirely from funds flowing into the sector from entities not in Southern California (e.g., international or non-Southern California shippers using the area's logistics system). For simplicity, assume that each logistics group is affected proportionately.

Note: The level of extra spending is not the key. The multiplier ratios apply to any level. The purpose of the exercise is thus to determine the size of the multipliers. The example assumed a hypothetical increase in funds entering from the outside world so that those multipliers could be generated.

A question arises about the fact that some trade creates a lot of impact on Southern California and other trade very little. The IMPLAN equations that determine multipliers were created from the actual economy in which the existing dollar values impacting Southern California's economy come from a mix of activities some of which have a significant local economic impact (*i.e., those subjected to extensive local handling*) and some of which do not (*i.e., those that directly leave the area by rail*). As a result, the impact of these differences are already in the modeling and incorporated into the multiplier ratios resulting from this exercise. The fact that some imported trade immediately leaves Southern California is the reason the multipliers are relatively small compared to those often found in this form of work.

In applying these multipliers to an increase in trade activity in Southern California, the key is to sort out the difference between changes at the ports driven by local dollars and those driven by outside dollars. Once that is done, then the multipliers apply as derived. That is done in looking at forecasts of changes in levels of trade entering the region.

Direct Spending Multiplier

The IMPLAN model for Southern California finds that the extra **$9.1 billion** in direct economic activity in the logistic sectors would have the following effects:

- As logistics firms buy goods and services from other Southern California firms, the model indicates that an additional $2.7 billion in indirect activity would be created.
- With more firms receiving and spending money, and household incomes rising and being spent on local goods and services, the IMPLAN model estimates that an additional $6.1 billion in induced economic activity would be created.
- Ultimately, all these forces will have played out as the money eventually leaks away to other regions. By then, the full impact will be **$9.1 billion** in direct, $2.7 billion in indirect and $6.1 billion in induced activity or an increase of **$17.9 billion** in Southern California's total economic activity.
- Each **$1.00** reaching Southern California through its logistics group would thus raise the region's activity by **1.97** times that amount.

Exhibit 40.-Direct, Indirect, and Induced Multipliers From Increased Logistics Activity

Logistics Sector	Direct Impact	Share	Indirect Impact	Induced Impact	Total Secondary	Total Impact	Multiplier
Wholesale Trade	$6,422,546,000	70.8%					
Air Transportation	$622,382,000	6.9%					
Rail Transportation	$148,610,000	1.6%					
Water Transportation	$108,242,000	1.2%					
Truck Transportation	$1,086,682,000	12.0%					
Couriers	$366,327,000	4.0%					
Warehousing & Storage	$311,930,000	3.4%					
Economic Activity	$9,066,719,000	100.0%	$2,721,995,000	$6,086,901,000	$8,808,896,000	$17,875,615,000	1.97
Value Added	$6,362,984,000		$1,540,037,000	$3,992,341,000	$5,532,378,000	$11,895,362,000	1.87
Employment	68,784		21,393	60,770	82,163	150,947	2.19
Income	5,257,154,712		1,419,652,663	1,408,693,247	2,828,345,910	8,085,500,622	1.54
Wages & Salaries	3,382,276,101		854,972,995	2,264,734	857,237,729	4,239,513,830	1.25
Self-Employed Pay	349,063,338		161,920,695	291,189,722	453,110,417	802,173,755	2.30
Property Income	1,525,815,273		402,758,973	1,115,238,791	1,517,997,764	3,043,813,037	1.99
Indirect Business Taxes	1,105,829,147		120,384,053	321,552,750	441,936,803	1,547,765,950	1.40

Source: IMPLAN model with assumptions as indicated

Employment Multiplier

As the economic activity described in the Measures of Economic Impact section takes places, the IMPLAN model also shows the employment impacts of the new spending. Specifically:

- There would be 68,784 new jobs directly created in Southern California's logistic sectors.
- As logistics firms buy goods and services from other Southern California firms, 21,393 additional jobs would be indirectly created.

- With more firms receiving and spending money and household incomes rising and being spent on local goods and services, an additional 60,770 jobs would result from the induced economic activity.
- The full impact of creating the initial **68,784 jobs** would thus be a total wage and salary and self employment expansion of **150,947 jobs**.
- **Each new job** created in Southern California's logistics group would thus support **2.19** times that number of jobs in the economy. The workers in those other jobs would likely not know that it was the logistics sector that ultimately created work for them.

Other Impacts

As the economic scenario described under the Direct Spending Multiplier section plays out, the IMPLAN model also shows that other forms of economic activity would expand as shown in Exhibit 40.

Income

Total income would expand due to increased direct ($5.3 billion), indirect ($1.4 billion), and induced ($2.8 billion) impacts, giving local households $8.1 billion in extra income. This would include extra wages and salaries ($4.2 billion), self-employment income ($0.8 billion), and property income ($3.0 billion).

Indirect Taxes

As the new funds move through Southern California's economy, the direct, indirect, and induced impacts will cause sales taxes, property taxes, fees, licenses, and excise taxes paid to government to rise by a total of $1.5 billion.

Logistics Multipliers by Sub-Sector

Rather than lump the logistics sectors together, it is possible to determine the output and employment multipliers from increased outside spending reaching any one of the sub-sectors. Calculations were made assuming a $1 billion increase in each sector, separately, to calculate these expansion ratios. Again, **the level of extra spending is not the key, the multiplier ratios apply to any level** as shown in Exhibit 41.

Wholesale Trade

$1 billion in outside funding injected into the Southern California economy through the wholesale trade sector would create a total of $1.95 billion in direct, indirect, and induced economic activity, a multiplier of **1.95**. In addition, that level of new spending would add **7,166 jobs** directly in the sector and a total of 16,386 into the economy, a multiplier of **2.29**.

Air Transportation

$1 billion in outside funding injected into the Southern California economy through the air transportation sector would create a total of $2.05 billion in direct, indirect, and induced economic activity, a multiplier of

2.05. In addition, that level of new spending would add **4,541 jobs** directly in the sector and a total of 13,547 into the economy, a multiplier of **2.98**. The sector's lower level of direct employment reflects its high level of capital intensiveness.

Exhibit 41.-Logistics Sub-Sectors Output and Employment Multipliers

Logistics Sector	Direct Impact	Indirect Impact	Induced Impact	Total Impact	Multiplier
Wholesale Trade Only	$1,000,000,000	$239,235,367	$712,566,964	$1,951,802,331	1.95
	7,166	2,009	7,211	16,386	2.29
Air Transportation	$1,000,000,000	$509,515,482	$540,084,339	$2,049,599,821	2.05
	4,541	3,765	5,241	13,547	2.98
Rail Transportation	$1,000,000,000	$307,172,558	$510,291,441	$1,817,463,999	1.82
	3,943	2,283	4,885	11,111	2.82
Water Transportation	$1,000,000,000	$380,790,248	$472,802,455	$1,853,592,703	1.85
	2,147	5,417	4,601	12,165	5.67
Truck Transportation	$1,000,000,000	$520,062,441	$592,974,407	$2,113,036,848	2.11
	9,280	3,630	5,659	18,569	2.00
Couriers	$1,000,000,000	$293,998,557	$591,121,230	$1,885,119,787	1.89
	15,122	1,988	5,621	22,731	1.50
Warehousing & Storage	$1,000,000,000	$244,287,506	$597,373,127	$1,841,660,633	1.84
	11,204	1,763	5,652	18,619	1.66

Source: IMPLAN Model Used with $1,000,000,000 assumption for each logistics sub-sector

Rail Transportation

$1 billion in outside funding injected into the Southern California economy through the rail transportation sector would create a total of $1.82 billion in direct, indirect, and induced economic activity, a multiplier of **1.82**. In addition, that level of new spending would add **3,943 jobs** directly in the sector and a total of 11,111 into the economy, a multiplier of **2.82**. The sector's still lower level of direct employment reflects its even higher level of capital intensiveness.

Water Transportation

$1 billion in outside funding injected into the Southern California economy through the water transportation sector would create a total of $1.85 billion in direct, indirect, and induced economic activity, a multiplier of **1.85**. In addition, that level of new spending would add **2,147 jobs** directly in the sector and a total of 12,165 into the economy, a multiplier of **5.67**. The sector had the lowest level of direct employment, reflecting its highest capital intensiveness. However, it takes many workers to support the sector, and workers are well paid, so the direct and induced effects yield the highest employment multiplier of the group.

Truck Transportation

$1 billion in outside funding injected into the Southern California economy through the truck transportation sector would create a total of $2.11 billion in direct, indirect, and induced economic activity, a multiplier of **2.11**. In addition, that level of new spending would add **9,280 jobs** directly in the sector and a total of 18,569 into the economy, a multiplier of **2.00**. The sector had relatively high direct employment as the sector's output requires a lot of workers (e.g., one per truck).

Couriers

$1 billion in outside funding injected into the Southern California economy through the courier sector would create a total of $1.89 billion in direct, indirect, and induced economic activity, a multiplier of **1.89**. In addition, that level of new spending would add **15,122 jobs** directly in the sector and a total of 22,731 into the economy, a multiplier of **1.50**. The sector's very high direct employment exists because its activities remain relatively labor intensive. Its low employment multiplier is a reflection of the lower average pay compared to the other logistics sectors.

Warehousing

$1 billion in outside funding injected into the Southern California economy through the warehousing sector would create a total of $1.84 billion in direct, indirect, and induced economic activity, a multiplier of **1.84**. In addition, that level of new spending would add **11,204 jobs** directly in the sector and a total of 18,619 into the economy, a multiplier of **1.66**. The sector's relatively high direct employment exists because it is still somewhat labor intensive. Its low employment multiplier is also a reflection of somewhat lower average pay compared to the other logistics sectors.

Direct Rail Versus Transloaded Freight.

An important issue for which no multipliers exist is the question of the economic and job impacts of the differences between two kinds of cargo flows. One is freight that comes off of ships and is directly loaded on to trains for shipments out of Southern California. The other is for freight that arrives at the ports and moves by truck to cross docks, intermodal facilities or warehouses for further processing. This is called "transloaded" freight.

Freight that moves directly out of the area by train has almost no Southern California impact since it involves very little local value added activity or employment creation. It would thus have multipliers close to zero. On the other hand, almost all of the economic impact from goods movement involves freight that undergoes some form(s) of local handling or transloading. The multipliers for this type of cargo would be higher than those shown above. That is the case as the multipliers above are averages that that include the impact of both directly shipped freight and transloaded freight. The directly shipped freight thus dampens the size of the multipliers.

To the extent that Southern California wishes to maximize the economic impact of goods movement, this distinction argues for having the area seek to maximize transloaded freight and discourage cargo that directly leaves the region by rail.

Economic Impact Summary

When outside money reaches Southern California's logistics sectors, it directly expands the region's economic activity, employment, income, and government revenues. As the same money reaches firms supplying goods and services to the sector, an indirect expansion occurs. Ultimately, the funds reach other firms and households. As they spend, it induces a further expansion in the economy. The IMPLAN model quantifies the level of these expansions, depending on what sectors first receive the new funds.

Other

A request was made to comment on work by the Public Policy Institute of California (*PPIC*) on the issue of international trade through the ports. The 2004 study, California's Globe Gateways: Trends and Issues was thus reviewed. The study is a good understanding of the issue in 2003-2004. However, thinking has advanced considerably since then. The need for environmental and the infrastructure investments are clearer as well as what those investments need to be. There has been a sharpening of the potential mix of public and private financing vehicles that can finance both. There has also been specificity developed in terms of the federal legislation needed to deal with these issues. The one area that is not covered in the PPIC report is the employment impact of trade, not in gross numbers, but in terms of the potential that job creation related to trade offers to blue collar workers in terms of career paths leasing to the Middle Class largely via on-the-job learning. This is an important factor given the 44% share of adult workers in Southern California who have not been educated beyond high school.

[1] See Sections 1.6 for detailed discussion of logistics facilities and operation of the system.

[2] See Sections 1.1 to 1.5 for detailed discussion of the economic challenge facing Southern California.

[3] See detailed discussion of pay levels and skill ladders of logistics sectors in Section 3.0.

[4] See Section 2.0 for details of logistics sector definitions and mean pay scales for workers in blue collar sectors.

[5] See Section 5.0 for detailed discussion of the drivers impacting the growth of logistics in Southern California.

[6] See Section 4.0 for detailed discussion of square footage per job in logistics and manufacturing.

[7] See Section 6.0 for detailed discussion of macro-economic impacts.

[8] Imperial County is not in the Southern California average as it was too small to be included in the 2004 American Community Survey. If its share were unchanged by 2004, it would raise the Southern California figure to 44.2%.

[9] San Diego County's communities are part of the San Diego Association of Governments, not SCAG.

[10] The others were: agriculture (-9,700), mining (-6,600), and utilities (-3,400).

[11] Port of Los Angeles Portwide Rail Synopsis, Jones and Stokes, page 10.

[12] Sea-going containers are typically 40 feet long (2 TEUs); landside containers are most often 53 feet long. Goods are typically transloaded from one to the other in Southern California.

[13] Port and Modal Elasticity Study Elasticity Study, Dr. Robert Leachman, Ph.D., under contract to Southern California Association of Governments, 2005. According to Leachman, the breakeven point for a rail versus truck decision is at 769 miles.

[14] Southern California Regional Strategy for Goods Movement: A Plan For Action, 2005, page 18.

[15] Goods Movement Truck and Rail Study, The Tioga Group under contract to Southern California Association of Governments, 2003, Executive Summary.

[16] Pier*PASS* OffPeak Program Diverts 2 Millionth Truck from Los Angeles Daytime Traffic, news release, May 25, 2006.

[17] Consolidation Activity in Southern California Area, BST Associates under contract to Alameda Corridor Transportation Authority, 2003.

[18] Port & Modal Elasticity Study, Dr. Robert Leachman, Leachman & Associates under contract to SCAG

[19] Quarterly Census of Employment and Wages. These data are generated quarterly and provide the employment, number of establishments, and payroll for employers enrolled in the Unemployment Insurance Program. This information is collected through a federal-state cooperative agreement between the U.S. Bureau of Labor Statistics and the California EDD. To access these data :http://www.labormarketinfo.edd.ca.gov/cgi/dataanalysis/AreaSelection.asp?tableName=Industry. The program was formerly called the ES202 Program.

[20] The Labor Market for Port Drivers in Southern California, Kristen Monaco, California State University Long Beach, August 30, 2005, pages 17-18. This paper used information from Study of Drayage at the Ports of Los Angeles and Long Beach, Kristen Monaco and Lisa Grobar, December 15, 2004.

[21] Non-Employer Statistics, Truck Transportation, U.S. Census Bureau. 2003 data based upon Non-Employer Statistics that provide U.S. and sub-national economic data by industry for businesses that have no paid employees and are subject to federal income tax. Data are primarily comprised of sole proprietorship businesses filing IRS Form 1040, Schedule C, although some of the data is derived from filers of partnership and corporation tax returns that report no paid employees. Updated annually using 2002 Census data as a base.

[22]Total Railroad Employment by State And County, Calendar Year 2004, U.S. Railroad Retirement Board.

[23]Wage and Salary Accruals per Full-Time Equivalent Employee by Industry, Table 6.6D, U.S. National Income and Product Accounts, U.S. Bureau of Economic Analysis, 2004.

[24] In a prior study (Logistics & Distribution: An Answer to Regional Upward Social Mobility, Husing, 2004) using 2003 data for just SCAG counties (San Diego omitted) and without independent truckers, it was found that logistics paid a little more than manufacturing. The 2005 data yield the same result. In the SCAG area only, manufacturing averaged $47,466 and the logistics group without independent truckers averaged $48,048. The inclusion of independent truckers (average pay: $31,093) lowers the 2005 logistics in the SCAG region to $47,270. The inclusion of San Diego County (manufacturing average: $55,620) raised the manufacturing to $48,397 and logistics with independent truckers to $47,411.

[25] The use of wage and salary data for this comparison omits the changes in self-employed truckers due to lack of data for 1990.

[26]Occupational Employment Statistics (OES) survey is a semiannual mail survey measuring occupational employment and occupational wage rates for wage and salary workers in non-farm establishments, by industry, by area. The survey samples about 37,000 establishments per year, taking 3 years to fully collect the sample of approximately 113,000 establishments in California. Wage data for all geographical areas are updated by applying the U. S. Department of Labor's Employment Cost Index to the wage database. The updated wage data have not been validated by BLS. However, EDD indicates that they feel that the updated information is useful to users of wage data.

[27]http://www.labormarketinfo.edd.ca.gov/cgi/dataanalysis/AreaSelection.asp?tableName=Oeswage provides Occupational Employment Statistics by SMA for the major counties and Imperial under OES Survey Region.

[28] CA Industry Staff Patterns are created from the data on the 113,000 establishments sampled during the OES survey. Using http://www.calmis.ca.gov/file/IOMatrix/Staffing-Patterns1.htm, staffing patterns and experience or educational levels by OES code are available for the numerous sub-sectors of the logistics group.

[29] BLS Training Level Definitions at EDD website:
http://www.calmis.cahwnet.gov/FILE/resource/BLStrainlvl.htm

[30] Note that four of the categories involve no institutional training beyond high school. The exceptions are two levels involving community college or trade school degrees and two levels involving college degrees.

[31]From the Quarterly Census of Employment and Wages based on unemployment insurance filings (*see footnote 1*).

[32] A study of entry-level pay in various logistics functions in San Bernardino County found: general warehouse associate (no equipment usage) $10/hour; forklift operator, few at $10/hour, most $12-$14/hour; Class A truck drivers, $12-$18/hour; receptionist (no computer usage) $9-$10/hour; data entry clerk/shipping clerk/receiving clerk $12-$14/hour, Kathi Rodriquez, Director of High Growth Job Initiatives, Chaffey College.

[33] Merrick-Memorial Neighborhood Redevelopment, Plan, Vanasse Hanger Brustlin, Inc., December 1, 2004.

[34] Documenting the Economic Contribution of Office, Industrial, and Retail Real Estate to the Local Community, Stephen Fuller, Ph.D., George Mason University, October 2004.

[35] 2004 Regional Transportation Program, Southern California Association of Governments, 2004, page. 36.

[36] E-5 Report, Demographic Research Unit, CA Department of Finance, 2006.

[37] SCAG draft Preliminary 2008 RTP baseline technical projections, 2006.

[38] Taxable Sales in California, CA State Board of Equalization, 1994-2004; adjusted by Los Angeles-Anaheim-Riverside Consumer Price Index, U.S. Bureau of Labor Statistics, E-5 Report, CA Department of Finance. 1994 used as starting point, as Southern California's 1990-1993 recession/depression was an extreme anomaly due to the end of the Cold War and the loss of 485,956 jobs in a region inordinately dependent on defense spending.

[39] Quarterly U.S. Retail Sales (Not Adjusted): Total and E-commerce in Quarterly Retail E-Commerce Sales, U.S. Census Bureau, http://www.census.gov/mrts/www/ecomm.html.

[40] Interview with Jerry Washington, former manager, BNSF's Intermodal yard, San Bernardino.

[41] Port Import Export Reporting Service data collected from vessel manifests and bills of lading.

[42] IMPLAN Professional Version 2.0, Minnesota IMPLAN Group, Inc.

[43] Examples: In Ontario, 31.2% of its 1990-2004 change in retail sales is from non-store sales. In Corona, it was 41.0%. It was 36.3% in Chino. By contrast, it was 14.5% in Temecula, a suburban city without a concentration of such facilities, and 26.0% in Garden Grove, a mature city with a modest sized industrial area.

OES Codes for Educational & Functional Categories

By Sector, With 2002 Weights

Code	Education Level Category
1	Work Experience & Bachelor's or Higher
2	Bachelor's Degree
3	Post-Secondary Vocational Education
4	Associate's Degree
5	Long-Term On-the-Job Training
6	Moderate-Term On-the-Job Training
7	Work Experience Related Occupation
8	Short-Term On-the-Job Training

Code	Functional Category
1	Fixed Site Operations
2	Trucking or Field Operations
3	Administration & Admin. Support
4	Sales & Customer Support
5	Craft & Repair
6	Finance & Information

Note: Median Pay By Category Used With This Information Was The Weighted Average of Median Pay for OES Codes In The Seven Southern California Counties

WAREHOUSING & DISTRIBUTION SECTORS

Motor Vehicle/Part Merchant Wholesalers NAICS Code 423100

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	1,100
113071	1	1	Transportation, Storage, and Distribution Managers	100
119199	3	1	Managers, All Other	400
339032	8	1	Security Guards	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	600
435061	8	1	Production, Planning, and Expediting Clerks	100
435071	8	1	Shipping, Receiving, and Traffic Clerks	1,600
435081	8	1	Stock Clerks and Order Fillers	1,900
435111	8	1	Weighers, Measurers, Checkers, and Samplers, Recordkeeping	500
499042	6	1	Maintenance and Repair Workers, General	300
499099	6	1	Installation, Maintenance, and Repair Workers, All Other	200
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	200
512092	8	1	Team Assemblers	500
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	400
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	200
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	2,300
537064	8	1	Packers and Packagers, Hand	100
493021	6	2	Automotive Body and Related Repairers	500
493023	6	2	Automotive Service Technicians and Mechanics	600
493031	6	2	Bus and Truck Mechanics and Diesel Engine Specialists	1,300
493052	6	2	Motorcycle Mechanics	100
519122	7	2	Painters, Transportation Equipment	100
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	300
533033	8	2	Truck Drivers, Light or Delivery Services	3,000
533099	8	2	Motor Vehicle Operators, All Other	1,400
537051	8	2	Industrial Truck and Tractor Operators	300
537061	8	2	Cleaners of Vehicles and Equipment	300
111011	1	3	Chief Executives	300
113011	1	3	Administrative Services Managers	100
113021	1	3	Computer and Information Systems Managers	100
113040	1	3	Human Resources Managers	100
113061	1	3	Purchasing Managers	100
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	400
131023	2	3	Purchasing Agents, Except Wholesale, Retail, and Farm Products	300
131073	2	3	Training and Development Specialists	100
131111	2	3	Management Analysts	200
131199	1	3	Business Operations Specialists, All Other	1,400
412011	8	3	Cashiers	200
412021	8	3	Counter and Rental Clerks	200
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	600
432011	7	3	Switchboard Operators, Including Answering Service	100

434151	8	3	Order Clerks	700
434171	8	3	Receptionists and Information Clerks	100
436011	7	3	Executive Secretaries and Administrative Assistants	500
436014	7	3	Secretaries, Except Legal, Medical, and Executive	200
439061	8	3	Office Clerks, General	1,900
439999	8	3	All other secretaries, administrative assistants,	300
112011	1	4	Advertising and Promotions Managers	100
112021	1	4	Marketing Managers	100
112022	1	4	Sales Managers	400
193021	4	4	Market Research Analysts	100
271024	4	4	Graphic Designers	100
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	300
412022	8	4	Parts Salespersons	2,200
412031	8	4	Retail Salespersons	400
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	200
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	4,100
419041	8	4	Telemarketers	200
434051	8	4	Customer Service Representatives	500
533031	8	4	Driver/Sales Workers	1,100
172141	2	5	Mechanical Engineers	100
172199	2	5	Engineers, All Other	100
173023	2	5	Electrical and Electronic Engineering Technicians	0
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	400
514041	6	5	Machinists	500
514121	5	5	Welders, Cutters, Solderers, and Brazers	300
113031	1	6	Financial Managers	300
132011	2	6	Accountants and Auditors	400
132041	2	6	Credit Analysts	100
151021	2	6	Computer Programmers	200
151041	2	6	Computer Support Specialists	100
151051	2	6	Computer Systems Analysts	100
151071	2	6	Network and Computer Systems Administrators	0
433011	8	6	Bill and Account Collectors	300
433021	8	6	Billing and Posting Clerks and Machine Operators	200
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	1,400
433051	8	6	Payroll and Timekeeping Clerks	100
439011	7	6	Computer Operators	100
439021	7	6	Data Entry Keyers	100
				41,200

Lumber and Supply Merchant Wholesalers NAICS Code 423300

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	700
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	0
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	400
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	100
435071	8	1	Shipping, Receiving, and Traffic Clerks	400
499042	6	1	Maintenance and Repair Workers, General	100
499099	6	1	Installation, Maintenance, and Repair Workers, All Other	0
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	100
512092	8	1	Team Assemblers	800
512099	8	1	Assemblers and Fabricators, All Other	100
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	100
519111	7	1	Packaging and Filling Machine Operators and Tenders	0
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	200
537011	7	1	Conveyor Operators and Tenders	0
537032	7	1	Excavating and Loading Machine and Dragline Operators	100
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	2,900
537064	8	1	Packers and Packagers, Hand	100
493031	6	2	Bus and Truck Mechanics and Diesel Engine Specialists	100
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	200
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	2,100
533033	8	2	Truck Drivers, Light or Delivery Services	1,000
537051	8	2	Industrial Truck and Tractor Operators	1,500
111011	1	3	Chief Executives	100
113011	1	3	Administrative Services Managers	100
113061	1	3	Purchasing Managers	100
131021	3	3	Purchasing Agents and Buyers, Farm Products	0
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	200
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	400
434151	8	3	Order Clerks	300
434171	8	3	Receptionists and Information Clerks	200
436011	7	3	Executive Secretaries and Administrative Assistants	100
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
439061	8	3	Office Clerks, General	400
112022	1	4	Sales Managers	200
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	100
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	3,300
472031	3	5	Carpenters	100
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	100
514041	6	5	Machinists	100
514121	5	5	Welders, Cutters, Solderers, and Brazers	0
517042	6	5	Woodworking Machine Setters, Operators, and Tenders, Except Sawing	200
519032	7	5	Cutting and Slicing Machine Setters, Operators, and Tenders	0
113031	1	6	Financial Managers	100

131051	3	6	Cost Estimators	100
132011	2	6	Accountants and Auditors	100
433011	8	6	Bill and Account Collectors	100
433021	8	6	Billing and Posting Clerks and Machine Operators	100
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	800
				18,400

Commercial Goods Merchant Wholesalers NAICS Code 423400

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	2.200
113071	1	1	Transportation, Storage, and Distribution Managers	100
119199	3	1	Managers, All Other	200
339032	8	1	Security Guards	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	1.200
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	100
435061	8	1	Production, Planning, and Expediting Clerks	600
435071	8	1	Shipping, Receiving, and Traffic Clerks	4.000
435081	8	1	Stock Clerks and Order Fillers	2.900
435111	8	1	Weighers, Measurers, Checkers, and Samplers, Recordkeeping	100
499042	6	1	Maintenance and Repair Workers, General	1.000
499098	8	1	Helpers--Installation, Maintenance, and Repair Workers	100
499099	6	1	Installation, Maintenance, and Repair Workers, All Other	200
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	300
512092	8	1	Team Assemblers	3.300
512099	8	1	Assemblers and Fabricators, All Other	300
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	500
519111	7	1	Packaging and Filling Machine Operators and Tenders	300
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	200
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	1.100
537064	8	1	Packers and Packagers, Hand	700
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	200
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	200
533033	8	2	Truck Drivers, Light or Delivery Services	1.000
537051	8	2	Industrial Truck and Tractor Operators	1.500
537061	8	2	Cleaners of Vehicles and Equipment	100
111011	1	3	Chief Executives	400
113011	1	3	Administrative Services Managers	200
113021	1	3	Computer and Information Systems Managers	900
113040	1	3	Human Resources Managers	200
113061	1	3	Purchasing Managers	200
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	1.000
131023	2	3	Purchasing Agents, Except Wholesale, Retail, and Farm Products	200
131041	3	3	Compliance Officers, Except Ag, Constr, Health-Safety, and Transportation	100
131073	2	3	Training and Development Specialists	100
131111	2	3	Management Analysts	100
131199	1	3	Business Operations Specialists, All Other	900
273042	4	3	Technical Writers	100
273043	4	3	Writers and Authors	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	1.300
432011	7	3	Switchboard Operators, Including Answering Service	200
434071	8	3	File Clerks	100
434151	8	3	Order Clerks	1.500
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	100
434171	8	3	Receptionists and Information Clerks	700
436011	7	3	Executive Secretaries and Administrative Assistants	900
436014	7	3	Secretaries, Except Legal, Medical, and Executive	700
439051	8	3	Mail Clerks and Mail Machine Operators, Except Postal Service	300
439061	8	3	Office Clerks, General	1.900
439071	8	3	Office Machine Operators, Except Computer	800
492011	3	3	Computer, Automated Teller, and Office Machine Repairers	5.000

112011	1	4	Advertising and Promotions Managers	100
112021	1	4	Marketing Managers	400
112022	1	4	Sales Managers	1,200
193021	4	4	Market Research Analysts	400
271024	4	4	Graphic Designers	100
273031	4	4	Public Relations Specialists	100
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	100
412031	8	4	Retail Salespersons	300
413011	8	4	Advertising Sales Agents	100
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	7,300
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	9,100
419031	7	4	Sales Engineers	400
419041	8	4	Telemarketers	900
419099	7	4	Sales and Related Workers, All Other	200
434051	8	4	Customer Service Representatives	2,100
533031	8	4	Driver/Sales Workers	100
113051	1	5	Industrial Production Managers	100
119041	1	5	Engineering Managers	200
172031	2	5	Biomedical Engineers	0
172061	2	5	Computer Hardware Engineers	200
172071	2	5	Electrical Engineers	100
172072	2	5	Electronics Engineers, Except Computer	200
172112	2	5	Industrial Engineers	100
172141	2	5	Mechanical Engineers	100
173023	2	5	Electrical and Electronic Engineering Technicians	900
173024	2	5	Electro-Mechanical Technicians	400
193099	4	5	Social Scientists and Related Workers, All Other	200
472031	3	5	Carpenters	200
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	800
492094	5	5	Electrical and Electronics Repairers, Commercial and Industrial Equipment	100
499061	6	5	Camera and Photographic Equipment Repairers	200
499062	6	5	Medical Equipment Repairers	300
499069	6	5	Precision Instrument and Equipment Repairers, All Other	700
512022	3	5	Electrical and Electronic Equipment Assemblers	200
514041	6	5	Machinists	200
514121	5	5	Welders, Cutters, Solderers, and Brazers	100
519083	3	5	Ophthalmic Laboratory Technicians	200
113031	1	6	Financial Managers	700
132011	2	6	Accountants and Auditors	1,000
132041	2	6	Credit Analysts	100
132051	2	6	Financial Analysts	100
132099	2	6	Financial Specialists, All Other	100
151021	2	6	Computer Programmers	2,000
151031	2	6	Computer Software Engineers, Applications	700
151032	2	6	Computer Software Engineers, Systems Software	800
151041	2	6	Computer Support Specialists	2,300
151051	2	6	Computer Systems Analysts	1,100
151061	2	6	Database Administrators	200
151071	2	6	Network and Computer Systems Administrators	600
151081	2	6	Network Systems and Data Communications Analysts	100
151099	2	6	Computer Specialists, All Other	1,200
433011	8	6	Bill and Account Collectors	700
433021	8	6	Billing and Posting Clerks and Machine Operators	1,600
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	1,900
433051	8	6	Payroll and Timekeeping Clerks	100
434041	8	6	Credit Authorizers, Checkers, and Clerks	200

434999	8	6	All other financial. information. and record clerk	0
439011	7	6	Computer Operators	900
439021	7	6	Data Entry Keyers	200
				85.600

Metal and Mineral Merchant Wholesalers NAICS Code 423500

OES Code	Education	Function	Job Title	*2002 Weights*
111021	1	1	General and Operations Managers	500
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	200
435071	8	1	Shipping, Receiving, and Traffic Clerks	600
435081	8	1	Stock Clerks and Order Fillers	400
499042	6	1	Maintenance and Repair Workers, General	100
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	200
512092	8	1	Team Assemblers	300
519111	7	1	Packaging and Filling Machine Operators and Tenders	100
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	100
537021	7	1	Crane and Tower Operators	200
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	900
537064	8	1	Packers and Packagers, Hand	0
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	700
533033	8	2	Truck Drivers, Light or Delivery Services	300
537051	8	2	Industrial Truck and Tractor Operators	600
111011	1	3	Chief Executives	100
113011	1	3	Administrative Services Managers	100
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	200
131199	1	3	Business Operations Specialists, All Other	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	200
434151	8	3	Order Clerks	200
434171	8	3	Receptionists and Information Clerks	100
436011	7	3	Executive Secretaries and Administrative Assistants	100
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
439061	8	3	Office Clerks, General	400
112022	1	4	Sales Managers	100
412031	8	4	Retail Salespersons	100
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	1,600
434051	8	4	Customer Service Representatives	100
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	0
512041	3	5	Structural Metal Fabricators and Fitters	200
514031	7	5	Cutting, Punching, and Press Machine Operators, Metal and Plastic	300
514041	6	5	Machinists	500
514121	5	5	Welders, Cutters, Solderers, and Brazers	600
514199	5	5	Metal Workers and Plastic Workers, All Other	200
113031	1	6	Financial Managers	100
132011	2	6	Accountants and Auditors	100
433011	8	6	Bill and Account Collectors	100
433021	8	6	Billing and Posting Clerks and Machine Operators	200
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	300
				11,400

Electric Goods Merchant Wholesalers NAICS Code 423600

OES Code	Education	Function	Job Title	*2002 Weights*
111021	1	1	General and Operations Managers	1,800
113071	1	1	Transportation, Storage, and Distribution Managers	200
119199	3	1	Managers, All Other	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	1,400
435061	8	1	Production, Planning, and Expediting Clerks	500
435071	8	1	Shipping, Receiving, and Traffic Clerks	2,700
435081	8	1	Stock Clerks and Order Fillers	1,300
435111	8	1	Weighers, Measurers, Checkers, and Samplers, Record keeping	100
499042	6	1	Maintenance and Repair Workers, General	100
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	300
512092	8	1	Team Assemblers	1,300
512099	8	1	Assemblers and Fabricators, All Other	200
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	1,000
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	200
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	1,100
537064	8	1	Packers and Packagers, Hand	500
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	100
533033	8	2	Truck Drivers, Light or Delivery Services	900
537051	8	2	Industrial Truck and Tractor Operators	300
537061	8	2	Cleaners of Vehicles and Equipment	0
111011	1	3	Chief Executives	300
113011	1	3	Administrative Services Managers	100
113021	1	3	Computer and Information Systems Managers	300
113040	1	3	Human Resources Managers	100
113061	1	3	Purchasing Managers	300
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	900
131023	2	3	Purchasing Agents, Except Wholesale, Retail, and Farm Products	200
131073	2	3	Training and Development Specialists	0
131199	1	3	Business Operations Specialists, All Other	500
412021	8	3	Counter and Rental Clerks	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	700
432011	7	3	Switchboard Operators, Including Answering Service	200
433061	8	3	Procurement Clerks	0
434151	8	3	Order Clerks	1,100
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	100
434171	8	3	Receptionists and Information Clerks	500
436011	7	3	Executive Secretaries and Administrative Assistants	700
436014	7	3	Secretaries, Except Legal, Medical, and Executive	600
439061	8	3	Office Clerks, General	1,900
492011	3	3	Computer, Automated Teller, and Office Machine Repairers	100

112011	1	4	Advertising and Promotions Managers	100
112021	1	4	Marketing Managers	200
112022	1	4	Sales Managers	900
193021	4	4	Market Research Analysts	100
271024	4	4	Graphic Designers	100
412022	8	4	Parts Salespersons	100
412031	8	4	Retail Salespersons	200
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	5,100
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	6,300
419031	7	4	Sales Engineers	500
419099	7	4	Sales and Related Workers, All Other	300
434051	8	4	Customer Service Representatives	2,000
119041	1	5	Engineering Managers	300
172061	2	5	Computer Hardware Engineers	100
172071	2	5	Electrical Engineers	400
172072	2	5	Electronics Engineers, Except Computer	700
172112	2	5	Industrial Engineers	100
172141	2	5	Mechanical Engineers	200
172199	2	5	Engineers, All Other	0
173023	2	5	Electrical and Electronic Engineering Technicians	1,000
173024	2	5	Electro-Mechanical Technicians	100
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	100
492022	3	5	Telecommunications Equip Installers and Repairers, Except Line Installers	100
492092	5	5	Electric Motor, Power Tool, and Related Repairers	1,500
492094	5	5	Electrical and Electronics Repairers, Commercial and Industrial Equipment	700
492097	5	5	Electronic Home Entertainment Equipment Installers and Repairers	100
499052	6	5	Telecommunications Line Installers and Repairers	100
514041	6	5	Machinists	200
514121	5	5	Welders, Cutters, Solderers, and Brazers	400
514199	5	5	Metal Workers and Plastic Workers, All Other	100
113031	1	6	Financial Managers	500
131051	3	6	Cost Estimators	100
132011	2	6	Accountants and Auditors	800
132041	2	6	Credit Analysts	100
151021	2	6	Computer Programmers	300
151031	2	6	Computer Software Engineers, Applications	200
151032	2	6	Computer Software Engineers, Systems Software	100
151041	2	6	Computer Support Specialists	300
151051	2	6	Computer Systems Analysts	300
151061	2	6	Database Administrators	100
151071	2	6	Network and Computer Systems Administrators	200
433011	8	6	Bill and Account Collectors	400
433021	8	6	Billing and Posting Clerks and Machine Operators	300
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	1,200
434041	8	6	Credit Authorizers, Checkers, and Clerks	200
439011	7	6	Computer Operators	200
439021	7	6	Data Entry Keyers	300
				50,700

Hardware & Plumbing Merchant Wholesalers NAICS Code 423700

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	800
113071	1	1	Transportation, Storage, and Distribution Managers	100
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	500
435061	8	1	Production, Planning, and Expediting Clerks	200
435071	8	1	Shipping, Receiving, and Traffic Clerks	1,200
435081	8	1	Stock Clerks and Order Fillers	1,100
499042	6	1	Maintenance and Repair Workers, General	100
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	100
512092	8	1	Team Assemblers	800
512099	8	1	Assemblers and Fabricators, All Other	100
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	100
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	300
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	1,300
537064	8	1	Packers and Packagers, Hand	1,000
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	300
533033	8	2	Truck Drivers, Light or Delivery Services	800
537051	8	2	Industrial Truck and Tractor Operators	400
111011	1	3	Chief Executives	100
113061	1	3	Purchasing Managers	100
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	500
131023	2	3	Purchasing Agents, Except Wholesale, Retail, and Farm Products	0
412011	8	3	Cashiers	100
412021	8	3	Counter and Rental Clerks	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	500
432011	7	3	Switchboard Operators, Including Answering Service	100
434151	8	3	Order Clerks	800
434171	8	3	Receptionists and Information Clerks	300
436011	7	3	Executive Secretaries and Administrative Assistants	300
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
439061	8	3	Office Clerks, General	700
112022	1	4	Sales Managers	200
271026	4	4	Merchandise Displayers and Window Trimmers	0
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	100
412022	8	4	Parts Salespersons	200
412031	8	4	Retail Salespersons	200
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	700
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	4,300
419031	7	4	Sales Engineers	100
419099	7	4	Sales and Related Workers, All Other	100
434051	8	4	Customer Service Representatives	700
172141	2	5	Mechanical Engineers	0
173023	2	5	Electrical and Electronic Engineering Technicians	100

491011	3	5 First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	200
493042	6	5 Mobile Heavy Equipment Mechanics, Except Engines	0
493053	6	5 Outdoor Power Equipment and Other Small Engine Mechanics	600
499021	6	5 Heating, Air Conditioning, and Refrigeration Mechanics and Installers	400
514041	6	5 Machinists	100
113031	1	6 Financial Managers	100
132011	2	6 Accountants and Auditors	200
151021	2	6 Computer Programmers	100
151041	2	6 Computer Support Specialists	100
433011	8	6 Bill and Account Collectors	200
433021	8	6 Billing and Posting Clerks and Machine Operators	300
433031	7	6 Bookkeeping, Accounting, and Auditing Clerks	700
439011	7	6 Computer Operators	100
439021	7	6 Data Entry Keyers	100
			22,900

Machinery & Supply Merchant Wholesalers NAICS Code 423800

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	2,200
113071	1	1	Transportation, Storage, and Distribution Managers	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	200
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	1,100
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	100
435061	8	1	Production, Planning, and Expediting Clerks	100
435071	8	1	Shipping, Receiving, and Traffic Clerks	2,400
435081	8	1	Stock Clerks and Order Fillers	1,000
499041	6	1	Industrial Machinery Mechanics	400
499042	6	1	Maintenance and Repair Workers, General	1,600
499043	6	1	Maintenance Workers, Machinery	100
499098	8	1	Helpers--Installation, Maintenance, and Repair Workers	100
499099	6	1	Installation, Maintenance, and Repair Workers, All Other	300
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	300
512092	8	1	Team Assemblers	800
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	200
519111	7	1	Packaging and Filling Machine Operators and Tenders	200
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	200
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	1,500
537064	8	1	Packers and Packagers, Hand	500
493023	6	2	Automotive Service Technicians and Mechanics	200
493031	6	2	Bus and Truck Mechanics and Diesel Engine Specialists	400
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	200
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	800
533033	8	2	Truck Drivers, Light or Delivery Services	1,600
537051	8	2	Industrial Truck and Tractor Operators	200
111011	1	3	Chief Executives	200
113011	1	3	Administrative Services Managers	100
113021	1	3	Computer and Information Systems Managers	100
113040	1	3	Human Resources Managers	0
113061	1	3	Purchasing Managers	200
131021	3	3	Purchasing Agents and Buyers, Farm Products	100
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	500
131023	2	3	Purchasing Agents, Except Wholesale, Retail, and Farm Products	200
131199	1	3	Business Operations Specialists, All Other	0
412011	8	3	Cashiers	100
412021	8	3	Counter and Rental Clerks	500
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	800
432011	7	3	Switchboard Operators, Including Answering Service	100
434151	8	3	Order Clerks	1,600
434171	8	3	Receptionists and Information Clerks	500
436011	7	3	Executive Secretaries and Administrative Assistants	400
436014	7	3	Secretaries, Except Legal, Medical, and Executive	300

439061	8	3	Office Clerks, General	2,200
112022	1	4	Sales Managers	400
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	300
412022	8	4	Parts Salespersons	1,100
412031	8	4	Retail Salespersons	300
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	1,600
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	10,900
419031	7	4	Sales Engineers	200
419041	8	4	Telemarketers	100
434051	8	4	Customer Service Representatives	700
533031	8	4	Driver/Sales Workers	100
172112	2	5	Industrial Engineers	200
173023	2	5	Electrical and Electronic Engineering Technicians	200
173024	2	5	Electro-Mechanical Technicians	100
472111	3	5	Electricians	100
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	700
492092	5	5	Electric Motor, Power Tool, and Related Repairers	100
492094	5	5	Electrical and Electronics Repairers, Commercial and Industrial Equipment	100
492098	5	5	Security and Fire Alarm Systems Installers	0
493041	6	5	Farm Equipment Mechanics	1,200
493042	6	5	Mobile Heavy Equipment Mechanics, Except Engines	2,000
514041	6	5	Machinists	600
514121	5	5	Welders, Cutters, Solderers, and Brazers	600
113031	1	6	Financial Managers	300
132011	2	6	Accountants and Auditors	400
151021	2	6	Computer Programmers	100
151041	2	6	Computer Support Specialists	100
151071	2	6	Network and Computer Systems Administrators	0
433011	8	6	Bill and Account Collectors	500
433021	8	6	Billing and Posting Clerks and Machine Operators	400
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	1,300
434041	8	6	Credit Authorizers, Checkers, and Clerks	100
439011	7	6	Computer Operators	100
				49,600

Misc Durable Goods Merchant Wholesalers NAICS Code 423900

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	1,200
113071	1	1	Transportation, Storage, and Distribution Managers	100
339032	8	1	Security Guards	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	700
435061	8	1	Production, Planning, and Expediting Clerks	100
435071	8	1	Shipping, Receiving, and Traffic Clerks	2,300
435081	8	1	Stock Clerks and Order Fillers	1,000
435111	8	1	Weighers, Measurers, Checkers, and Samplers, Recordkeeping	100
499042	6	1	Maintenance and Repair Workers, General	200
499099	6	1	Installation, Maintenance, and Repair Workers, All Other	100
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	200
512092	8	1	Team Assemblers	2,100
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	1,000
519111	7	1	Packaging and Filling Machine Operators and Tenders	1,400
519199	8	1	Production Workers, All Other	100
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	400
537011	7	1	Conveyor Operators and Tenders	200
537021	7	1	Crane and Tower Operators	100
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	8,500
537064	8	1	Packers and Packagers, Hand	500
537081	8	1	Refuse and Recyclable Material Collectors	100
493031	6	2	Bus and Truck Mechanics and Diesel Engine Specialists	100
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	200
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	1,200
533033	8	2	Truck Drivers, Light or Delivery Services	800
537051	8	2	Industrial Truck and Tractor Operators	900
111011	1	3	Chief Executives	200
113011	1	3	Administrative Services Managers	100
113021	1	3	Computer and Information Systems Managers	100
113040	1	3	Human Resources Managers	0
113061	1	3	Purchasing Managers	100
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	700
131023	2	3	Purchasing Agents, Except Wholesale, Retail, and Farm Products	100
131199	1	3	Business Operations Specialists, All Other	100
412011	8	3	Cashiers	200
412021	8	3	Counter and Rental Clerks	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	700
432011	7	3	Switchboard Operators, Including Answering Service	100
434151	8	3	Order Clerks	700
434171	8	3	Receptionists and Information Clerks	300
436011	7	3	Executive Secretaries and Administrative Assistants	400
436014	7	3	Secretaries, Except Legal, Medical, and Executive	400
439061	8	3	Office Clerks, General	2,100
112011	1	4	Advertising and Promotions Managers	100
112021	1	4	Marketing Managers	0
112022	1	4	Sales Managers	200
193021	4	4	Market Research Analysts	200
271021	4	4	Commercial and Industrial Designers	0
271024	4	4	Graphic Designers	200

273031	4	4	Public Relations Specialists	100
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	100
412031	8	4	Retail Salespersons	400
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	100
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	5,800
419011	7	4	Demonstrators and Product Promoters	200
419041	8	4	Telemarketers	100
419099	7	4	Sales and Related Workers, All Other	100
434051	8	4	Customer Service Representatives	700
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	100
493042	6	5	Mobile Heavy Equipment Mechanics, Except Engines	100
514041	6	5	Machinists	100
514121	5	5	Welders, Cutters, Solderers, and Brazers	200
519071	3	5	Jewelers and Precious Stone and Metal Workers	200
113031	1	6	Financial Managers	300
132011	2	6	Accountants and Auditors	600
132041	2	6	Credit Analysts	0
151021	2	6	Computer Programmers	100
151041	2	6	Computer Support Specialists	100
151051	2	6	Computer Systems Analysts	0
151071	2	6	Network and Computer Systems Administrators	100
433011	8	6	Bill and Account Collectors	400
433021	8	6	Billing and Posting Clerks and Machine Operators	200
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	900
433051	8	6	Payroll and Timekeeping Clerks	0
434041	8	6	Credit Authorizers, Checkers, and Clerks	100
439021	7	6	Data Entry Keyers	200
				42,200

Paper/Paper Product Merchant Wholesalers NAICS Code 424100

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	500
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	200
435061	8	1	Production, Planning, and Expediting Clerks	100
435071	8	1	Shipping, Receiving, and Traffic Clerks	800
499042	6	1	Maintenance and Repair Workers, General	0
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	100
512092	8	1	Team Assemblers	400
512099	8	1	Assemblers and Fabricators, All Other	100
519111	7	1	Packaging and Filling Machine Operators and Tenders	200
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	100
537011	7	1	Conveyor Operators and Tenders	0
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	600
537064	8	1	Packers and Packagers, Hand	200
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	500
533033	8	2	Truck Drivers, Light or Delivery Services	600
537051	8	2	Industrial Truck and Tractor Operators	600
111011	1	3	Chief Executives	0

131022	2	3	Wholesale and Retail Buyers, Except Farm Products	400
131023	2	3	Purchasing Agents, Except Wholesale, Retail, and Farm Products	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	400
433061	8	3	Procurement Clerks	100
434071	8	3	File Clerks	100
434151	8	3	Order Clerks	300
434171	8	3	Receptionists and Information Clerks	400
436011	7	3	Executive Secretaries and Administrative Assistants	100
436014	7	3	Secretaries, Except Legal, Medical, and Executive	300
439061	8	3	Office Clerks, General	600
112022	1	4	Sales Managers	200
271024	4	4	Graphic Designers	100
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	100
412031	8	4	Retail Salespersons	300
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	200
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	3,100
419041	8	4	Telemarketers	200
419099	7	4	Sales and Related Workers, All Other	300
434051	8	4	Customer Service Representatives	800
515021	5	5	Job Printers	100
515023	5	5	Printing Machine Operators	100
113031	1	6	Financial Managers	100
132011	2	6	Accountants and Auditors	100
433011	8	6	Bill and Account Collectors	100
433021	8	6	Billing and Posting Clerks and Machine Operators	100
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	800
439021	7	6	Data Entry Keyers	100
				14,700

Apparel/Piece Goods Merchant Wholesalers NAICS Code 424300

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	700
113071	1	1	Transportation, Storage, and Distribution Managers	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	400
435061	8	1	Production, Planning, and Expediting Clerks	200
435071	8	1	Shipping, Receiving, and Traffic Clerks	2,100
435081	8	1	Stock Clerks and Order Fillers	1,200
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	700
512092	8	1	Team Assemblers	100
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	1,100
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	100
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	1,100
537064	8	1	Packers and Packagers, Hand	900
533033	8	2	Truck Drivers, Light or Delivery Services	100
537051	8	2	Industrial Truck and Tractor Operators	100
111011	1	3	Chief Executives	100
113021	1	3	Computer and Information Systems Managers	0
113040	1	3	Human Resources Managers	0
113061	1	3	Purchasing Managers	100
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	400
131199	1	3	Business Operations Specialists, All Other	0
412011	8	3	Cashiers	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	1,000
432011	7	3	Switchboard Operators, Including Answering Service	100
433061	8	3	Procurement Clerks	100
434151	8	3	Order Clerks	700
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	0
434171	8	3	Receptionists and Information Clerks	200
436011	7	3	Executive Secretaries and Administrative Assistants	200
436014	7	3	Secretaries, Except Legal, Medical, and Executive	200
439061	8	3	Office Clerks, General	1,500
112011	1	4	Advertising and Promotions Managers	100
112021	1	4	Marketing Managers	100
112022	1	4	Sales Managers	100
193021	4	4	Market Research Analysts	200
271021	4	4	Commercial and Industrial Designers	100
271022	4	4	Fashion Designers	1,000
271024	4	4	Graphic Designers	200
271026	4	4	Merchandise Displayers and Window Trimmers	100
271099	4	4	All other art and design workers	500
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	300
412031	8	4	Retail Salespersons	500
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	0
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical & Scientific Products	4,000
419099	7	4	Sales and Related Workers, All Other	100
434051	8	4	Customer Service Representatives	600
113051	1	5	Industrial Production Managers	100
515023	5	5	Printing Machine Operators	600
516021	5	5	Pressers, Textile, Garment, and Related Materials	100
516031	7	5	Sewing Machine Operators	1,100
516051	7	5	Sewers, Hand	1,600
516062	7	5	Textile Cutting Machine Setters, Operators, and Tenders	0
516092	7	5	Fabric and Apparel Patternmakers	700
519031	7	5	Cutters and Trimmers, Hand	800
113031	1	6	Financial Managers	200

131051	3	6	Cost Estimators	100
132011	2	6	Accountants and Auditors	200
151021	2	6	Computer Programmers	100
151041	2	6	Computer Support Specialists	100
433011	8	6	Bill and Account Collectors	200
433021	8	6	Billing and Posting Clerks and Machine Operators	200
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	600
433051	8	6	Payroll and Timekeeping Clerks	0
434041	8	6	Credit Authorizers, Checkers, and Clerks	100
439011	7	6	Computer Operators	100
439021	7	6	Data Entry Keyers	100
				28,600

Grocery Product Merchant Wholesalers NAICS Code 424400

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	2,000
113071	1	1	Transportation, Storage, and Distribution Managers	300
119199	3	1	Managers, All Other	0
339032	8	1	Security Guards	100
352021	8	1	Food Preparation Workers	300
353021	8	1	Combined Food Preparation and Serving Workers, Including Fast Food	600
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	800
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	1,200
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	100
435061	8	1	Production, Planning, and Expediting Clerks	100
435071	8	1	Shipping, Receiving, and Traffic Clerks	1,800
435081	8	1	Stock Clerks and Order Fillers	2,800
435111	8	1	Weighers, Measurers, Checkers, and Samplers, Recordkeeping	0
451011	8	1	First-Line Supervisors/Managers of Farming, Fishing, and Forestry Workers	100
452011	8	1	Agricultural Inspectors	0
452041	8	1	Graders and Sorters, Agricultural Products	1,700
452092	8	1	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	100
499042	6	1	Maintenance and Repair Workers, General	700
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	700
512092	8	1	Team Assemblers	1,200
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	900
519111	7	1	Packaging and Filling Machine Operators and Tenders	2,200
519199	8	1	Production Workers, All Other	200
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	1,000
537011	7	1	Conveyor Operators and Tenders	100
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	9,100
537064	8	1	Packers and Packagers, Hand	2,700
493031	6	2	Bus and Truck Mechanics and Diesel Engine Specialists	300
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	600
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	4,600
533033	8	2	Truck Drivers, Light or Delivery Services	4,300
537051	8	2	Industrial Truck and Tractor Operators	1,800
537061	8	2	Cleaners of Vehicles and Equipment	200
111011	1	3	Chief Executives	200
113011	1	3	Administrative Services Managers	100
113021	1	3	Computer and Information Systems Managers	100
113040	1	3	Human Resources Managers	100
113061	1	3	Purchasing Managers	300
131021	3	3	Purchasing Agents and Buyers, Farm Products	500
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	1,000
131073	2	3	Training and Development Specialists	0
131199	1	3	Business Operations Specialists, All Other	100
412011	8	3	Cashiers	700
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	1,000
432011	7	3	Switchboard Operators, Including Answering Service	100

433061	8	3	Procurement Clerks	100
434071	8	3	File Clerks	100
434151	8	3	Order Clerks	800
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	100
434171	8	3	Receptionists and Information Clerks	300
436011	7	3	Executive Secretaries and Administrative Assistants	500
436014	7	3	Secretaries, Except Legal, Medical, and Executive	300
439061	8	3	Office Clerks, General	1,600
112011	1	4	Advertising and Promotions Managers	100
112021	1	4	Marketing Managers	100
112022	1	4	Sales Managers	500
193021	4	4	Market Research Analysts	0
271026	4	4	Merchandise Displayers and Window Trimmers	400
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	100
412031	8	4	Retail Salespersons	600
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	100
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	9,000
419011	7	4	Demonstrators and Product Promoters	0
419041	8	4	Telemarketers	100
419091	8	4	Door-To-Door Sales Workers, News and Street Vendors, and Related Workers	0
434051	8	4	Customer Service Representatives	1,200
533031	8	4	Driver/Sales Workers	6,000
113051	1	5	Industrial Production Managers	0
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	100
499091	6	5	Coin, Vending, and Amusement Machine Servicers and Repairers	100
513011	7	5	Bakers	1,700
513021	7	5	Butchers and Meat Cutters	500
513022	7	5	Meat, Poultry, and Fish Cutters and Trimmers	1,300
513023	7	5	Slaughterers and Meat Packers	100
513091	7	5	Food and Tobacco Roasting, Baking, & Drying Machine Operators & Tenders	0
513092	7	5	Food Batchmakers	200
513099	7	5	All other food processing workers	700
113031	1	6	Financial Managers	400
132011	2	6	Accountants and Auditors	500
132041	2	6	Credit Analysts	0
151021	2	6	Computer Programmers	100
151041	2	6	Computer Support Specialists	100
151071	2	6	Network and Computer Systems Administrators	0
433011	8	6	Bill and Account Collectors	300
433021	8	6	Billing and Posting Clerks and Machine Operators	600
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	1,700
433051	8	6	Payroll and Timekeeping Clerks	100
434041	8	6	Credit Authorizers, Checkers, and Clerks	100
439011	7	6	Computer Operators	300
439021	7	6	Data Entry Keyers	100
				77,800

Alcoholic Beverage Merchant Wholesalers NAICS Code 424800

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	200
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	400
435071	8	1	Shipping, Receiving, and Traffic Clerks	100
435081	8	1	Stock Clerks and Order Fillers	400
499042	6	1	Maintenance and Repair Workers, General	0
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	100
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	600
537064	8	1	Packers and Packagers, Hand	100
493031	6	2	Bus and Truck Mechanics and Diesel Engine Specialists	100
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	1,200
533033	8	2	Truck Drivers, Light or Delivery Services	800
537051	8	2	Industrial Truck and Tractor Operators	700
111011	1	3	Chief Executives	0
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	200
434171	8	3	Receptionists and Information Clerks	100
436011	7	3	Executive Secretaries and Administrative Assistants	100
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
439061	8	3	Office Clerks, General	300
112022	1	4	Sales Managers	300
271026	4	4	Merchandise Displayers and Window Trimmers	400
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	100
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	3,700
419011	7	4	Demonstrators and Product Promoters	100
434051	8	4	Customer Service Representatives	100
533031	8	4	Driver/Sales Workers	300
113031	1	6	Financial Managers	100
132011	2	6	Accountants and Auditors	100
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	200
				11,100

Misc Nondurable Goods Merchant Whsle NAICS Code 424900

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	1,300
113071	1	1	Transportation, Storage, and Distribution Managers	100
339032	8	1	Security Guards	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
373011	8	1	Landscaping and Groundskeeping Workers	200
373012	8	1	Pesticide Handlers, Sprayers, and Applicators, Vegetation	100
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	900
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	100
435061	8	1	Production, Planning, and Expediting Clerks	100
435071	8	1	Shipping, Receiving, and Traffic Clerks	2,300
435081	8	1	Stock Clerks and Order Fillers	4,400
451011	8	1	First-Line Supervisors/Managers of Farming, Fishing, & Forestry Workers	200
452041	8	1	Graders and Sorters, Agricultural Products	600
452091	8	1	Agricultural Equipment Operators	100
452092	8	1	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	2,300
499042	6	1	Maintenance and Repair Workers, General	400
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	300
512092	8	1	Team Assemblers	1,200
512099	8	1	Assemblers and Fabricators, All Other	100
519111	7	1	Packaging and Filling Machine Operators and Tenders	600
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	200
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	2,600
537064	8	1	Packers and Packagers, Hand	1,100
537199	8	1	Material Moving Workers, All Other	100
493031	6	2	Bus and Truck Mechanics and Diesel Engine Specialists	0
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	200
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	1,200
533033	8	2	Truck Drivers, Light or Delivery Services	1,800
537051	8	2	Industrial Truck and Tractor Operators	400
111011	1	3	Chief Executives	100
113011	1	3	Administrative Services Managers	100
113021	1	3	Computer and Information Systems Managers	100
113040	1	3	Human Resources Managers	100
113061	1	3	Purchasing Managers	100
131021	3	3	Purchasing Agents and Buyers, Farm Products	100
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	300
131199	1	3	Business Operations Specialists, All Other	200
273041	4	3	Editors	100
412011	8	3	Cashiers	600
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	800
433061	8	3	Procurement Clerks	100
434151	8	3	Order Clerks	1,000
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	100
434171	8	3	Receptionists and Information Clerks	200
436011	7	3	Executive Secretaries and Administrative Assistants	300
436014	7	3	Secretaries, Except Legal, Medical, and Executive	300
439061	8	3	Office Clerks, General	1,700
439081	8	3	Proofreaders and Copy Markers	100

439999	8	3	All other secretaries, administrative assistants,	200
112011	1	4	Advertising and Promotions Managers	100
112021	1	4	Marketing Managers	100
112022	1	4	Sales Managers	400
193021	4	4	Market Research Analysts	100
271023	4	4	Floral Designers	400
271024	4	4	Graphic Designers	200
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	300
412022	8	4	Parts Salespersons	100
412031	8	4	Retail Salespersons	1,000
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	800
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical & Scientific Products	6,900
419011	7	4	Demonstrators and Product Promoters	100
419041	8	4	Telemarketers	300
419099	7	4	Sales and Related Workers, All Other	100
434051	8	4	Customer Service Representatives	1,000
533031	8	4	Driver/Sales Workers	800
194011	4	5	Agricultural and Food Science Technicians	100
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	100
493041	6	5	Farm Equipment Mechanics	100
515023	5	5	Printing Machine Operators	100
516031	7	5	Sewing Machine Operators	200
519023	7	5	Mixing and Blending Machine Setters, Operators, and Tenders	100
113031	1	6	Financial Managers	200
132011	2	6	Accountants and Auditors	500
151021	2	6	Computer Programmers	200
151031	2	6	Computer Software Engineers, Applications	200
151032	2	6	Computer Software Engineers, Systems Software	100
151041	2	6	Computer Support Specialists	200
151071	2	6	Network and Computer Systems Administrators	100
151081	2	6	Network Systems and Data Communications Analysts	100
433011	8	6	Bill and Account Collectors	300
433021	8	6	Billing and Posting Clerks and Machine Operators	300
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	1,800
433051	8	6	Payroll and Timekeeping Clerks	100
439011	7	6	Computer Operators	100
439021	7	6	Data Entry Keyers	200
				47,500

Furniture & Furnishings Wholesalers NAICS 423200

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	600
113071	1	1	Transportation, Storage, and Distribution Managers	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	200
435061	8	1	Production, Planning, and Expediting Clerks	200
435071	8	1	Shipping, Receiving, and Traffic Clerks	1300
435081	8	1	Stock Clerks and Order Fillers	300
499099	6	1	Installation, Maintenance, and Repair Workers, All Other	300
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	200
512092	8	1	Team Assemblers	1800
512099	8	1	Assemblers and Fabricators, All Other	200
531021	3	1	First-Line Super.s/Mgrs. of Helpers, Laborers, & Material Movers, Hand	200
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	2600
537064	8	1	Packers and Packagers, Hand	500
531031	3	2	First-Line Super./Mgrs., Transport, Material-Moving Machine & Vehicles	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	300
533033	8	2	Truck Drivers, Light or Delivery Services	200
537051	8	2	Industrial Truck and Tractor Operators	500
111011	1	3	Chief Executives	100
113061	1	3	Purchasing Managers	0
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	200
131199	1	3	Business Operations Specialists, All Other	100
431011	7	3	First-Line Supervisors/Managers of Office & Admin. Support Workers	300
434151	8	3	Order Clerks	400
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	0
434171	8	3	Receptionists and Information Clerks	200
436011	7	3	Executive Secretaries and Administrative Assistants	200
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
439061	8	3	Office Clerks, General	1400
112022	1	4	Sales Managers	100
271024	4	4	Graphic Designers	100
271025	4	4	Interior Designers	200
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	0
412031	8	4	Retail Salespersons	100
414012	7	4	Sales Reps. Wholesale and Manufacturing, Except Technical & Scientific	2900
419031	7	4	Sales Engineers	100
434051	8	4	Customer Service Representatives	500
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	100
514121	5	5	Welders, Cutters, Solderers, and Brazers	100
516031	7	5	Sewing Machine Operators	400
516051	7	5	Sewers, Hand	100
516093	6	5	Upholsterers	200
517021	6	5	Furniture Finishers	200
113031	1	6	Financial Managers	100

132011	2	6	Accountants and Auditors	200
151071	2	6	Network and Computer Systems Administrators	0
433011	8	6	Bill and Account Collectors	200
433021	8	6	Billing and Posting Clerks and Machine Operators	200
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	600
439021	7	6	Data Entry Keyers	100
				19,200

Chemical Merchant Wholesalers, NAICS 424600

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	700
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	200
435061	8	1	Production, Planning, and Expediting Clerks	100
435071	8	1	Shipping, Receiving, and Traffic Clerks	500
435081	8	1	Stock Clerks and Order Fillers	100
499042	6	1	Maintenance and Repair Workers, General	200
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	300
512092	8	1	Team Assemblers	200
519061	3	1	Inspectors, Testers, Sorters, Samplers, and Weighers	200
519111	7	1	Packaging and Filling Machine Operators and Tenders	600
519198	8	1	Helpers--Production Workers	100
531021	3	1	First-Line Supervisors/Managers of Helpers, Laborers, and Material Movers, Hand	100
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	600
537064	8	1	Packers and Packagers, Hand	200
531031	3	2	First-Line Super/Mgr. Transport & Material-Moving Machine & Vehicle Operator	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	500
533033	8	2	Truck Drivers, Light or Delivery Services	400
537051	8	2	Industrial Truck and Tractor Operators	300
111011	1	3	Chief Executives	100
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	100
131199	1	3	Business Operations Specialists, All Other	100
431011	7	3	First-Line Supervisors/Managers of Office and Administrative Support Workers	200
434151	8	3	Order Clerks	300
434171	8	3	Receptionists and Information Clerks	100
436011	7	3	Executive Secretaries and Administrative Assistants	200
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
439061	8	3	Office Clerks, General	500
112022	1	4	Sales Managers	200
414011	8	4	Sales Reps, Wholesale & Manufacturing, Technical & Scientific Products	600
414012	7	4	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific	1500
434051	8	4	Customer Service Representatives	400
172141	2	5	Mechanical Engineers	100
192031	4	5	Chemists	100
519011	6	5	Chemical Equipment Operators and Tenders	0
519023	7	5	Mixing and Blending Machine Setters, Operators, and Tenders	100
113031	1	6	Financial Managers	100
132011	2	6	Accountants and Auditors	200
433011	8	6	Bill and Account Collectors	100
433021	8	6	Billing and Posting Clerks and Machine Operators	100
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	400
				11,000

Electronic Market Agent and Brokers, NAICS 425000

OES Code	Education	Function	Occupation	2002 Weights
119199	3	1	Managers, All Other	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	200
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	1,400
435011	8	1	Cargo and Freight Agents	200
435061	8	1	Production, Planning, and Expediting Clerks	100
435071	8	1	Shipping, Receiving, and Traffic Clerks	1,700
435081	8	1	Stock Clerks and Order Fillers	1,200
499042	6	1	Maintenance and Repair Workers, General	400
499043	6	1	Maintenance Workers, Machinery	100
499099	6	1	Installation, Maintenance, and Repair Workers, All Other	200
511011	3	1	First-Line Supervisors/Managers of Production and Operating Workers	100
512092	8	1	Team Assemblers	300
512099	8	1	Assemblers and Fabricators, All Other	100
519111	7	1	Packaging and Filling Machine Operators and Tenders	400
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	200
537011	7	1	Conveyor Operators and Tenders	400
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	2,300
537064	8	1	Packers and Packagers, Hand	600
113071	1	1	Transportation, Storage, and Distribution Managers	100
493023	6	2	Automotive Service Technicians and Mechanics	100
493031	6	2	Bus and Truck Mechanics and Diesel Engine Specialists	400
493093	8	2	Tire Repairers and Changers	200
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	900
533033	8	2	Truck Drivers, Light or Delivery Services	1,700
536099	8	2	Transportation Workers, All Other	200
537051	8	2	Industrial Truck and Tractor Operators	1,200
111011	1	3	Chief Executives	100
111021	1	3	General and Operations Managers	2,000
113040	1	3	Human Resources Managers	0
113061	1	3	Purchasing Managers	100
131021	3	3	Purchasing Agents and Buyers, Farm Products	100
131022	2	3	Wholesale and Retail Buyers, Except Farm Products	600
131023	2	3	Purchasing Agents, Except Wholesale, Retail, and Farm Products	100
131073	2	3	Training and Development Specialists	0
131111	2	3	Management Analysts	0
131199	1	3	Business Operations Specialists, All Other	300
412011	8	3	Cashiers	200
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	1,300
432011	7	3	Switchboard Operators, Including Answering Service	100
434071	8	3	File Clerks	100
434151	8	3	Order Clerks	2,200
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	100

434171	8	3	Receptionists and Information Clerks	1,100
436011	7	3	Executive Secretaries and Administrative Assistants	800
436014	7	3	Secretaries, Except Legal, Medical, and Executive	1,700
439061	8	3	Office Clerks, General	4,400
492011	3	3	Computer, Automated Teller, and Office Machine Repairers	600
112011	1	4	Administrative Services Managers	100
112021	1	4	Computer and Information Systems Managers	100
112021	1	4	Marketing Managers	100
112022	1	4	Sales Managers	600
193021	4	4	Market Research Analysts	100
271024	4	4	Graphic Designers	0
271026	4	4	Merchandise Displayers and Window Trimmers	300
411011	6	4	First-Line Supervisors/Managers of Retail Sales Workers	100
412022	8	4	Parts Salespersons	100
412031	8	4	Retail Salespersons	100
414011	8	4	Sales Rep, Wholesale and Manuf, Technical and Scientific Products	3,800
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	16,200
419011	7	4	Demonstrators and Product Promoters	500
419031	7	4	Sales Engineers	200
419041	8	4	Telemarketers	500
419099	7	4	Sales and Related Workers, All Other	300
434051	8	4	Customer Service Representatives	1,700
533031	8	4	Driver/Sales Workers	200
119041	1	5	Engineering Managers	0
172072	2	5	Electronics Engineers, Except Computer	200
172112	2	5	Industrial Engineers	100
173023	2	5	Electrical and Electronic Engineering Technicians	300
472152	6	5	Plumbers, Pipefitters, and Steamfitters	100
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	200
492022	3	5	Telecommunications Equip Installers and Repairers, Except Line Installers	200
492094	5	5	Electrical and Electronics Repairers, Commercial and Industrial Equipment	200
493042	6	5	Mobile Heavy Equipment Mechanics, Except Engines	100
514041	6	5	Machinists	100
514081	7	5	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	100
514121	5	5	Welders, Cutters, Solderers, and Brazers	0
519061	3	5	Inspectors, Testers, Sorters, Samplers, and Weighers	100
113031	1	6	Financial Managers	300
131051	3	6	Cost Estimators	100
132011	2	6	Accountants and Auditors	800
151021	2	6	Computer Programmers	200
151031	2	6	Computer Software Engineers, Applications	100
151032	2	6	Computer Software Engineers, Systems Software	400
151041	2	6	Computer Support Specialists	100
151051	2	6	Computer Systems Analysts	0
151061	2	6	Database Administrators	100
151071	2	6	Network and Computer Systems Administrators	100
151081	2	6	Network Systems and Data Communications Analysts	0
433011	8	6	Bill and Account Collectors	300

433021	8	6	Billing and Posting Clerks and Machine Operators	500
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	1,700
433051	8	6	Payroll and Timekeeping Clerks	100
434041	8	6	Credit Authorizers, Checkers, and Clerks	300
439011	7	6	Computer Operators	200
439021	7	6	Data Entry Keyers	700
				53,500

TRANSPORTATION SECTORS

Air Transportation, NAICS 481

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	300
113071	1	1	Transportation, Storage, and Distribution Managers	200
391021	3	1	First-Line Supervisors/Managers of Personal Service Workers	100
396032	3	1	Transportation Attendants, Except Flight Attendants and Baggage Porters	100
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	100
531011	3	1	Aircraft Cargo Handling Supervisors	300
499099	6	1	Installation, Maintenance, and Repair Workers, All Other	200
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	0
434181	8	1	Reservation and Transportation Ticket Agents and Travel Clerks	8500
396011	8	1	Baggage Porters and Bellhops	700
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
339032	8	1	Security Guards	200
435061	8	1	Production, Planning, and Expediting Clerks	0
435011	8	1	Cargo and Freight Agents	1200
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	800
537199	8	1	Material Moving Workers, All Other	800
492091	5	2	Avionics Technicians	0
532012	6	2	Commercial Pilots	500
493011	6	2	Aircraft Mechanics and Service Technicians	300
532011	6	2	Airline Pilots, Copilots, and Flight Engineers	700
536099	7	2	Transportation Workers, All Other	1900
537061	8	2	Cleaners of Vehicles and Equipment	0
131199	1	3	Business Operations Specialists, All Other	0
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	1100
436011	7	3	Executive Secretaries and Administrative Assistants	200
439061	8	3	Office Clerks, General	100
434171	8	3	Receptionists and Information Clerks	0
112022	1	4	Sales Managers	100
112021	1	4	Marketing Managers	100
434051	8	4	Customer Service Representatives	100
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	100
132011	2	6	Accountants and Auditors	200
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	200
				19,200

Rail Transportation, NAICS 482

OES Code	Education	Function	Occupation	2002 Weights
113071	1	1	Transportation, Storage, and Distribution Managers	400
534011	3	2	Locomotive Engineers	1,400
534013	3	2	Rail Yard Engineers, Dinkey Operators, and Hostlers	200
472211	7	5	Sheet Metal Workers	100
				2,100

Water Transportation, NAICS 483

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	100
434181	8	1	Reservation and Transportation Ticket Agents and Travel Clerks	400
352021	8	1	Food Preparation Workers	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	100
113071	1	1	Transportation, Storage, and Distribution Managers	100
535031	3	2	Ship Engineers	300
535021	3	2	Captains, Mates, and Pilots of Water Vessels	500
535011	8	2	Sailors and Marine Oilers	400
131023	2	3	Purchasing Agents, Except Wholesale, Retail, and Farm Products	100
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	100
131199	1	3	Business Operations Specialists, All Other	100
436011	7	3	Executive Secretaries and Administrative Assistants	100
434051	8	4	Customer Service Representatives	100
419099	7	4	Sales and Related Workers, All Other	100
172121	2	5	Marine Engineers and Naval Architects	100
				2,900

Truck Transportation, NAICS 484

OES Code	Education	Function	Occupation	2002 Weights
491011	3	1	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	400
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	1200
514121	5	1	Welders, Cutters, Solderers, and Brazers	100
493031	6	1	Bus and Truck Mechanics and Diesel Engine Specialists	3,200
493023	6	1	Automotive Service Technicians and Mechanics	200
499042	6	1	Maintenance and Repair Workers, General	600
518093	6	1	Petroleum Pump System Operators, Refinery Operators, and Gaugers	100
499099	6	1	Installation, Maintenance, and Repair Workers, All Other	100
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	2,800
537121	7	1	Tank Car, Truck, and Ship Loaders	2,000
536099	7	1	Transportation Workers, All Other	300
537081	8	1	Refuse and Recyclable Material Collectors	100
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	11,800
537064	8	1	Packers and Packagers, Hand	700
499098	8	1	Helpers--Installation, Maintenance, and Repair Workers	200
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	800
537061	8	1	Cleaners of Vehicles and Equipment	300
339032	8	1	Security Guards	100
536031	8	1	Service Station Attendants	100
113071	1	2	Transportation, Storage, and Distribution Managers	900
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	2,500
536051	3	2	Transportation Inspectors	0
533033	8	2	Truck Drivers, Light or Delivery Services	4,400
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	19,500
537051	8	2	Industrial Truck and Tractor Operators	2,600
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	29,500
533033	8	2	Truck Drivers, Light or Delivery Services	3,000
113040	1	3	Human Resources Managers	100
111011	1	3	Chief Executives	200
113011	1	3	Administrative Services Managers	100
113031	1	3	Financial Managers	200
131199	1	3	Business Operations Specialists, All Other	100
111021	1	3	General and Operations Managers	1,900
132011	2	3	Accountants and Auditors	300
131071	2	3	Employment, Recruitment, and Placement Specialists	100
131051	3	3	Cost Estimators	200
436014	5	3	Secretaries, Except Legal, Medical, and Executive	400
439021	5	3	Data Entry Keyers	200
436011	5	3	Executive Secretaries and Administrative Assistants	500
433031	7	3	Bookkeeping, Accounting, and Auditing Clerks	1,700
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	1,500
433021	8	3	Billing and Posting Clerks and Machine Operators	1,400
433051	8	3	Payroll and Timekeeping Clerks	200

435199	8	3	All other material recording, scheduling, dispatch	100
434051	8	3	Customer Service Representatives	1,800
439061	8	3	Office Clerks, General	3,300
433011	8	3	Bill and Account Collectors	300
434151	8	3	Order Clerks	200
434171	8	3	Receptionists and Information Clerks	200
435081	8	3	Stock Clerks and Order Fillers	500
435111	8	3	Weighers, Measurers, Checkers, and Samplers, Recordkeeping	100
435011	8	3	Cargo and Freight Agents	500
435071	8	3	Shipping, Receiving, and Traffic Clerks	2,000
435021	8	3	Couriers and Messengers	100
419041	8	3	Telemarketers	100
435061	8	3	Production, Planning, and Expediting Clerks	300
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	100
112022	1	4	Sales Managers	400
419099	7	4	Sales and Related Workers, All Other	1,300
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	400
533031	8	4	Driver/Sales Workers	800
				109,100

Water Transport Support NAICS Code 488300

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	100
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, & Material Movers, Hand	100
499042	6	1	Maintenance and Repair Workers, General	300
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	1,000
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	100
535021	3	2	Captains, Mates, and Pilots of Water Vessels	400
131199	1	3	Business Operations Specialists, All Other	100
434051	8	4	Customer Service Representatives	200
514121	5	5	Welders, Cutters, Solderers, and Brazers	100
172121	2	5	Marine Engineers and Naval Architects	100
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	100
				2,600

Road Support, NAICS 488400

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	300
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	100
499042	6	1	Maintenance and Repair Workers, General	0
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	800
434181	8	1	Reservation and Transportation Ticket Agents and Travel Clerks	100
372011	8	1	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	100
435111	8	1	Weighers, Measurers, Checkers, and Samplers, Recordkeeping	0
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	1,400
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	500
493023	6	2	Automotive Service Technicians and Mechanics	500
493031	6	2	Bus and Truck Mechanics and Diesel Engine Specialists	400
536099	7	2	Transportation Workers, All Other	100
533033	8	2	Truck Drivers, Light or Delivery Services	1,100
533099	8	2	Motor Vehicle Operators, All Other	600
537061	8	2	Cleaners of Vehicles and Equipment	100
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	4,900
131199	1	3	Business Operations Specialists, All Other	0
113011	1	3	Administrative Services Managers	0
436011	7	3	Executive Secretaries and Administrative Assistants	100
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	200
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
434171	8	3	Receptionists and Information Clerks	0
412011	8	3	Cashiers	100
412021	8	3	Counter and Rental Clerks	0
434151	8	3	Order Clerks	100
439061	8	3	Office Clerks, General	700
434051	8	4	Customer Service Representatives	100
491011	3	5	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	100
132011	2	6	Accountants and Auditors	0
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	200
433021	8	6	Billing and Posting Clerks and Machine Operators	100
				12,800

Freight Arranging, 488500

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	1,000
113071	1	1	Transportation, Storage, and Distribution Managers	300
119199	3	1	Managers, All Other	200
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	200
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	0
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	400
435011	8	1	Cargo and Freight Agents	4,700
435071	8	1	Shipping, Receiving, and Traffic Clerks	700
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	1,600
536051	3	2	Transportation Inspectors	0
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	200
493023	6	2	Automotive Service Technicians and Mechanics	0
536099	7	2	Transportation Workers, All Other	200
435021	8	2	Couriers and Messengers	600
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	1,700
533033	8	2	Truck Drivers, Light or Delivery Services	1,100
537051	8	2	Industrial Truck and Tractor Operators	400
111011	1	3	Chief Executives	100
113021	1	3	Computer and Information Systems Managers	0
113011	1	3	Administrative Services Managers	100
131199	1	3	Business Operations Specialists, All Other	1,100
131073	2	3	Training and Development Specialists	100
131041	3	3	Compliance Officers, Except Ag, Constr, Health-Safety, and Transportation	200
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	1,800
436011	7	3	Executive Secretaries and Administrative Assistants	300
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
439999	8	3	All other secretaries, administrative assistants,	100
434151	8	3	Order Clerks	200
439061	8	3	Office Clerks, General	1,200
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	0
434171	8	3	Receptionists and Information Clerks	200
112022	1	4	Sales Managers	200
419099	7	4	Sales and Related Workers, All Other	600
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	100
434051	8	4	Customer Service Representatives	1,300
113031	1	6	Financial Managers	100
132011	2	6	Accountants and Auditors	400
151021	2	6	Computer Programmers	100
131051	3	6	Cost Estimators	0
439011	7	6	Computer Operators	100
439021	7	6	Data Entry Keyers	200
433031	7	6	Bookkeeping, Accounting, and Auditing Clerks	1,000
433021	8	6	Billing and Posting Clerks and Machine Operators	400
433011	8	6	Bill and Account Collectors	100
				23,400

A31418

Freight Arranging, 488500

OES Code	Education	Function	Occupation	2002 Weights
111021	1	1	General and Operations Managers	1,000
113071	1	1	Transportation, Storage, and Distribution Managers	300
119199	3	1	Managers, All Other	200
531021	3	1	First-Line Sup/Mgrs of Helpers, Laborers, and Material Movers, Hand	200
411012	6	1	First-Line Supervisors/Managers of Non-Retail Sales Workers	0
435032	7	1	Dispatchers, Except Police, Fire, and Ambulance	400
435011	8	1	Cargo and Freight Agents	4,700
435071	8	1	Shipping, Receiving, and Traffic Clerks	700
537062	8	1	Laborers and Freight, Stock, and Material Movers, Hand	1,600
536051	3	2	Transportation Inspectors	0
531031	3	2	First-Line Sup/Mgrs of Trans and Material-Moving Vehicle Operators	200
493023	6	2	Automotive Service Technicians and Mechanics	0
536099	7	2	Transportation Workers, All Other	200
435021	8	2	Couriers and Messengers	600
533032	8	2	Truck Drivers, Heavy and Tractor-Trailer	1,700
533033	8	2	Truck Drivers, Light or Delivery Services	1,100
537051	8	2	Industrial Truck and Tractor Operators	400
111011	1	3	Chief Executives	100
113021	1	3	Computer and Information Systems Managers	0
113011	1	3	Administrative Services Managers	100
131199	1	3	Business Operations Specialists, All Other	1,100
131073	2	3	Training and Development Specialists	100
131041	3	3	Compliance Officers, Except Ag, Constr, Health-Safety, and Transportation	200
431011	7	3	First-Line Sup/Mgrs of Office and Administrative Support Workers	1,800
436011	7	3	Executive Secretaries and Administrative Assistants	300
436014	7	3	Secretaries, Except Legal, Medical, and Executive	100
439999	8	3	All other secretaries, administrative assistants,	100
434151	8	3	Order Clerks	200
439061	8	3	Office Clerks, General	1,200
434161	8	3	Human Resources Assistants, Except Payroll and Timekeeping	0
434171	8	3	Receptionists and Information Clerks	200
112022	1	4	Sales Managers	200
419099	7	4	Sales and Related Workers, All Other	600
414012	7	4	Sales Rep, Wholesale and Manuf, Except Technical and Scientific Products	100
434051	8	4	Customer Service Representatives	1,300
113031	1	6	Financial Managers	100
132011	2	6	Accountants and Auditors	400
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433021	8	6	Billing and Posting Clerks and Machine Operators	400
433011	8	6	Bill and Account Collectors	100
				23,400

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TECHNICAL MEMORANDUM 5b – ENVIRONMENTAL AND COMMUNITY IMPACTS MULTI-COUNTY GOODS MOVEMENT ACTION PLAN

Prepared for:

Los Angeles County Metropolitan Transportation Authority (Metro)
Orange County Transportation Authority (OCTA)
Riverside County Transportation Commission (RCTC)
San Bernardino Associated Governments (SANBAG)
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Table of Contents

E.0 EXECUTIVE SUMMARY
- **E.1 Introduction** **E-1**
- **E.2 Regulatory Background** **E-2**
- **E.3 Environmental & Community Impacts** **E-7**
- **E.4 Operational & Cumulative Resource Impacts** **E-19**
- **E.5 Conclusions and Next Steps** **E-20**

1.0 INTRODUCTION

Purpose of this Technical Memorandum **1-1**

Regulatory Background **1-1**
- **1.1 California Air Quality Regulation** **1-4**
- **1.2 Pollution & Air Basins** **1-5**
- **1.3 Goods Movement-Related Agency Plans** **1-12**

2.0 ENVIRONMENTAL AND COMMUNITY IMPACTS
- **2.1 Quality of Life** **2-2**
- **2.2 Traffic Congestion** **2-2**
- **2.3 Land Use & Compatibility Changes** **2-3**
- **2.4 Air Quality & Health Impacts** **2-4**
  - Health Impacts of Goods Movement Emissions 2-4
  - Air Quality Impacts by Goods Movement Mode 2-11
- **2.5 Visual Impacts** **2-16**
- **2.6 Noise Impacts** **2-17**
- **2.7 Environmental Justice** **2-21**
- **2.8 Water Quality & Wetlands** **2-26**
- **2.9 HAZMAT Movements** **2-27**
- **2.10 Safety** **2-29**

APPENDIX **A-1**

APPENDIX **B-1**

Tables

Table 1 – Key Environmental Regulatory Agencies 1-2
Table 2 – Southern California Air Districts and Air Basins 1-6
Table 3 – State Area Designations per Criteria Pollutants 1-9
Table 4 – 2005 Estimated Annual Average Emissions in South Coast Air Basin (Percent of Total) 1-11
Table 5 – Estimated 2005 Annual Average Aircraft Emissions in SCAB 2-12
Table 6 – Estimated 2005 Annual Average Ship Emissions in SCAB 2-13
Table 7 – Estimated 2005 Annual Average Rail Emissions in SCAB 2-14
Table 8 – Rail Crossing Emissions Due to Delay 2-14
Table 9 – Estimated 2005 Annual Average Truck Emissions in SCAB 2-15

Table 10 – Estimated Cancer Risk versus Distance from Center of TRU Activity 2-16
Table 11 – Rail Noise Levels 2-18

Figures

Figure 1 – Air Districts and Air Basins 1-8
Figure 2 – 2005 Estimated Annual Average Emissions in South Coast Air Basin 1-10
Figure 3 – Agency Plans Sphere of Influence..... 1-14
Figure 4 – Diesel PM Statewide 2001 Emissions from Ports and Goods Movement..... 2-5
Figure 5 – Estimated Risk of Cancer from All Toxics: All Emission Sources 2-7
Figure 6 – Estimated Risk of Cancer from Airborne Toxics: Excluding Diesel..... 2-8
Figure 7 – Schools Located within a 2-mile Radius of San Pedro Bay Ports..... 2-10
Figure 8 – Toxic Release Facilities Relative to Racial/Ethnic Composition of Neighborhoods, Los Angeles, 1996 2-24
Figure 9 – Traffic, Susceptibility, and Childhood Asthma in the Study Area 2-25

E.1 Introduction

Technical Memorandum (TM) 5b outlines the environmental issues currently associated with Southern California's goods movement network. The specific impacts associated with these issues are numerous and widely varied throughout the region. This memo looks at the various existing environmental issues with the intent to provide a regional perspective of existing and potential impacts from freight movement. These impacts include: quality of life, environmental justice, traffic congestion, land use and compatibility changes, air quality and health, visual, noise and vibration, environmental justice, water quality and wetlands, HAZMAT, and safety issues. By providing a regional perspective of freight related environmental impacts, TM5b will serve as the necessary basis for identifying environmental mitigation measures in the evaluation of specific strategies for improving goods movement. Building upon the information presented in this memo, the strategies will be developed as a part of Task 6, and a list of good practice mitigation measures will be identified as a part of Task 7.

This TM builds on significant work by many international, national, state and regional agencies to minimize the environmental impacts associated with goods movement. Many studies, such as the South Coast Air Quality Management District (SCAQMD) Multiple Air Toxics Exposure (MATES-II) Study, validate that increasing goods movement activities to date have contributed to congestion, elevated air pollutant emission levels, and other community impacts such as safety, land use conflicts, noise, intrusion on communities.

This TM is intended to be a summary of the environmental and community impacts in the study area that result from current goods movement and could potentially result in the future. Thorough impact analyses will be conducted in accordance with state and federal environmental mandates (e.g. California Environmental Quality Act and National Environmental Policy Act) for specific programs or projects when proposed. This will ensure all impacts are sufficiently addressed and that the public is appropriately engaged. Specific programs or projects are not within the scope of this study. Strategies (as opposed to specific programs and projects) to be proposed as the final product of this Multi-County Goods Movement Action Plan (MCGMAP) will be broader in approach; therefore the characterization of impacts in this TM focuses on the regional affects of goods movement.

It should be noted that during the outreach process (conducted as a part of Task 2), stakeholders within the MCGMAP region voiced strong concern over the impacts of goods movement on the environment, their communities, and their overall quality of life. Due to the serious environmental, public health impacts and traffic congestion issues, communities and policy makers have begun to demand mitigation and to challenge proposals for infrastructure capacity enhancement. The stakeholders within the affected communities are opposing key infrastructure improvement projects that could improve current circumstances, they are calling for slower growth and mitigation of existing impacts.

The stakeholder outreach process has highlighted the critical need to address community and stakeholder concerns regarding the environmental and community impacts of goods movement while pursuing infrastructure improvements. The mitigation of direct and indirect impacts of specific goods movement projects or related activities must become a part of the process from the early stages.

This technical memorandum (TM) will:

1. Present the environmental framework in which the MCGMAP is operating – key regulatory framework and data.
2. Discuss the prominent environmental and community impacts confronted by goods related activities within the study area, and explain why these issues are important within the study area.
3. Discuss some of the potential operational and cumulative resource impacts from goods movement projects should they be proposed.

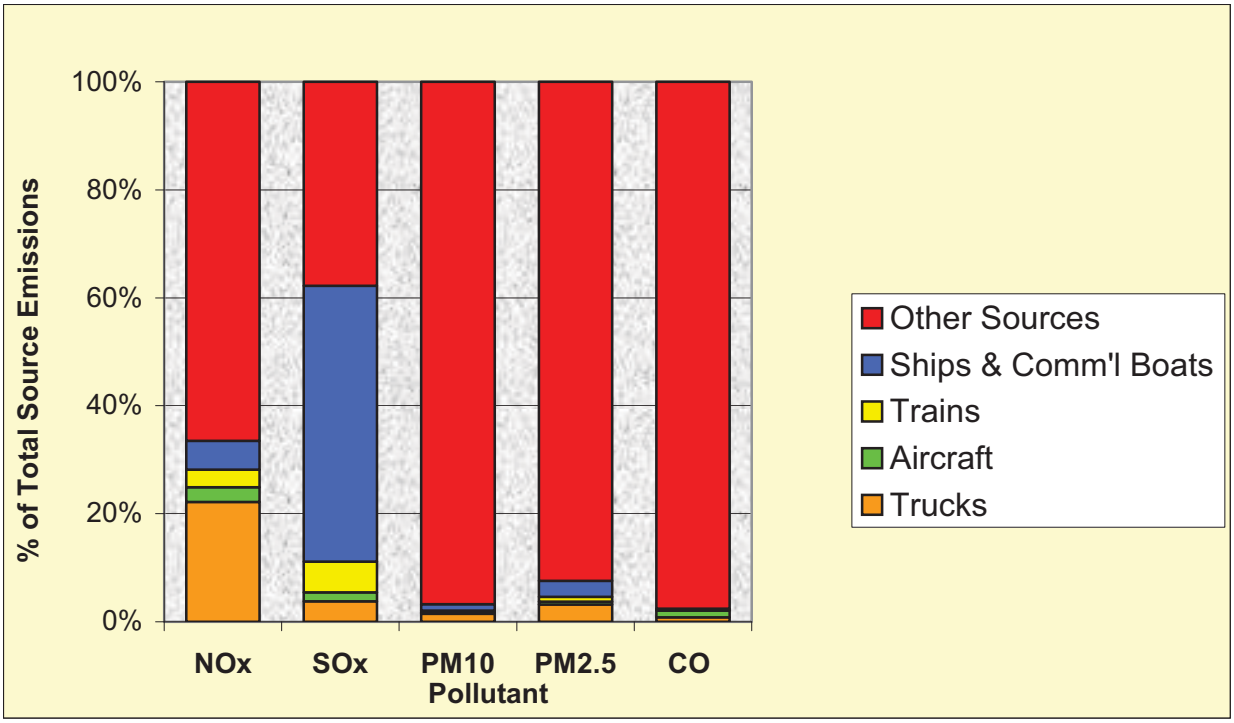
By presenting the information described above, this TM will serve as the foundation for the identification of a set of good practice measures for mitigating the effects of goods movement on local communities and the environment. These mitigating strategies will be identified as a part of Task 7.

E.2 Regulatory Background

The study area covers a large geographic area that contains a wide variety of topography, air, water, and other environmental characteristics. Due to its unique geographic location, the state's environmental quality and control is shared between international, federal, state, and regional agencies. There are approximately 30 agencies with jurisdiction over a broad range of environmental impacts. Landmark environmental legislation includes the Clean Air Act, Clean Water Act, and Noise Control Act; however, it is the reduction of air pollutants via cleaner fuels, operational changes, and technological improvements that has received the primary focus. A comprehensive list of the agencies, jurisdictions, and responsibilities is included in the body of the technical memorandum.

While these agencies establish environmental standards, the travel demand resulting from rapid population and goods movement growth with their resulting travel demand are challenging the study area's ability to mitigate the related impacts on its natural resources and community neighborhoods. California's largest metropolitan region – and largest goods movement contributor in the state – is the South Coast Air Basin (SCAB). The area is comprised of 6,480 square miles, 43 percent of California's population, and contributes 29 percent of the State's total criteria pollutant emissions.[1] Pollutant concentrations in parts of this air basin are among the highest in the Nation.[2] The study area is in attainment with the required levels of carbon monoxide (CO), nitrogen oxides (NO_2), and sulfur oxides (SO_2). However, the study area is in non-attainment with state air quality standards for ozone and particulate matter.[3] Emissions from goods movement in relation to all emission sources in the SCAB are presented below in Figure 1. Emission sources other than goods movement sources are also significant contributors to the study area's air quality concerns.

Figure 1
2005 Estimated Annual Average Emissions in SCAB



Source: *Final 2003 Air Quality Management Plan.* South Coast Air Quality Management District.

More efforts are required to bring the study area into attainment for all air quality standards to the benefit of the environment and those who live here. However, it is important to note that there has been significant progress in mitigating and reducing environmental and community impacts. Without the progress to date, the study area would be in far worse condition. For example, CARB estimates that due to air quality regulations adopted through October 2005 the following emission levels in diesel particulate matter (PM), NOx, and SOx from years 2001 to 2020 will result in[4]:

- Substantial diesel PM emissions reductions from trucks (84%), harbor craft (53%), and cargo handling equipment (75%); a minor rail reduction (4%); and a substantial increase from ships (199%).
- Substantial NOx emissions reductions from trucks (61%), harbor craft (48%), cargo handling equipment (71%), and rail (32%); and a substantial increase from ships (168%).
- Substantial SOx emissions reductions from trucks (80%), harbor craft (75%), and rail (99%); no change in cargo handling equipment emissions; and a substantial increase from ships (200%).

While the reductions to the domestic mobile source emissions are expected to be significant, this is not a guarantee that the study area will meet emissions budgets or attain federal and state standards for PM2.5[5] or ozone. This issue will be further addressed in Technical Memo 7.

It should also be noted that the gains in known health impacts associated with a reduction in domestic goods movement air emissions are less substantial due to anticipated increases in air pollutant emissions from international ships.

Ongoing efforts – both by regulatory agencies and private industry – will help to minimize the impacts as the region continues to reap the effects of increased growth. For example, such efforts in regards to reducing pollutant emissions include: dockside cold ironing, cleaner fuel requirements, extended hours for port operations, voluntary vessel speed reductions, truck idling limits, use of diesel-hybrid switch locomotives, and rail grade separations.

Air quality standards and regulations are dynamic. Evolving environmental science and emerging data concerning pollutant impacts are prompting new policies and standards. Some recent emerging issues and developments concerning the Study Area's air quality relating to the goods movement network are:

- First-time area designations for PM2.5 promulgated in early 2005 by the U.S. EPA. The South Coast Air Basin is designated as nonattainment for PM2.5 (currently, the other basins within the study area are in attainment).[6]

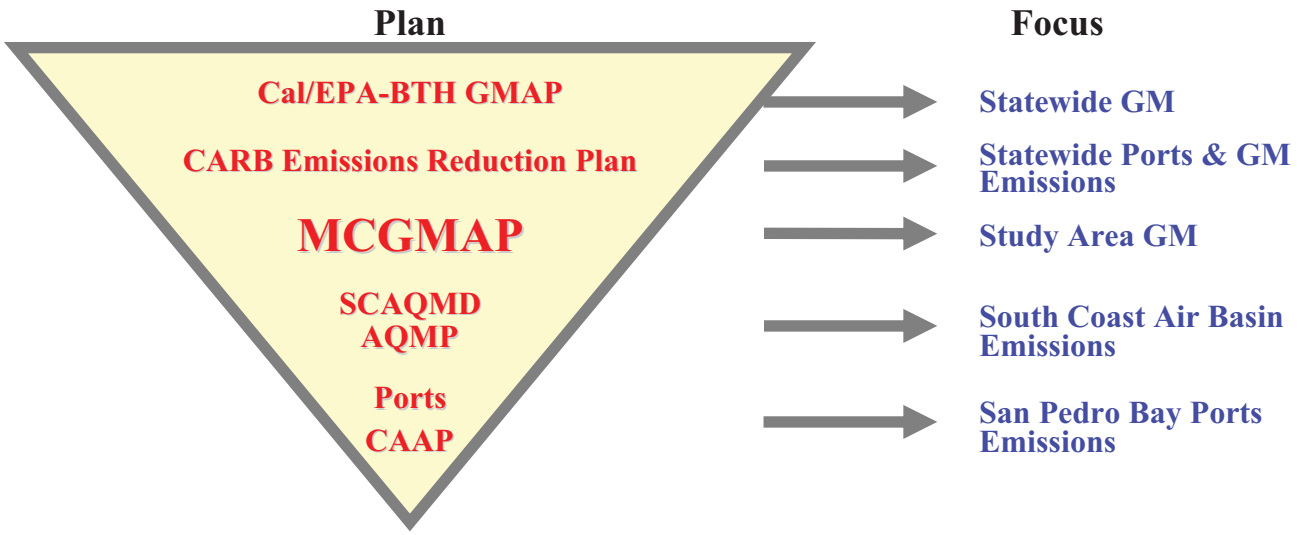
- The U.S. EPA has recently amended emission standards for nitrogen oxides (NOx) for new commercial aircraft engines. A 16% NOx source reduction (or increase in stringency) is expected between the old and new engine standards.[7]

- Effective January 1, 2007, domestic and international ships operating auxiliary diesel engines (Category 2 engines) and diesel-electric engines (Category 3) will be required to use cleaner burning diesel when approaching within 24 nautical miles[8] of the California coast.

- The Office of the United States Trade Representative (USTR) has proposed the United States-Thailand Free Trade Agreement (FTA).[9] An agreement with Thailand, which is currently the United States' 20th largest trading partner, would significantly increase trade in goods and services, thereby creating a potential significant impact on the goods movement system in the study area, resulting in additional local air quality concerns to be addressed.

California agencies continue to aggressively address goods movement emissions. Four landmark plans are currently shaping the goods movement industry within the study area as follows: (1) California EPA (Cal/EPA) and the Business, Transportation, and Housing Agency (BTH) *Goods Movement Action Plan Phase II Progress Report: Draft Framework for Action* (March 2006), (2) California ARB (CARB) *Emission Reduction Plan for Ports and Goods Movement in California* (March 2006), (3) SCAQMD *2003 Air Quality Management Plan*, and (4) the Ports of Long Beach and Los Angeles *San Pedro Bay Ports Clean Air Action Plan* (Draft – June 2006). This Multi-County Goods Movement Action Plan (MCGMAP) will supplement these agency plans. The sphere of influence of each plan is presented in Figure 2 below. Key points of each plan (excluding the MCGMAP) follows.

Figure 2
Agency Plans Sphere of Influence



Source: Jones & Stokes, 2006.

The Cal/EPA-BTH Goods Movement Action Plan is a statewide goods movement action plan proposed by the Schwarzenegger Administration to generate jobs, increase mobility and relieve traffic congestion, improve air quality and protect public health, enhance public and port safety, and improve California's quality of life. The plan addresses goods movement infrastructure and operations, as well as air quality emission reductions efforts. Goals include: reduce emissions to year 2001 levels by 2010;continue reducing emissions past year 2001 levels until attainment of applicable standards is achieved; reduce diesel-related health risks by 85% by year 2020; and ensure sufficient localized air toxics risk reductions in each affected community. The $15B action plan proposes funding via $1.95B in previously committed public funding and proposed bond funding (S.B. 1266) to include $2B for trade corridor improvement projects and $1B for air quality improvements. A key component of the plan is the simultaneous and continuous improvement in infrastructure and mitigation. A preliminary working list of candidate projects has been developed based on criteria. Examples of goods movement infrastructure projects include dock-rail facilities, the Alameda Corridor East, and rail capacity improvements.

The CARB Emissions Reduction Plan focuses on statewide emission reductions specifically from ports and the goods movement industry. This plan focuses solely on air quality per CARB's legislative purview. While the plans are consistent with one another, the Emissions Reduction plan is broader than the Cal/EPA-BTH plan in terms of air quality efforts. Goals include: reduce total statewide international and domestic goods movement emissions back to year 2001 levels or below by year 2010; reduce statewide diesel particulate matter health risk from goods movement by 85% by year 2020; reduce NOx emissions from international goods movement in the South Coast by 30% from projected year 2015 levels, and 50% from projected year 2020 levels; and apply plan strategies statewide to aid all regions in attaining air quality standards. Measures identified in the plan include more stringent emissions standards, cleaner fuels, shore power, speed reduction of ships, engine upgrades and retrofits, and emission control devices. Over

a fifteen-year period, the plan is expected to cost between $6B and $10B and result in $34B to 47B in economic benefits in terms of the savings via the avoidance of adverse health impacts. Funding of the plan assumes all industries involved must share in investment costs, and is generally unfunded by CARB itself.

The SCAQMD *2003 Air Quality Management Plan (AQMP)* is a mandated document that develops emissions budgets for State Implementation Plan (SIP) conformity with state and national ambient air quality standards. AQMD's air pollution control strategy focuses on controlling man-made sources through technologies and management practices, and relies on mobile source control measures developed by CARB. The current 2003 AQMP focuses on demonstrating attainment with the federal PM10 ambient air quality standard by 2006 and with the federal 1-hour ozone in year 2010. The development of the 2007 Plan is currently in progress and will focus in part on new federal 8-hour ozone and PM2.5 standards. Large emission reductions NOx, Sox and PM will be needed to attain by statutory deadlines. The overall reductions necessary for demonstrating attainment of the PM2.5 would be 50% NOx reduction from current levels by 2020 and 70% SOx reduction by 2014. AQMD's approach is to pursue the most effective possible set of air quality improvement strategies while maintaining a healthy economy.[10]

The *San Pedro Bay Ports Clean Air Action Plan* (CAAP) is the most recently developed plan to target goods movement emissions at the Port of Los Angeles (POLA) and Port of Long Beach (POLB), and has been developed jointly by the ports with the input of SCAQMD, CARB, and EPA. The CAAP establishes port area emissions standards. It targets trucks, ships, rail, harbor craft, and cargo handling equipment for various control measures and initiatives, including: improvements to engine performance standards, alternate fuels and power, and emissions reductions; a Technology Advancement Program; infrastructure and operational efficiency improvements; and tracking and monitoring. The CAAP is to be reviewed for progress and updated annually. The CAAP targets the annual reduction of specific pollutants and anticipates a reduction in NOx by 13,090 tons per year (TPY), diesel PM by 1,242 TPY, and SOx by 2,721 TPY. This is a 5-year program at an estimated cost of $1.98B[11], committed funding of $394.4M, and a potential shortfall of approximately $1.6B. This shortfall is likely to be addressed in part by the state's proposed bond measure (S.B. 1266) if voters pass the measure in late 2006.

E-3 Environmental & Community Impacts

Quality of Life

The general quality of life for area residents is greatly affected by the goods movement network. While quality of life is not an environmental impact per se, it is important because so many individual environmental impacts influence the ability to enjoy one's living conditions. Quality of life is primarily affected by the following environmental impacts: traffic congestion, land use compatibility and land use changes, air quality and related health impacts, visual and noise impacts, and safety. These impacts affect people in their residences, schools, and public spaces. An overview of these impacts is addressed below. Further discussion of the impacts is in the technical memorandum.

Traffic Congestion

Ninety-nine percent of the trips taken within the MCGMAP study area occur on the highway and arterial network. This network is comprised of over 9,000 freeway lane miles and more than 42,000 arterial lane miles, accounting for over 54 million vehicle trips per day on a network that has seen little added capacity in comparison to population growth. Both passenger vehicles and trucks compete for space on the roadway network. Truck vehicle miles traveled (VMT) is expected to approach 39.1 million in year 2030, a 63% increase from 2000.[12] Automobile traffic in 2030 is expected to approach 449.7 million, an increase of 33%, and will account for 92% of the total VMT. The total daily delay from congestion in 2000 was estimated at 2.2 million person-hours, and could reach 5.4 million person-hours by 2030.[13]

Rational driver behavior predicts that drivers faced with increasing corridor congestion will divert from their original route in an attempt to find a more efficient path to their destination. Once an alternate path is established, it becomes a regular pattern. One effect of this behavior is increasing diversion of truck traffic from highways to city surface roadways that run adjacent to or through communities causing increased surface street congestion. As surface street congestion increases, so do idling and emission levels. However, it has been asserted a ten percent gain in lane capacity could be achieved by shifting thirty trucks per hour from the freeway to railway.[14] The benefit could be felt by commuters in travel time savings on freeways and by neighborhoods in potentially less truck traffic diversion from freeway corridors.

Land Use & Compatibility Changes

Buffer zones between incompatible land uses are being squeezed as (a) goods movement facilities expand and encroach into residential neighborhoods, and (b) residential development due to population growth (and a need for affordable housing) expands thus encroaching onto goods movement facilities. Concurrently, high land costs in the developed areas surrounding ports, airports, intermodal terminals, and truck terminals have forced the freight transportation industry to look to outlying areas for facility growth. This coupled with the region's spreading development patterns has caused regional freight distribution patterns that emphasize peak period congestion and high levels of freight VMT.[15] However, the use of brownfields located near ports in some areas of the country is receiving more consideration as the goods movement sector continues to grow. Brownfield reuse provides the warehousing and distribution center

industry more opportunities for affordable and developable land, and easy access to markets, transportation modes, and labor supply.[16]

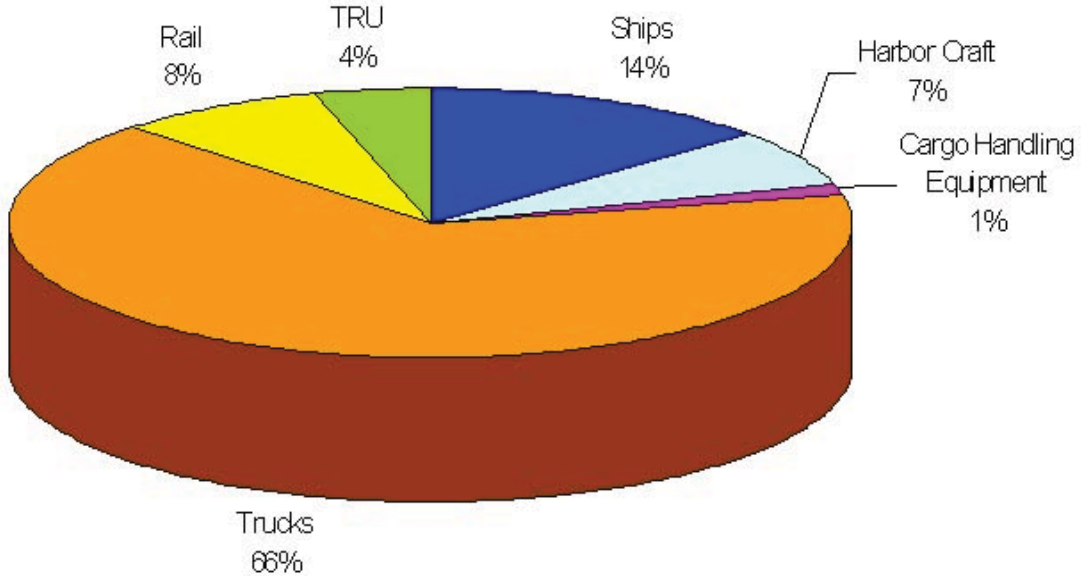
Air Quality & Health

Health Effects of Air Quality

Ambient air quality standards are essentially "health-based standards." Air quality is by far the most significant potential impact to communities throughout the study area, the state, and beyond. Mobile source emissions that include goods movement are a major emissions contributor. The goods movement industry relies heavily on diesel fuel to power their activities.

Regional air quality is a primary concern because issues of toxic air contaminants (TACs) and ultrafine PM pose known health risks to people. A primary TAC is diesel PM, which is emitted from all source categories associated with diesel fuel combustion. Boats, trucks, and trains associated with goods movement are the primary sources of diesel PM. Seaport activities significantly affect air quality within the study area due to the congregation of these mobile sources and their resulting diesel PM emissions. As displayed in Figure 3, statewide 2001 diesel PM emissions inventory from ports and goods movement were approximately 57 tons per day, with modal contributions as follows: 66% truck emissions, 8% rail, 14% ships, 7% harbor craft, 4% transport refrigeration units (TRU), and 1% cargo handling equipment.[17]

Figure 3
Diesel PM Statewide 2001 Emissions from Ports and Goods Movement



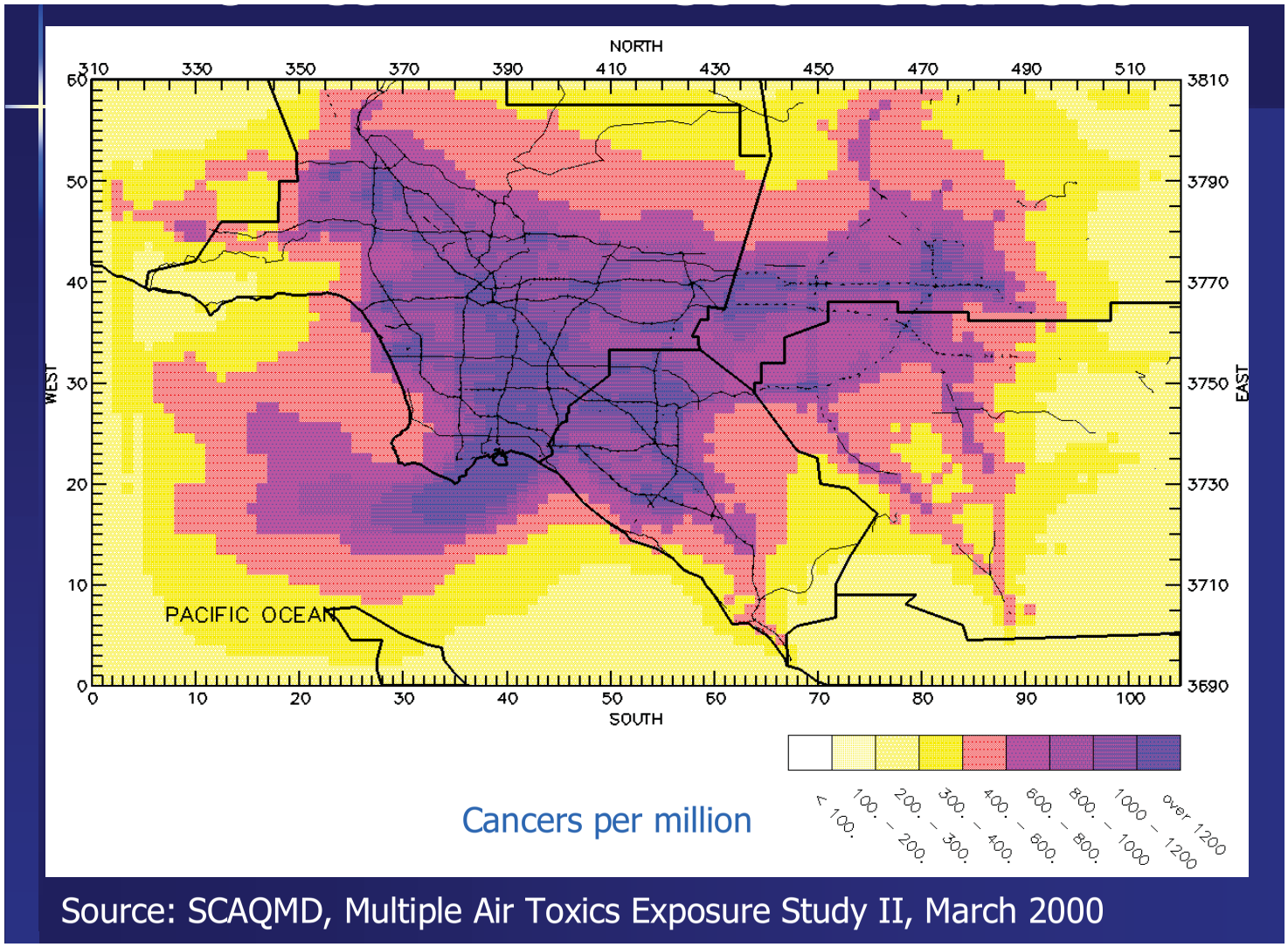
Source: Proposed Emission Reduction Plan for Ports and Goods Movement in California. California EPA and California Air Resources Board. March 21, 2006.

Diesel PM is a cause for special concern to human health because 50-90% of the particles are very small (i.e., *ultrafine*) and can readily enter into and deposit within the lungs and pass through the bloodstream to

the cellular level. However, it should be noted that ultrafine particulate matter is not exclusive to diesel emissions – ultrafine particles originate from any combustion process using any fuel, including gasoline, compressed natural gas (CNG), and liquid natural gas (LNG). Combustion sources other than mobile sources include stationary, industrial, occupational, and atmospheric conversion.[18] Independently published research reinforces the health risks associated with emissions by establishing a diesel exhaust-cancer connection. In more than 35 studies involving railroad workers exposed to occupational diesel exhaust, the excess risk of lung cancer is consistently elevated by 20-50%.[19]

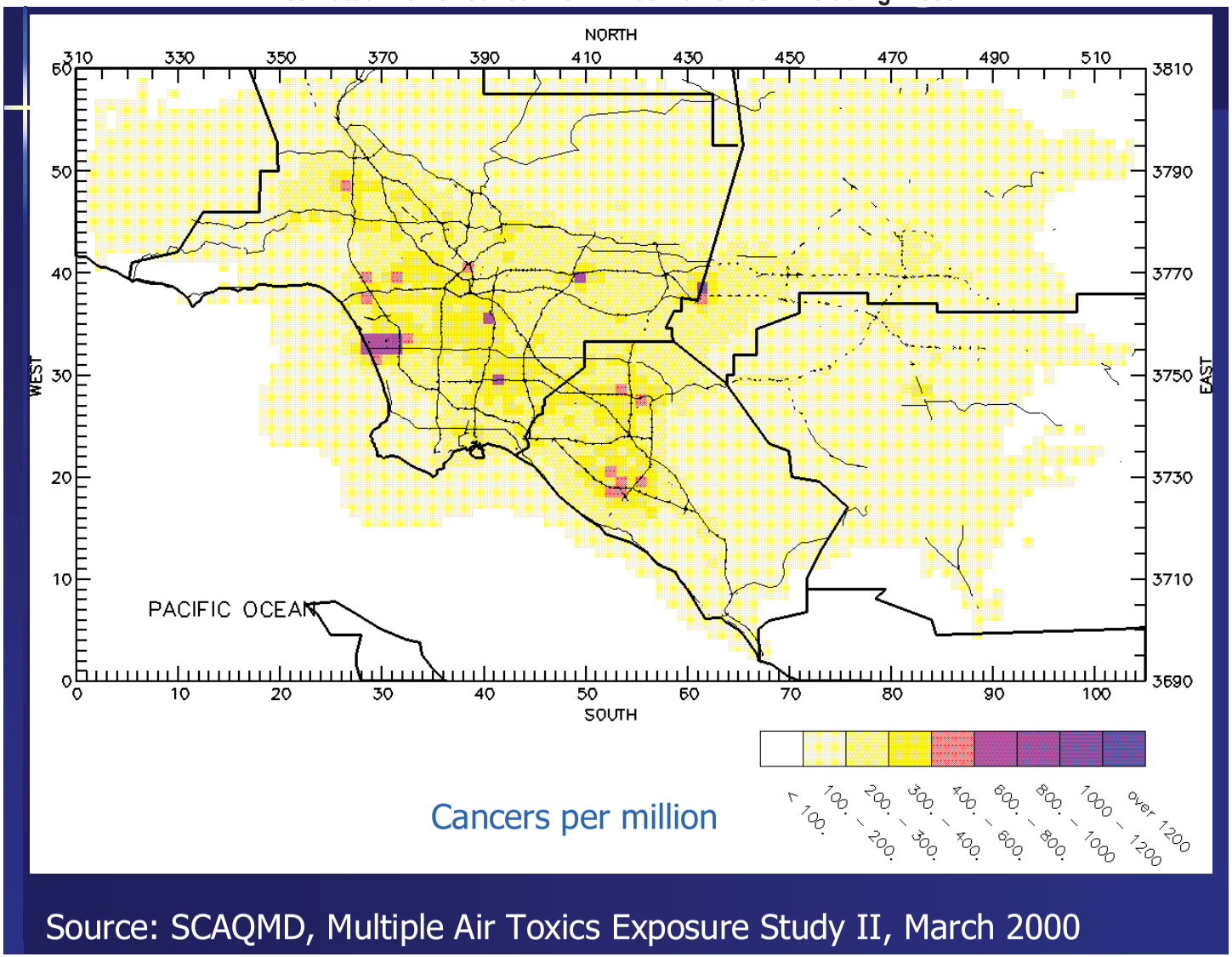
According to the South Coast Air Quality Management District Multiple Air Toxics Exposure (MATES-II) Study, diesel particulates account for 71% of the cancer risks (1,400 in one million) relating to pollutants in the South Coast Air Basin. For comparative purposes, Figures 4 and 5 display the cancer risk from airborne toxics with and without diesel emissions for the counties of Los Angeles, Orange, Riverside, San Bernardino, and Ventura.[20] Based on a comparison of Figures 4 and 5, and a cancer risk of 1,400 per million; individuals in areas of maximum risk are 14 times more likely to contract cancer due to diesel emissions.

Figure 4
Estimated Risk of Cancer from All Toxics: All Emission Sources



Source: SCAQMD, Multiple Air Toxics Exposure Study II, March 2000

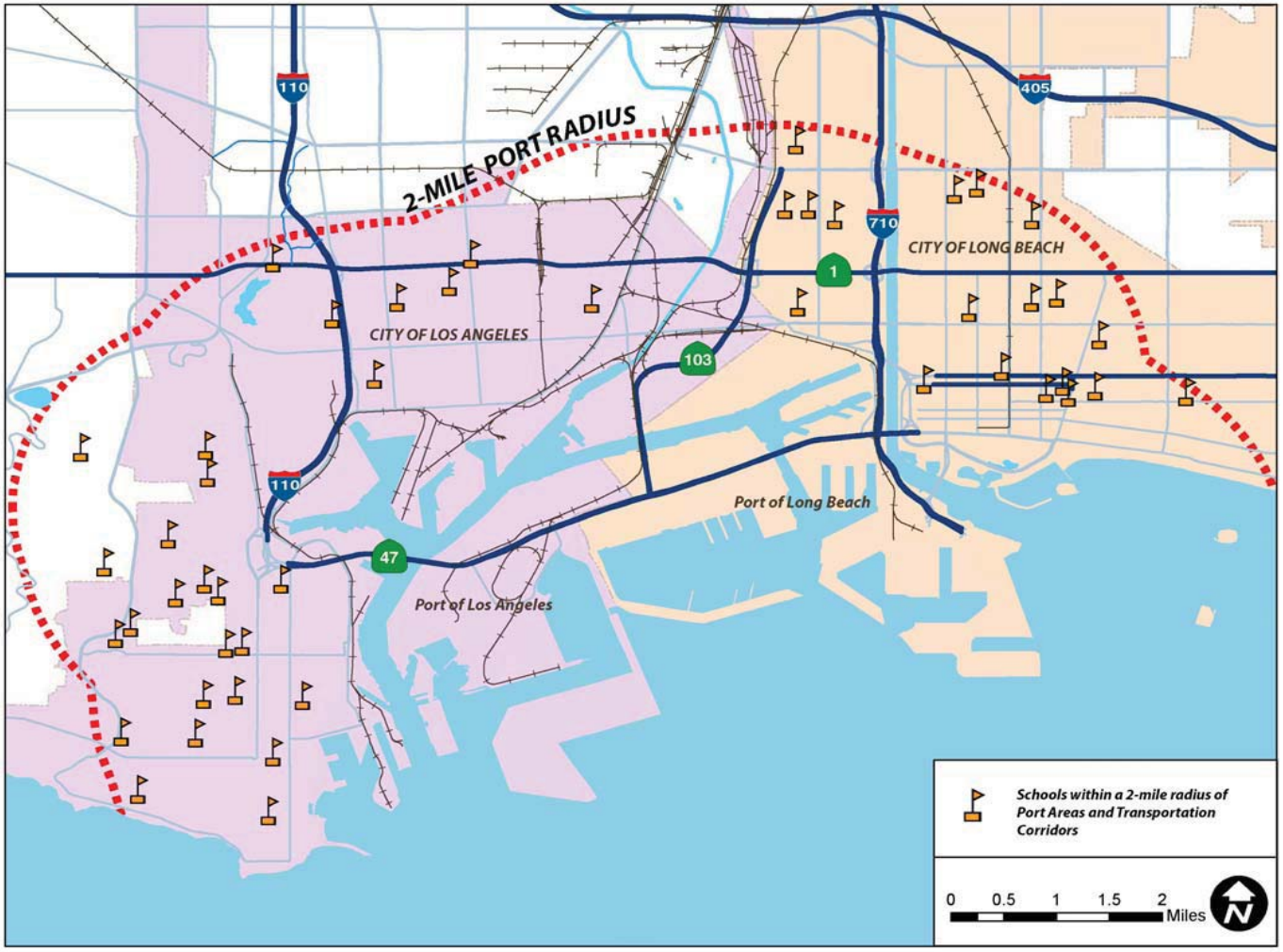
Figure 5
Estimated Risk of Cancer from Airborne Toxics: Excluding Diesel



Source: SCAQMD, Multiple Air Toxics Exposure Study II, March 2000

The Keck School of Medicine of USC also found harmful health effects cause by diesel PM, including increased incidences of: asthma, preterm and low birth weight babies; cardiac birth defects, thickening of arterial walls, oropharyngeal (mouth and throat) cancer, and slowed lung development in children. [21] Recent CARB analysis shows 5,400 premature deaths (up to 14 years premature) each year in the South Coast Air Basin just due to PM2.5 pollution. CARB previously estimated that 2,400 people die prematurely each year of that in the South Coast Air Basin. There is evidence that vehicle-related pollutants decrease to "near background levels" within about 300 meters (approximately 1,000 feet) of freeways.[22] The issue nevertheless raises concern in areas near goods movement facilities and corridors where people live and their children go to school. Taking the study area's ports for example, forty-six schools are located within two miles of either the San Pedro Bay ports as displayed in Figure 6.

Figure 6
Schools Located Within a 2-Mile Radius of San Pedro Bay Ports



Source: 2000 U.S. Census TIGER data

NOx also poses health threats to individuals, albeit indirectly. NOx precursor emissions are required to form ground-level ozone (O_3) as well as PM2.5.[23] Ozone can affect the health of individuals by aggravating asthma and causing lung tissue inflammation. Children and the elderly are the most susceptible, although the U.S. EPA estimates that ozone can result in a 15 to 20% temporary decrease in lung capacity in some healthy adults.[24]

Goods Movement's Role in Air Quality

Commercial aircraft emissions are a growing segment of the transportation emissions inventory due to increasing air traffic demand. This growth is occurring at a time when other significant mobile and stationary sources are drastically reducing emissions, thereby accentuating the growth in aircraft emissions. Recently, the Federal Aviation Administration (FAA) reported that flights of commercial air carriers are expected to increase by 34% from 2002 to 2020.[25] According to the FAA, the combined emissions from aircraft and GSE typically represent approximately three to five percent of emissions regulated under State Implementation Plans (SIP) nationwide.[26] Aircraft emissions data within SCAB is presented in Table 5.

Table 5
Estimated 2005 Annual Average Aircraft Emissions in SCAB

	Pollutant (Tons per Day)				
	NOx	**SOx**	**PM10**	**PM2.5**	**CO**
Aircraft	26.53	0.95	0.65	0.65	50.79
TOTAL All Sources	975.3	58.48	291.95	112.49	4100.19
Aircraft % of Total	2.7%	1.6%	0.2%	0.6%	1.2%

Source: South Coast AQMD 2003 Air Quality Management Plan

Ports have such a significant impact because three major modes of goods movement transportation converge there – ships, trucks, and rail. These modes predominantly use particulate-producing diesel fuel. Not only are more diesel-powered vehicles accessing the ports due to goods movement growth, but they are also spending more time there due to port capacity constraints, thereby resulting in increased diesel emissions from idling. In addition, support vehicles such as harbor craft and cargo handling equipment typically rely on diesel fuel as well. Further, ships use a low-grade diesel fuel ("bunker fuel") that contributes significantly more particulate matter than diesel used by trucks and locomotives. Ship emissions data within SCAB is presented in Table 6.

Table 6
Estimated 2005 Annual Average Ship Emissions in SCAB

	Pollutant (Tons per Day)				
	NOx	SOx	PM10	PM2.5	CO
Ships & Commercial Boats	51.88	29.89	3.59	3.32	6.19
TOTAL All Sources	975.3	58.48	291.95	112.49	4100.19
Ships % of Total	5.3%	51.1%	1.2%	3.0%	0.2%

Source: South Coast AQMD 2003 Air Quality Management Plan

The locomotive engine is the primary source of diesel emissions associated with rail, with rail support equipment and switchers also contributing to diesel PM. Rail emissions data within SCAB is presented in Table 7.

Table 7
Estimated 2005 Annual Average Rail Emissions in SCAB

	Pollutant (Tons per Day)				
	NOx	SOx	PM10	PM2.5	CO
Rail	31.79	3.33	1.05	0.97	6.55
TOTAL All Sources	975.3	58.48	291.95	112.49	4100.19
Rail % of Total	3.3%	5.7%	0.4%	0.9%	0.2%

Source: South Coast AQMD 2003 Air Quality Management Plan

Emissions caused by vehicle delays at rail crossings contribute further to air quality issues relating to goods movement rail activity. The Leachman study established year 2000 baseline emissions generated from delayed vehicles at grade crossings as follows: 9.65 tons of ROG; 100.46 tons of CO; 13.85 tons of NOx; 0.54 tons PM10; and 0.09 tons of SOx.[27]

Truck corridors are also shared-use facilities in that cars use the same infrastructure. An increase in automobile traffic coupled with an increase in truck traffic causes even greater congestion. This negatively affects transportation efficiency for all users by creating congestion from overlapping user groups (total number of vehicles on the road) and especially inadequate capacity during peak hours, thereby increasing idling and related emissions. Truck emissions data within SCAB, including but not limited to port-related trucks, is presented in Table 9.

Table 9
Estimated 2005 Annual Average Truck Emissions in SCAB

	Pollutant (Tons per Day)				
	NOx	SOx	PM10	PM2.5	CO
Trucks	216.82	2.22	4.28	3.57	35.16
TOTAL All Sources	975.3	58.48	291.95	112.49	4100.19
Trucks % of Total	22.2%	3.8%	1.5%	3.2%	0.9%

Source: South Coast AQMD 2003 Air Quality Management Plan

Warehousing and distribution centers are experiencing increased bottlenecking and idling emissions due to increasing goods movement activities. Congestion at these facilities center upon the following key constraints: points of entry (gates), docks, and yard design and layout. Additionally, warehousing and distribution centers are the key destination point for trucks equipped with diesel-powered TRUs, which convey specific health risks (see Table 10).

Table 10
Estimated Cancer Risk versus Distance from Center of TRU Activity[28]

Distance from Center of Source	Potential Cancer Risk
275 meters (~900 feet)	> 100 per million
1,050 meters (~3,450 feet)	>= 10 and < 100 per million

Source: *Air Quality and Land Use Handbook: A Community Health Perspective.* Cal/EPA and California Air Resources Board. April 2005.

In addition, the trend to site warehousing and distribution centers further inland will result in longer truck trips, leading to an increase in local and regional congestion and emissions.[29]

Visual

A lack of appropriate height controls on new structures in pier development/redevelopment can cause visual incongruity and intrusion in the landscape of the adjacent community. Confined footprints of container storage yards at ports, rail yards, and warehousing and distribution centers can lead to increased container stack height, creating a negative visual aesthetic by blocking views or preventing natural lighting from reaching adjacent residential properties (shadowing). Further, encroachment into neighborhood areas can result from demand for additional storage space. As an example, residents of Wilmington are being encroached by a proliferation of "temporary" storage facilities near the port in locations not zoned for such use.[30] Lighting spillover can disrupt the sleep patterns of residents and may also negatively affect wildlife

by potentially causing disorientation or confusion of biological rhythms, and potentially cause high mortality in birds attracted to brightly lit buildings or towers.[31]

Noise & Vibration

Railway activity is a significant source of noise for people who live and work nearby. Noise relating to goods movement falls within two general categories: (1) noise generated on the rail line during goods transport, and (2) noise resulting from interfacing rail operations at goods movement facilities, such as vehicle idling, container placement and goods transfer, rail car coupling/uncoupling, and the operation of support equipment. A significant number of railway noise complaints result from idling engines and blowing whistles/horns as opposed to line haul operations, according to Illinois EPA noise advisor, Greg Zak.[32] At a distance of 50-feet, noise levels average 90 dBA for locomotive horn and 75 dBA for line haul operations traveling at 50 m.p.h.[33]The Federal Railroad Administration (FRA) estimates that 4.6 million people nationwide are severely impacted by locomotive horns.[34] Programs that extend freight operating hours through the night compounds the noise issue. During nighttime hours ambient noise levels are lower, thus causing related goods movement noise to be more noticeable by nearby sensitive populations.

Environmental Justice

On February 11, 1994, Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was issued. The Executive Order directs federal agencies to take necessary and appropriate steps to identify and address disproportionately high and adverse human health or environmental effects of federal projects and programs on minority and low-income populations to the greatest extend practical and permitted by law. Fundamentally, environmental justice is about fairness toward the disadvantaged and often addresses the exclusion of racial and ethnic minorities from decision making. Some events that lead to EO 12898 and that established the principles of disproportionate impacts and exclusion in decision making as adopted by NEPA follow[35]:

- 1969 – The National Environmental Policy Act (NEPA) is passed in the U.S. Congress. This policy requires federal agencies to incorporate environmental values into the process of decision-making. Thinking about environmental impacts of proposed projects and considering reasonable alternatives is accomplished through Environmental Impact Statements (EIS).
- 1971 – The annul report on the U.S. Council on Environmental Quality (CEQ) acknowledges that racial discrimination adversely affects the environmental quality of urban people of color.
- 1983 – U.S. General Accounting Office (GAO) published Siting of Hazardous Landfills and Their Correlation with Racial and Economic Status of Surrounding Communities, and found that:
  - 75% of off-site commercial hazardous and toxic waste landfills were in communities of color although they made up only 20% of the population.
  - 60% of Latinos and Blacks live in areas with uncontrolled toxic waste sites.
- 1991 – In Kettleman City, CA, a judge rules in the El Pueblo para el Aire y Agua Limpio v County of Kings case that the permit process for a toxic waste incinerator is unsound. Moreover, the judge found that the local community was not “meaningfully involved” due to the failure to translate documents into Spanish.

As the goods movement system grows the first consideration is physical expansion – whether by increasing acreage at airports, seaports, and rail yards, enlarging warehouse footprints, or adding new asphalt lanes and steel tracks. The modal capacity expansion/land use connection often raises the issue of environmental justice. Environmental justice issues relating to goods movement arise most frequently when minority and low-income communities suffer disproportionately from transportation programs' negative impacts, like air pollution. Environmental justice issues can also arise when some communities are less represented than others when policy-making bodies debate and decide what should be done with transportation resources.

Water Quality & Wetlands

Storm water is the largest source of pollution of water quality impairment in U.S. coastal waters and the second-largest source of water pollution in U.S. estuaries.[36] Five to ten percent of dredged sediment nationwide is estimated to be contaminated with toxic chemicals, including polychlorinated biphenyls (PCBs), mercury and other heavy metals, polycyclic aromatic hydrocarbons, and pesticides.[37] Ship ballast water discharged in port areas introduces aquatic invasive alien species into U.S. waters, as well as pathogens, such as Clostridium perfringins, Salmonella species, Escherichia coli, Vibrio cholerae, and enteroviruses, which can result in paralytic shellfish poisoning, and can ultimately cause severe illness or death in humans.[38] Ballast water may also transfer micro-algae, including those species known to form harmful algae blooms or red tides.[39]

Diesel fuel from ship exhaust affects the quality of water and the vitality of marine life in and around port harbors. Pollutants can result in hypoxia (a condition where water has extremely low dissolved oxygen content typically insufficient to support marine life), or the eutrophication of coastal ecosystems (a reduction of dissolved oxygen in the water due to excess nutrients that stimulate excessive plant growth causing other organisms to die.)[40]

At ports, sediment deposits from filling coastal land to increase surface area for port operations can disrupt tidal influence necessary for vital coastal wetlands. Contaminated runoff from inland goods movement activities (rail yards, transportation corridors, and warehousing and distribution centers) has the potential to negatively affect inland wetlands. While typical goods movement expansion activities can displace existing wetlands, airports located near water sources have evolved into a sort of wetlands protector, as well. Due to airport land use compatibility issues, adjacent airport development is restricted. Therefore, adjoining wetlands experience limited displacement from off-airport development.

Hazmat

Potential releases of hazardous materials pose risks to the environment and communities near goods movement corridors and facilities. Releases could occur during these common activities: hazardous materials transport, fueling operations, and fuel storage. The potential for HAZMAT accidents during transit by rail and truck are increasing due to (1) the stand-alone increase in freight activity for rail operators, (2) the increase in potential safety conflicts between freight and commuter rail, and (3) the increase in potential safety conflicts at grade crossings with vehicular traffic. The warehousing and distribution center sector

segregates these specialized HAZMAT facilities from general commodities facilities (which handle typical consumer goods.)

Safety

Railroad crossing safety is a consideration as travel demand for rail (passenger and freight) and passenger vehicles increase. Blocked crossings by trains can be frustrating, time-consuming, and cause potentially dangerous situations, such as preventing the crossing of emergency vehicles, drivers attempting to "beat the train" to avoid long waits, or school bus drivers distracted with the noise and activity inside their bus. In spite of the potential risks associated with increased travel demand and goods movement activity, the FRA announced in March 2006 that train accidents and derailments declined in 2005, and that the highway-rail grade crossing collision rate is at an all-time record low. [41] Since 1995, the highway-rail grade crossing collision rate has declined from 6.92 to 3.84 per million train miles.[42] That being said, the FRA has recently announced a renewed focus on improving the safety at the nation's largely unregulated private highway-rail grade crossings where approximately 400 accidents, and between 30 and 40 fatalities, occur annually at the over 94,000 private crossings used by both freight and passenger trains.[43]

To accommodate ever-increasing passenger and freight rail demands, shared-track usage is occurring more frequently. Where shared use between freight rail and light rail transit (excluding other commuter rail) occurs, transit and insurance experts find little or nor additional risk to passengers compared to non-shared track transit operations.[44]

Increasing freeway congestion can motivate trucks to deviate and use surface streets within neighboring communities in search of alternate routes to enter ports, rail yards, and distribution centers and warehouses, which may create greater safety risks to both trucks and passenger vehicles.

E-4 Operational & Cumulative Resource Impacts

Future expansion of goods movement facilities and corridors, if proposed, has other potential significant resource effects, such as:

- Displacement of endangered or sensitive plant and animal species
- Disruption of wildlife corridors and habitat, alteration of drainage patterns, and conflict with established habitat/natural communities conservation plans
- Disturbance and displacement of irreplaceable cultural resources, such as historic buildings and archeological resources, including Native American lands
- Open space infringement and displacement

Each project that is subject to CEQA will warrant individual, site-specific analysis. For example, review of the California Natural Diversity Database (CNDDB) would occur for a preliminary determination on whether a proposed project has the potential to affect endangered, threatened, or sensitive plant and animal species. A CNDDB inquiry revealed potential special status species throughout the study area as shown in Figure 7.

A proposed project may also result in cumulative impacts that result from the incremental impact of the proposed project when added to other past, present, and reasonably foreseen future projects. Individually minor but collectively significant actions taking place over a period of time can occur, thereby resulting in significant environmental impacts.

Ultimately, there is no way of avoiding all impacts. By identifying them in advance under CEQA and NEPA, however, the potential for impact avoidance and minimization is greatly improved to the benefit of the environment and community.

E-5 Conclusion and Next Steps

This technical memorandum describes the types of environmental impacts within the MCGMAP study area and the regulatory framework governing the mitigation of these impacts. The regional environmental impacts identified by this technical memorandum will be the primary types of impacts that will be mitigated by strategies identified later in the MCGMAP project. Goods movement strategies developed under Task 6 of the MCGMAP will have environmental impacts within the region; some positive and some negative. By understanding the types and relationships of environmental impact within the study area, the MCGMAP will maximize both the economic opportunities associated with goods movement, as well as opportunities to reduce the associated environmental and community impacts.

The next task of the MCGMAP will focus on the development and evaluation of strategies to improve goods movement within the study area. Task 7 will follow and will identify good practices for mitigating the effect of goods movement on local communities and the environment. It is anticipated that Task 7 will result in the identification of set of strategies or good practices that can be implemented at a regional level to mitigate the environmental impacts of goods movement projects and reduce current acceptable levels of pollution. The purpose of Task 7 is to identify these mitigation measures for the region as a whole. Project specific mitigation measures or measures to mitigate regional environmental or community impacts will be identified and evaluated in future efforts.

Purpose of This Technical Memorandum

This Technical Memorandum 5b provides a general overview of the environmental issues that exist today concerning Southern California's good movement network. By providing a regional perspective of these issues, it will establish the baseline for upcoming study and analysis for the MCGMAP. These studies include the identification and evaluation of potential goods movement improvements (Task 6) and the identification of a list of good practice mitigation strategies (Task 7).

The purpose of Technical Memo 5b is to provide context to environmental issues related to goods movement within the regional setting. Copious data have already been collected and published due to concentrated efforts by numerous state and regional environmental agencies in a proactive effort to minimize goods movement environmental impacts and to protect the state's natural resources and citizens as we move into the future. The existing data verifies that increasing goods movement demand contributes to increasing levels of transportation congestion, emissions, and community impacts. Therefore, this memorandum will not assess in detail the environmental impacts associated with all goods movement activity. The intent of this memo is not to prove what has already been proven, but to provide the context necessary for the holistic evaluation of potential goods movement improvements and environmental mitigation strategies in the study area. The conclusive data is thus acknowledged and is hereby integrated into this section as a foundation.

As a result of increasing momentum for environmental awareness and protection within the goods movement industry, technological and policy developments are occurring at a very rapid pace. Weekly, if not daily, developments are published. A good faith effort has been made to include the major developments.

This memo begins in Section 1 with a review of the environmental framework in which the MCGMAP is operating – key regulatory framework and data. A discussion of prominent environmental and community impacts follows in Section 2. Section 3 discusses some of the potential operational and cumulative resource impacts from goods movement projects should they be proposed.

Regulatory Background

The study area covers a large geographic area that contains a wide variety of topography, air, water, and other environmental characteristics. Due to its unique geographic location, the state's environmental quality and control is shared between international, federal, state, and regional agencies. There are approximately 30 agencies with jurisdiction over a broad range of environmental impacts. Landmark environmental legislation includes the Clean Air Act, Clean Water Act, and Noise Control Act; however, it is the reduction of air pollutants via cleaner fuels, operational changes, and technological improvements that has received the primary focus. A comprehensive list of the agencies, jurisdictions, and responsibilities is included in Table 1 below.

Table 1
Key Environmental Regulatory Agencies

AGENCY	RESPONSIBILITY	JURISDICTION	KEY REGULATION(S)
International Civil Aviation Organization (ICAO)	International civil aviation standards established by Convention	International, but not preemptive of FAA	Annex 16: Environmental Protection, Volume II - Aircraft Engine Emissions
International Marine Organization (IMO)	International marine safety and pollution prevention law established by the United Nations	International	MARPOL Annex I-VI
US Congress	Established federal environmental protection and Council of Environmental Quality (CEQ) to further NEPA.	Nationwide	National Environmental Protection Act (NEPA)
US Environmental Protection Agency (EPA)	Regulation and enforcement for protection of human health and the environment.	Nationwide	Clean Air Act, Clean Water Act, Oil Pollution Prevention Regulation
Federal Aviation Administration (FAA)	Regulation and enforcement of aviation standards for airport, aircraft, and airmen.	Nationwide	Airport Noise & Compatibility Act; Commercial Airport Certification; Aircraft Certification
US Fish and Wildlife	Conservation and protection of fish, wildlife, and plants and their habitats.	Nationwide	Endangered Species Act
US Department of Transportation (DOT)	Ensuring a fast, safe, efficient, accessible, and convenient transportation system; oversees federal railroad, federal transit, and federal highway regulations.	Nationwide	Title 49 of the Code of Federal Regulations (Transportation), including Hazmat transport.
Bureau of Land Management (BLM)	Sustain the health, diversity, and productivity of the public lands.	Nationwide	Federal Land Policy and Management Act
Army Corps of Engineers (ACE)	Water resource and environmental restoration and stewardship.	Nationwide	Permitting of projects/actions affecting navigable waters of the US
California Legislature	Established state environmental protection and the State Clearinghouse and Office of Planning and Research (OPR) to further CEQA.	Statewide	California Environmental Quality Act (CEQA)
Business, Transportation, & Housing Agency	Oversees 13 state agencies, including Caltrans, California Highway Patrol, Department of Motor Vehicles, and Department of Alcoholic Beverage Control; Regulates managed health care	Statewide	Oversight of law enforcement activities of subordinate state agencies.

AGENCY	RESPONSIBILITY	JURISDICTION	KEY REGULATION(S)
	plans as well as the banking, and financial and securities industries		
California Fish & Game	Manage fish, wildlife, and plant resources and their habitats	Statewide	California Endangered Species Act
California EPA *see also CARB and SWRCB*	Oversees CARB, SWRCB, Department of Pesticide Regulation, Department of Toxic Substances Control, Office of Environmental Health Hazard Assessment, Integrated Waste Management Board	Statewide	California Clean Air Act
California Air Resources Board (CARB) *see also Regional Air Quality Management Districts*	Part of CalEPA; to promote and protect public health, welfare, and ecological resources through effective reduction of air pollutants while recognizing and considering effects on the economy.	Statewide	California Air Pollution Control Laws
State Water Resources Control Board (SWRCB) *see also Regional Water Quality Control Boards*	Water allocation and water quality protection; Oversees nine regional boards	Statewide	Porter-Cologne Water Quality Control Act (California Water Code, Division 7)
Native American Heritage Commission	Identify and catalogue Native American cultural resources, and prevent damage to and insure Native American access to sacred sites. Also, identify a Most Likely Descendant (MLD) when Native American human remains were discovered any place other than a dedicated cemetery -- MLDs were granted the legal authority to make recommendations regarding the treatment and disposition of the discovered remains.	Statewide	
Regional Air Quality Management Districts	*See CARB*	Regional	
South Coast AQMD		Portions of Los Angeles, Orange, Riverside, and San Bernardino counties	Emissions regulations

AGENCY	RESPONSIBILITY	JURISDICTION	KEY REGULATION(S)
South Central AQMD		Ventura County	Emissions regulations
Imperial County Air Pollution Control District		Imperial County	Emissions regulations
San Diego Air Pollution Control District		San Diego County	Emissions regulations
Mojave Desert AQMD		Portions of Los Angeles, Riverside, and San Bernardino counties	Emissions regulations
Antelope Valley AQMD		Portion of Los Angeles County	Emissions regulations
Regional Water Quality Control Boards	*See SWQCB*	Regional	
Los Angeles RWQCB		Portions of Los Angeles and Ventura counties	Water allocation and water quality protection regulations
Santa Ana RWQCB		Portions of Orange, San Bernardino, and Riverside Counties	Water allocation and water quality protection regulations
Colorado River Basin RWQCB		Portions of San Bernardino, Riverside, and San Diego Counties	Water allocation and water quality protection regulations
Lahontan RWQCB		Portions of Los Angeles and San Bernardino Counties	Water allocation and water quality protection regulations
San Diego RWQCB		Portions of Orange and Riverside Counties	Water allocation and water quality protection regulations
Central Coast RWQCB		Portion of Ventura County	Water allocation and water quality protection regulations

Source: Jones & Stokes, 2006; Wilbur Smith Associates, 2007.

1.1 California Air Quality Regulation

As previously mentioned, the focus of environmental regulations is the reduction of air pollutants, primarily due to their potential impacts on human health. Air pollution control in California is a shared responsibility between 35 local air quality management districts (AQMD), the California Air Resources Board (CARB),

and the United States Environmental Protection Agency (EPA). Some of the basic responsibilities of each entity are outlined as follows:

AQMD – adopt local air quality plans and rules; control and permit industrial pollution sources (e.g., power plants, refineries, and manufacturing operations) and area-wide sources (e.g., bakeries, dry cleaners, and service stations); control indirect pollution sources (i.e., facilities that attract mobile sources.)

CARB – establish state ambient air quality standards; adopt and enforce emission standards for mobile sources (except where federal law preempts CARB's authority), fuels, and toxic air contaminants; oversee AQMD compliance with federal and state law; approve local air quality plans and submit State Implementation Plans (SIPs) to the EPA.

EPA – Establish national ambient air quality standards; set emission standards for mobile sources; oversee state air programs as they relate to the Federal Clean Air Act; approve SIPs.

1.2 Pollution & Air Basins

Sources of air pollution are divided into four major emissions categories: stationary, area-wide, mobile, and natural. The MCGMAP focuses on the mobile source emissions from trucks, ships, rail, and aircraft.

CARB designates air basins for assessing pollutants from emissions based on varying topographic, air, water, and other environmental characteristics. Meteorological and geographic/topographic conditions within an air basin are generally similar throughout, as these conditions factor into how pollution behaves when released into the atmosphere.

CARB establishes state ambient air quality standards (SAAQS) for criteria pollutants, such as nitrogen oxides (NO_2), ozone, particulate matter of 10-microns and 2.5-microns or less (PM10 and PM2.5, respectively), carbon monoxide, and sulfur oxides (SO_2). In addition, California is subject to national ambient air quality standards (NAAQS) set by the Environmental Protection Agency (EPA); however, state standards are typically more stringent and are defaulted to in the context of environmental analyses for studies such as the MCGMAP. Federal law establishes specific deadlines to attain national ambient air quality standards; however, no such deadlines are established by the State.

Specifically, CARB establishes state area designations for the following 10 criteria pollutants: ozone, suspended particulate matter (PM10), fine suspended particulate matter (PM2.5), carbon monoxide, nitrogen dioxide, sulfur dioxide, sulfates, lead, hydrogen sulfide, and visibility reducing particles. In contrast to the state area designations, the U.S. Environmental Protection Agency (U.S. EPA) makes national area designations for five criteria pollutants: ozone (1-hour and 8-hour standards), PM10, carbon monoxide, nitrogen dioxide, and sulfur dioxide.

CARB monitors the air quality in each basin and assigns area designations by criteria pollutant. Area designations are:

Attainment: a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a three-year period.

Nonattainment: a pollutant is designated nonattainment if there was at least one violation of a state standard for that pollutant in the area.

Nonattainment/Transitional: is a subcategory of the nonattainment designation. An area is designated nonattainment / transitional to signify that the area is close to attaining the standard for that pollutant.

Unclassified: a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Air Quality Management Districts (AQMD) are the regional government agency responsible for air pollution control in their management districts. AQMD regulations and plans must be approved by CARB and the U.S. EPA.

The five counties within the MCGMAP study area encompass four of the states' 15 air basins and four of 35 AQMDs as follows in Table 2:

Table 2
Southern California Air Districts and Air Basins

COUNTY	AIR BASIN	AIR DISTRICT
Imperial	Salton Sea Air Basin	Imperial County Air Pollution Control District
Los Angeles	South Coast	South Coast AQMD
	Mojave Desert	Mojave Desert AQMD and Antelope Valley AQMD
Orange	South Coast	South Coast AQMD
Riverside	South Coast	South Coast AQMD
	Mojave Desert	Mojave Desert AQMD
	Salton Sea	Mojave Desert AQMD
San Bernardino	South Coast	South Coast AQMD
	Mojave Desert	Mojave Desert AQMD
San Diego	San Diego Air Basin	San Diego Air Pollution Control District
Ventura	South Central Coast	Ventura County AQMD

Source: Jones & Stokes, 2006.

The relation between the study area's counties, air quality management districts, and air basins are displayed in Figure 1 below.

An ambient air quality standard is the definition of "clean air." A standard establishes the concentrations above which a pollutant is know to cause adverse health effects to sensitive groups within the population, such as children and the elderly. Area designations for state ambient air quality standards for each air basin covering the MCGMAP counties are summarized in Table 3. Figures demonstrating the area designations for criteria pollutants (excluding CO due to attainment status) within the study area are located in Appendix A.

California's largest metropolitan region – and largest goods movement contributor in the state – is the South Coast Air Basin (SCAB). The SCAB encompasses the southern two-thirds of Los Angeles County, all of Orange County, and the western urbanized portions of Riverside and San Bernardino counties. The area is comprised of 6,480 square miles, 43 percent of California's population, and contributes 29 percent of the state's total criteria pollutant emissions.[1]

Figure 1
Air Districts and Air Basins

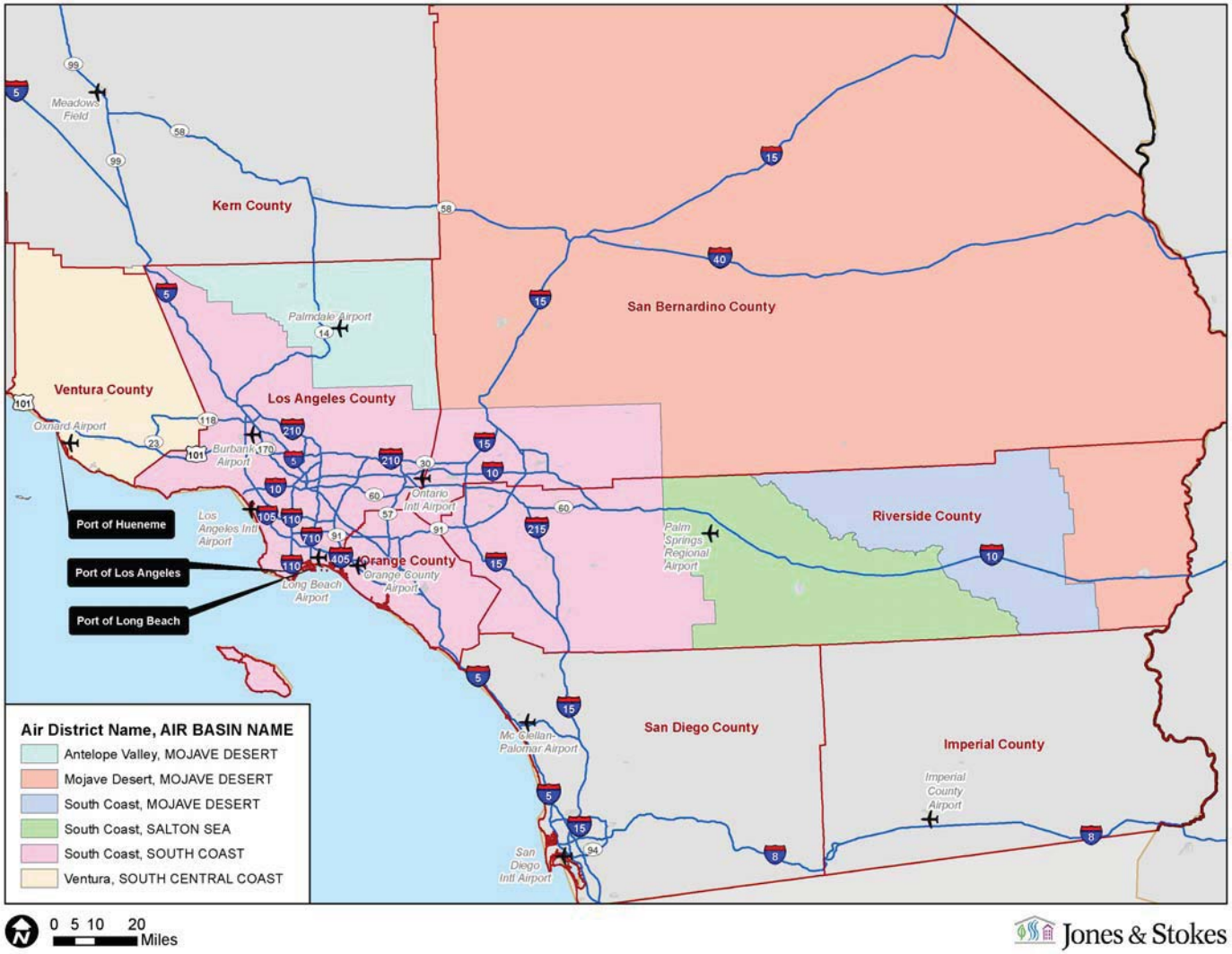


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Table 3
State Area Designations per Criteria Pollutants

BASIN	POLLUTANT [a, b]					
	Ozone	PM10	PM2.5	NO_2	SO_2	CO
South Coast	Nonattainment	Nonattainment	Nonattainment, except for Unclassified in northern L.A. County	Attainment	Attainment	Attainment
Mojave Desert	Nonattainment	Nonattainment	Nonattainment, except Unclassified in eastern San Bernardino and eastern Riverside Counties	Attainment	Attainment	Attainment, except for Unclassified in eastern Riverside County
South Central Coast	Nonattainment	Nonattainment	Nonattainment	Attainment	Attainment	Attainment
Salton Sea	Nonattainment	Nonattainment	Unclassified	Attainment	Attainment	Attainment

Notes:

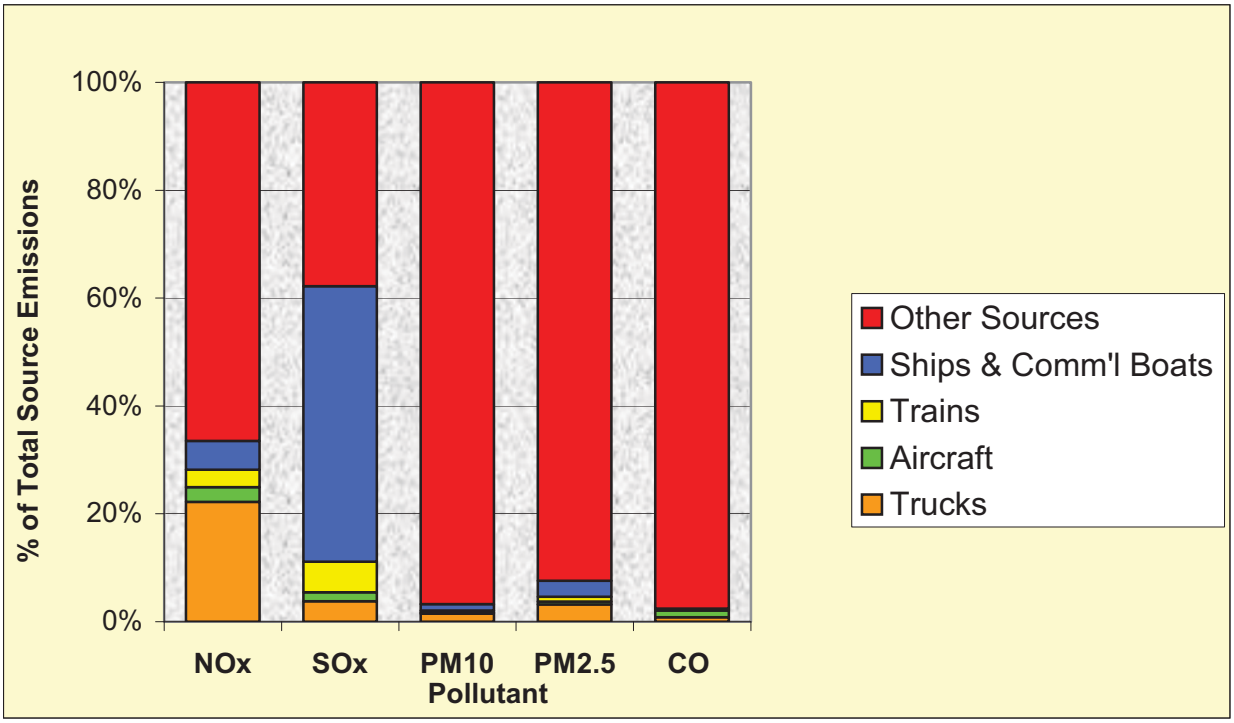
[a] Area Designation for State Ambient Air Quality Standards Ozone, PM10 and CO. California Air Resources Board. Updated October 18, 2004. http://www.arb.ca.gov/knowzone/basin/basin.htm.

[b] 2004 Area Designations for State Ambient Air Quality Standards PM2.5, Nitrogen Dioxide, and Sulfur Dioxide maps. CARB. October 18, 2004. http://www.arb.ca.gov/desig/adm/adm.htm.

Source: Jones & Stokes, 2006.

The SCAB generally forms a lowland plain, bounded by the Pacific Ocean on the west and by mountains on the other three sides. According to the CARB, there are probably few areas less suited for urban development in terms of air pollution potential. The warm, sunny weather associated with a persistent high-pressure system is conducive to the formation of ozone, commonly referred to as “smog.” The surrounding mountains, frequent low inversion heights, and stagnant air conditions further aggravate the problem. All these factors act together to trap pollutants in the air basin. Pollutant concentrations in parts of this air basin are among the highest in the Nation.2 Emissions from goods movement in relation to all emission sources in the SCAB are presented below in Figure 2.

Figure 2
2005 Estimated Annual Average Emissions in South Coast Air Basin



Source: *Final 2003 Air Quality Management Plan.* South Coast Air Quality Management District.

As indicated in Figure 2 above, the goods movement industry is a major contributor to SCAB emissions, especially for NOx and SOx. Other emissions sources contributing to the Basin's air quality as reported by the AQMD include:

- On-Road Mobile – automobiles and lighter duty trucks. Excludes heavy heavy duty (HHD) trucks accounted for in goods movement truck category.
- Other Mobile – off road sources, such as recreational boats, off-road recreational vehicles, and farm equipment. Excludes goods movement categories of aircraft, trains, and ships.
- Stationary and Area – numerous sources, such as utilities, oil and gas production, waste disposal, cleaning and surface coating, industrial processes (e.g. food and agriculture, electronics, and wood and paper), and solvent evaporation.

The percentage contribution of these emissions sources in comparison to the goods movement industry is presented in Table 4.

Table 4
2005 Estimated Annual Average Emissions in South Coast Air Basin
(Percent of Total)

Source	Pollutant				
	NOx	SOx	PM10	PM2.5	CO
Goods Movement	33.5%	62.2%	3.3%	7.6%	2.4%
On-Road Mobile	37.3%	4.3%	5.1%	8.4%	65.1%
Other Mobile	19.1%	0.9%	5.3%	12.0%	27.4%
Stationary & Area	10.0%	32.6%	86.3%	72.1%	5.1%

Source: *Final 2003 Air Quality Management Plan.* South Coast Air Quality Management District.

Air quality standards and regulations are dynamic in nature, undergoing changes as new data concerning pollutant impacts emerge and as goods movement transportation policy evolves. Some recent emerging issues and developments concerning the study area's air quality relating to the goods movement network are briefly discussed below.

- The EPA promulgated first-time area designations for PM 2.5 in early 2005. High PM2.5 concentrations result from reactions in the atmosphere from precursor gases emitted from combustion sources, and from direct particulate emissions from mobile sources and burning activities. The SCAB is designated as nonattainment for PM2.5 (currently, the other basins within the MCGMAP are in attainment). SIPs for PM2.5 nonattainment areas are scheduled for submittal in early 2008. Actions currently taken to reduce ozone, PM10, and diesel PM will also help to reduce PM2.5.

- The United States-Thailand Free Trade Agreement (FTA) has been proposed by the Office of the United States Trade Representative (USTR).[3] In October 2003, President Bush announced his intent to enter into FTA negotiations with Thailand, reaffirming his commitment under the Enterprise for ASEAN Initiative (EAI) to strengthen trade ties with countries in the ASEAN region that are actively pursuing economic reforms. An agreement with Thailand, which is currently the United States' 20th largest trading partner, would significantly increase trade in goods and services, thereby creating a potential significant impact on the goods movement system in Southern California. Following several rounds of negotiation in 2004 and 2005, the Interim Environmental Review (IER) (per section 2102(c)(4) of the Trade Act of 2002) examining possible environmental effects associated with the FTA was published in the Federal Register for comment. In January 2006, a Southern California response was issued emphasizing, "…There is a clear federal responsibility to help our region address the local domestic impacts of global trade."[4] Whereas the IER concluded that the FTA is not expected to have a negative impact on U.S. (i.e., *national*) enforcement and maintenance of environmental laws and regulations, the Southern California response is anticipated to influence appropriate *localized* environmental considerations to the final trade agreement.

- The U.S. EPA has recently amended emission standards for nitrogen oxides (NOx) for new commercial aircraft engines. The new standards (adopted in 1999 and effective in 2004) are equivalent to the NOx emission standards of the United Nations International Civil Aviation Organization (ICAO), and will

bring U.S. aircraft into alignment with international standards. These standards will apply to new aircraft engines used on commercial aircraft. A 16% NOx reduction is expected between the old and new standards.[5]

- Effective January 1, 2007, domestic and international ships operating auxiliary diesel engines (Category 2 engines) and diesel-electric engines (Category 3) will be required to use cleaner burning diesel when approaching within 24 nautical miles[6] of the California coast. This new CARB regulation also allows for alternative compliance with fuel requirements if the vessel operator utilizes programs such as: shore-side electric power for each California port call; auxiliary engine modifications; exhaust treatment control; use of alternative fuels or fuel additives.

Regulating emissions from international vessels is a continuing challenge. International aircraft and marine vessel standards are not expected to result in any reduction in emissions, due to the weakness of such standards and due to growth in trade volume. Seaports are international by nature. The primary convention regulating and preventing marine pollution by ships is the International Maritime Organization (IMO) International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). It covers accidental and operational oil pollution as well as pollution by chemicals, goods in packaged form, sewage, garbage, and air pollution. MARPOL Annex VI (adopted in 1997 and effective in 2005) amended the convention by regulating limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances.

1.3 Goods Movement-Related Agency Plans

While numerous regulatory agencies establish environmental standards, travel demand resulting from rapid population and goods movement growth are challenging the study area's ability to mitigate the related impacts on its natural resources and community neighborhoods. For example, the study area is in attainment with the required levels of carbon monoxide (CO), nitrogen oxides (NOx), and sulfur oxides (SOx).[7] However, the study area is in non-attainment with air quality standards for ozone and particulate matter. More efforts are required to bring the study area into attainment for all air quality standards to the benefit of the environment and those living here.

However, it is important to note that there has been significant progress in mitigating and reducing environmental and community impacts. Without the progress to date, the study area would be in far worse condition.

Significant progress in the reduction of air emissions and its impacts to the community has been made and can be credited to implemented environmental policies. For example, CARB estimates that due to air quality regulations adopted through October 2005 the following emission levels in diesel PM, NOx, and SOx from years 2001 to 2020 will result in:[8]

- Substantial diesel PM emissions reductions from trucks (84%), harbor craft (53%), and cargo handling equipment (75%); a minor rail reduction (4%); and a substantial increase from ships (199%).

- Substantial NOx emissions reductions from trucks (61%), harbor craft (48%), cargo handling equipment (71%), and rail (32%); and a substantial increase from ships (168%).
- Substantial SOx emissions reductions from trucks (80%), harbor craft (75%), and rail (99%); no change in cargo handling equipment emissions; and a substantial increase from ships (200%).

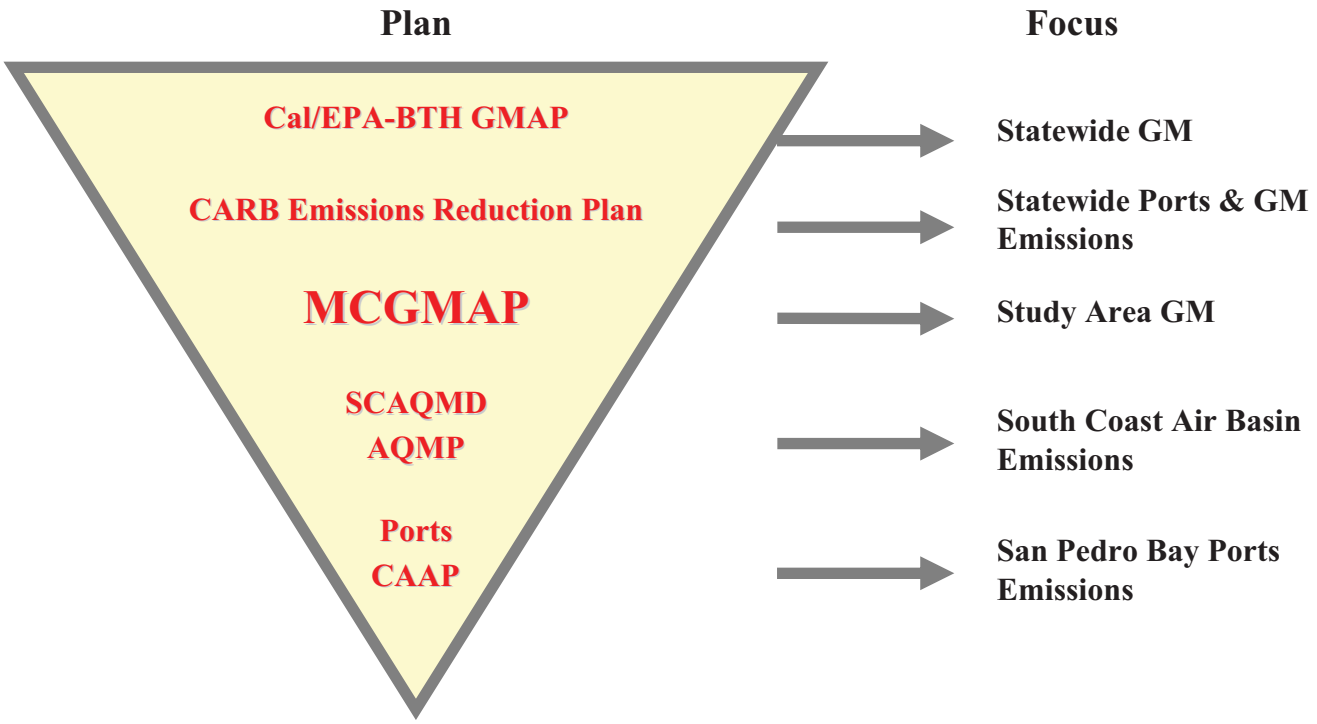
While the reductions to the domestic mobile source emissions are expected to be significant, this is not a guarantee that the study area will meet emissions budgets or attain federal and state standards for PM2.5 or ozone. This issue will be further addressed in Technical Memo 7.

It should also be noted that the gains in known health impacts associated with a reduction in domestic goods movement air emissions are less substantial due to anticipated increases in air pollutant emissions from international ships.

Ongoing efforts – both by regulatory agencies and private industry – will help to minimize the impacts as the region continues to reap the effects of increased growth. For example, such efforts in regards to reducing pollutant emissions include: dockside cold ironing, cleaner fuel requirements, extended hours for port operations, voluntary vessel speed reductions, truck idling limits, use of diesel-hybrid switch locomotives, and rail grade separations.

Promisingly, California agencies continue to aggressively address goods movement emissions. Four landmark plans are currently shaping the goods movement industry within the study area as follows: (1) California EPA (Cal/EPA) and the Business, Transportation, and Housing Agency (BTH) *Goods Movement Action Plan Phase II Progress Report: Draft Framework for Action* (March 2006), (2) CARB *Emission Reduction Plan for Ports and Goods Movement in California* (March 2006), (3) SCAQMD *2003 Air Quality Management Plan*, and (4) the Ports of Long Beach and Los Angeles *San Pedro Bay Ports Clean Air Action Plan* (Draft – June 2006). This Multi-County Goods Movement Action Plan (MCGMAP) will supplement these agency plans. The sphere of influence of each plan is presented in Figure 3 below. An overview of each plan (excluding the MCGMAP) follows.

Figure 3
Agency Plans Sphere of Influence



Source: Jones & Stokes, 2006.

The Cal/EPA-BTH Goods Movement Action Plan is a statewide goods movement action plan proposed by the Schwarzenegger Administration to generate jobs, increase mobility and relieve traffic congestion, improve air quality and protect public health, enhance public and port safety, and improve California's quality of life. The plan addresses goods movement infrastructure and operations, as well as air quality emission reductions efforts. The state's action plan, based upon CARB's Emissions Reduction Plan, establishes the following goals:

- Reduce emissions to year 2001 levels by 2010.
- Continue reducing emissions past year 2001 levels until attainment of applicable standards is achieved.
- Reduce diesel-related health risks by 85% by year 2020.
- Ensure sufficient localized air toxics risk reductions in each affected community.

Funding of the state's estimated fifteen billion dollar ($15B) action plan is proposed to include: $1.95B in previously committed public funding; a proposed bond (S.B. 1266 – *Highway Safety, Traffic Reduction, Air Quality, & Port Security Bond Act of 2006*) encompassing $2B for trade corridor improvement projects with 1:1 matching, plus $1B for air quality improvements (no matching requirement); and suggested funding strategies (regulations, incentives, federal funding, user-based fees, and market-based approaches.) A key component of the plan is the simultaneous and continuous improvement in infrastructure and mitigation.

That is, environmental mitigation is to be included as a cost of a goods movement infrastructure project and funded as a single project. A preliminary working list of candidate projects has been developed based on criteria. Examples of goods movement infrastructure projects include dock-rail facilities, the Alameda Corridor East, and rail capacity improvements.

The CARB Emissions Reduction Plan focuses on statewide emission reductions specifically from ports and the goods movement industry. Whereas the Cal/EPA-BTH action plan addresses both infrastructure projects and air quality projects, CARB's plan focuses solely on air quality per their legislative purview. While the plans are consistent with one another, the Emissions Reduction plan is broader in terms of air quality efforts. Overall goals of the plan include:

- Reduce total statewide international and domestic goods movement emissions back to year 2001 levels or below by year 2010.
- Reduce statewide diesel particulate matter health risk from goods movement by 85% by year 2020.
- Reduce NOx emissions from international goods movement in the South Coast by 30% from projected year 2015 levels, and 50% from projected year 2020 levels (based on preliminary targets for attaining federal air quality standards).
- Apply plan strategies statewide to aid all regions in attaining air quality standards.

To meet these goals, the plan's regulatory strategies include several measures, including:

- More stringent emissions standards
- Cleaner fuels
- Shore power
- Speed reduction of ships
- Engine upgrades and retrofits
- Emission control devices

Implementation of the Emissions Reduction Plan is estimated to cost $6 to $10B over 15 years. CARB estimates that the economic benefits in terms of the savings via the avoidance of adverse health impacts over the same time period are $34 to $47B. Funding of the plan assumes all industries involved must share in investment costs, and is generally unfunded by CARB itself. The agency, however, does acknowledge that incentives are critical to some sectors, and has also proposed the creation of a special $5M annual fund for goods movement demonstration projects. In addition to incentives, possible funding strategies include the state's proposed bond (S.B. 1266), container fees, federal funding, other user fees, and market-based approaches.

The SCAQMD *2003 Air Quality Management Plan (AQMP)* is a mandated document that develops emissions budgets for SIP conformity with state and national ambient air quality standards. The SIP is ultimately approved by the U.S. EPA to satisfy requirements of the federal Clean Air Act following approval by CARB. One of the Air Resources Board's responsibilities is to propose the State and federal strategy for the SIP to reach the federal standards. The SIP is a comprehensive strategy designed to attain federal air quality standards as quickly as possible through a combination of technologically feasible and cost-effective measures. It outlines ARB staff's assessment of how far adopted regulations will take us towards

attainment of federal standards, what new actions could be taken, how the timing of new technology and incentive funds comes into play, and what are the earliest feasible timeframes for meeting standards is likely to be in each region.[9] Goods movement-related [mobile source] emissions projections are integral to the AQMP. SCAQMD's air pollution control strategy focuses on controlling man-made sources through technologies and management practices, and relies on mobile source control measures developed by CARB.

SCAQMD acknowledges the importance of a multi-agency approach in addressing long-term air quality improvements:

To ultimately achieve ambient air quality standards and demonstrate attainment, additional long-term emissions reductions will be necessary from sources including those primary under the jurisdiction of California Air Resource Board (e.g., on-road motor vehicles, off-road equipment, and consumer products) and U.S. Environmental Protection Agency (e.g., aircraft, ships, trains, and pre-empted off-road equipment.) Without adequate and fair share level of reductions from all sources, the emissions reduction burden would unfairly be shifted to sources that have otherwise done their part for clean air.[10]

Clean air progress is a challenging task that must account for complex interactions between emissions and resulting air quality, but also to pursue the most effective possible set of air quality improvement strategies while maintaining a healthy economy.[11] To ensure continued progress toward clean air and compliance with state and federal requirements, the AMQP is developed by SCAQMD in conjunction with CARB, SCAG, and the U.S. EPA. Every three years, AQMD revises the AQMP for air quality improvement. Each iteration of the plan is an update of the previous plan and has a 20-year horizon. The current 2003 AQMP focuses on demonstrating attainment with the federal PM10 ambient air quality standard by 2006 and with the federal 1-hour ozone standard in year 2010 while making notable progress toward attainment of state standards and upcoming new federal standards. The development of the 2007 Plan is currently in progress and will focus in part on new federal 8-hour ozone and PM2.5 standards.

The *San Pedro Bay Ports Clean Air Action Plan* (CAAP) is the most recently developed plan to target goods movement emissions at the Port of Los Angeles (POLA) and Port of Long Beach (POLB). Jointly developed with the SCAQMD, the Ports released the draft plan in June 2006, which is expected to be approved by the Ports' governing boards in September of the same year. The CAAP is a "living document" in that is to be reviewed for progress and updated annually.

The CAAP established attainment standards on three levels: San Pedro Bay standards, project specific standards, and source specific performance standards. Trucks, ships (ocean going vessels), rail, harbor craft, and cargo handling equipment are targeted for various control measure and initiatives, including:

- Improvements to engine performance standards, alternate fuels and power, and emissions reductions.
- Technology Advancement Program
- Infrastructure and operational efficiency improvements
- Tracking and monitoring

Several implementation strategies are outlined in the CAAP:

- Lease requirements
- Tariff charges
- CEQA mitigations
- Incentives
- Voluntary measures
- Credit trading
- Capital lease backs
- Government-backed loan guarantees for trucks

The CAAP targets the annual reduction of specific pollutants. For example, the Plan anticipates a reduction in NOx by 13,090 tons per year (TPY), diesel particulate matter by 1,242 TPY, and SOx by 2,721 TPY. To accomplish these goals, the CAAP encompasses a 5-year program at an estimated cost of $1.98B.[12] Initially committed funding to be provided by the Ports and SCAQMD totals $394.4M, resulting in a potential shortfall of approximately $1.6B. This shortfall is likely to be addressed in part by the state's proposed bond measure (S.B. 1266) if voters pass the measure in late 2006.

It is to the benefit of the community that there are a number of agencies working ceaselessly towards reducing the impacts of goods movement and thereby improving the overall condition of the environment. Impacts on the environmental and community that result from the goods movement industry include traffic congestion, air quality and health, visual, noise and vibration, water quality, wetlands, hazardous materials (HAZMAT) movement, and safety, amongst others. Quality of life and environmental justice issues are also concerns of communities affected by goods movement activities.

This section provides a summary of the environmental and community impacts associated with goods movement found throughout the MCGMAP region. These impacts were identified by the project team based on experience preparing project-level environmental assessments within the MCGMAP region. It should be noted that during the outreach process (conducted as a part of Task 2), stakeholders within the MCGMAP region voiced strong concern over the impacts of goods movement on the environment, their communities, and their overall quality of life. Due to the serious environmental, public health impacts and traffic congestion issues, communities and policy makers have begun to demand mitigation and to challenge proposals for infrastructure capacity enhancement. The stakeholders within the affected communities are opposing key infrastructure improvement projects that could improve current circumstances, they are calling for slower growth and mitigation of existing impacts.

The stakeholder outreach process has highlighted the critical need to address community and stakeholder concerns regarding the environmental and community impacts of goods movement while pursuing infrastructure improvements. The mitigation of direct and indirect impacts of specific goods movement projects or related activities must become a part of the process from the early stages.

Examples of general existing environmental and community issues identified by County are shown below. Note that these are general issues and are not listed in order of importance. In many cases, goods movement may be one of many contributing factors for each specified impact. For the purposes of Task 5 of the MCGMAP, only a listing of environmental impacts and concerns related to goods movement are identified; therefore, the resulting list is very general.

1. Orange County
    a. Air quality
    b. Noise
    c. Grade crossing delays / congestion
2. San Bernardino County
    a. Land use impacts / conflicts
    b. Noise
    c. Operational issues
    d. Grade crossing delays / congestion
3. Riverside County
    a. Land use impacts / conflicts
    b. Noise
    c. Operational issues
    d. Grade crossing delays / congestion
4. Los Angeles County
    a. Port / Gateway Cities issues

    i. Air Quality
    ii. Health
    iii. Noise
    iv. Lighting
    v. Environmental Justice
    vi. Water quality
  b. Truck volume and congestion
  c. Commercial vehicles on local streets,
  d. Noise
  e. Land use impacts / conflicts
  f. Air quality
5. Ventura County
  a. Land use compatibility / conflicts
6. San Diego County
  a. Air quality
    i. Trucks coming in and out of Mexico
  b. Land use impacts / conflicts
7. Imperial County
  a. Air quality
    i. Mexican truck emissions
  b. Land use impacts / conflicts

2.1 Quality of Life

The general quality of life for area residents is greatly affected by the goods movement network. While quality of life is not an environmental impact per se, it is important because so many individual environmental impacts influence the ability to enjoy one's living conditions. Quality of life is primarily affected by the following environmental impacts: traffic congestion, land use compatibility and land use changes, air quality and related health impacts, visual and noise impacts, and safety. These impacts affect people in their residences, schools, and public spaces.

2.2 Traffic Congestion

As trade activity increases, so must the goods movement network, including the transportation modes that use pollution-producing fuel – aircraft, ships, trucks, rail, and the necessary support vehicles and equipment. In addition to meeting the trade needs, there is the added challenge to operate within an ever-constrained transportation network. Surface goods movement corridors are shared with non-goods movement users – cars using existing roadways and commuters using the rail network. Such shared use of corridors negatively affects transportation efficiency for all by creating congestion from overlapping user groups and inadequate capacity during peak hours, thereby increasing idling and related emissions. The competition for network capacity can also cause conflict as modes intersect more frequently. For example, safety issues can arise between heavy trucks and passenger vehicles or between passenger vehicles and

trains at railroad crossings. Increased trade also leads to increased bottlenecking at and within the ports as operational space is constrained.

Ninety-nine percent of the trips taken within the MCGMAP study area occur upon the highway and arterial network. This network is comprised of over 9,000 freeway lane miles and more than 42,000 arterial lane miles. This accounts for over 54 million vehicle trips per day on a network that has seen little added capacity in comparison to population growth. Both passenger vehicles and trucks compete for space on the roadway network. Truck vehicle miles traveled (VMT) is estimated to approach 39.1 million in year 2030, a 63% increase from 2000.[1] Automobile traffic in 2030 is expected to approach 449.7 million VMT, an increase of 33%, and will account for 92% of the total VMT. The total daily delay from congestion in 2000 was estimated at 2.2 million person-hours, and could reach 5.4 million person-hours by 2030.[2]

Rational driver behavior predicts that drivers faced with increasing corridor congestion will divert from their original route in an attempt to find a more efficient path to their destination. Once an alternate path is established, it becomes a regular pattern. One effect of this behavior is increasing diversion of truck traffic from highways to city surface roadways that run adjacent to or through communities. The affects on neighborhoods are felt via increased truck traffic noise, increased surface street congestion, increased concerns for pedestrian and bicycle safety, and visual landscape incongruity. As surface street congestion increases, so do idling and emission levels.

However, it has been asserted a 10 percent gain in lane capacity could be achieved by shifting 30 trucks per hour from the freeway to railway.[3] The benefit could be felt by commuters in travel time savings on freeways and by neighborhoods in potentially less truck traffic diversion from freeway corridors.

2.3 Land Use & Compatibility Changes

Community impacts resulting from goods movement – whether physical health or other facets of environmental quality – basically stem from land use policy relating to modal operations and capacity expansion.

Negative impacts on communities from goods movement are greatly affected by land use policy. Residential areas are often in close proximity to truck and rail corridors as well as highly industrialized ports and high-activity warehousing and distribution centers. Property prices adjacent to ports and goods movement corridors are generally discounted due to their location. This has pushed development from both ends of the equation – (a) goods movement facilities have expanded thus encroaching into residential neighborhoods, and (b) residential development due to population growth (and a need for affordable housing) has expanded thus encroaching onto goods movement facilities. Buffer zones are being squeezed out of existence thereby resulting in land use incompatibilities.

High land costs in the developed areas surrounding ports, airports, intermodal terminals, and truck terminals have forced the freight transportation industry to look to outlying areas for facility growth. This coupled with the region's spreading development patterns has caused regional freight distribution patterns that emphasize peak period congestion and high levels of freight vehicle-miles traveled.[4]

Distribution and warehousing centers typically utilize cheap suburban land to relocate and expand their facilities. Housing developers are building in the same areas to provide homes to the region's growing population. Over time, the pattern experienced in today's developed sections of the metropolitan area may likely be repeated. Community pressure may mount for the distribution centers to relocate and expand further out of the region. One long-term outcome may be more dispersed distribution centers and longer truck trips, leading to an increase in local and regional congestion and emissions.[5] The use of brownfields located near ports in some areas of the country is receiving more consideration as the goods movement sector continues to grow, providing the warehousing and distribution center industry more opportunities for affordable and developable land, easy access to markets, transportation modes, and labor supply.[6]

As the goods movement network looks to meet demands of ever-increasing growth, the first consideration is physical expansion – whether by increasing airport, seaport and rail yard acreage, enlarging warehouse footprints, or adding new asphalt lanes and steel tracks. Historically, it has been common practice to displace nearby residents and businesses in order to acquire property for infrastructure expansion in meeting capacity needs.

This overlapping, and oft incompatible, land use between goods movement and the general population results in a multitude of community impacts that are discussed in this technical memorandum – that is, the increases in traffic congestion, emissions and air quality, visual and noise impacts, and overall quality of life largely result from land use decisions. The degree to which communities are exposed to goods movement impacts are influenced by the appropriateness of land use decisions.

2.4 Air Quality & Health Impacts

As previously mentioned in Section 1, the primary focus of environmental regulations has been on air quality and the reduction of emissions. The reason for this is that air quality impacts directly affect human health. Ambient air quality standards are essentially "health-based standards." Air quality is by far the most significant potential impact to communities throughout the study area, the state, and beyond. Mobile source emissions that include goods movement are a major emissions contributor. The goods movement industry relies heavily on diesel fuel to power their vehicles. A discussion of diesel emissions and their health-based impacts is provided below. A more general discussion on goods movement modes and their respective contribution to emissions follows.

Health Impacts of Goods Movement Emissions

Air quality impacts are regionally monitored and characterized per mandate, and are quantitatively based. Regional air quality is a primary concern because issues of toxic air contaminants (TACs) and ultrafine particulate matter (PM)[7] pose known health risks to people.

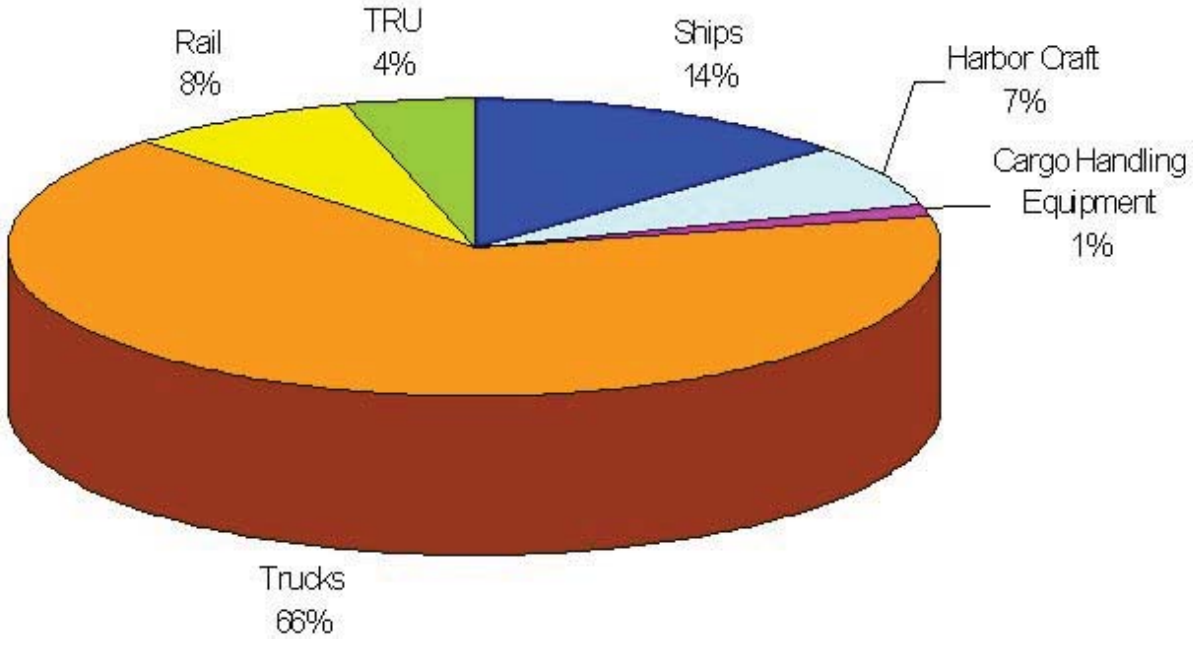
Formally defined, a TAC is "an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health" (Health and Safety Code section 39655).[8] A primary TAC is diesel PM, which is emitted from all source categories associated with diesel fuel combustion. Boats, trucks, and trains associated with goods movement are the

primary sources of diesel PM. Seaport activities significantly affect the air quality within the study area due to the congregation of these mobile sources and their resulting diesel PM emissions.

As displayed in Figure 4, statewide 2001 diesel PM emissions inventory from ports and goods movement were approximately 57 tons per day, with modal contributions as follows: 66% truck emissions, 8% rail, 14% ships, 7% harbor craft, 4% transport refrigeration units (TRU), and 1% cargo handling equipment.[9]

While figures may vary by air basin (and are not available for all basins as of this printing), the significance of diesel particulate matter relating to health is firmly established. Diesel particulate matter is a cause for special concern to human health because 50 to 90 percent of the particles are very small (i.e., *ultrafine*[10]) and can readily enter into and deposit within the lungs and pass through the bloodstream to the cellular level. However, it should be noted that ultrafine particulate matter is not exclusive to diesel emissions – ultrafine particles originate from any combustion process using any fuel, including gasoline, compressed natural gas (CNG), and liquid natural gas (LNG). Combustion sources other than mobile sources include stationary, industrial, occupational, and atmospheric conversion.[11] Independently published research reinforces the emissions health risks by establishing a diesel exhaust-cancer connection. In more than 35 studies involving railroad workers exposed to occupational diesel exhaust, the excess risk of lung cancer is consistently elevated by 20-50%.[12]

Figure 4
Diesel PM Statewide 2001 Emissions from Ports and Goods Movement

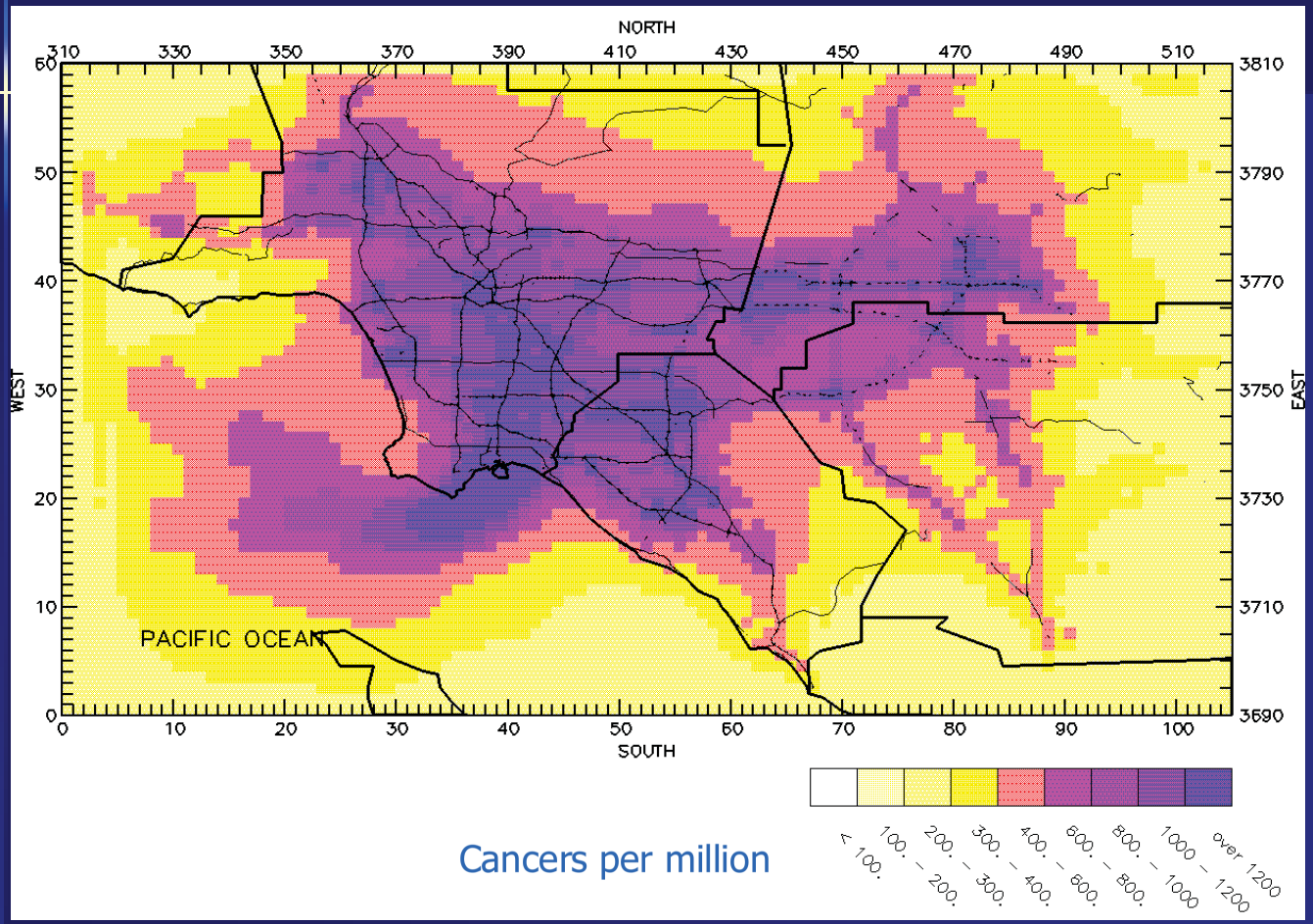


Source: Emission Reduction Plan for Ports and Goods Movement in California. California EPA and California Air Resources Board. March 21, 2006.

Carcinogenic risk refers to the increased probability that an individual exposed to an average air concentration of a chemical will develop cancer when exposed over a 70-year period. Cancer risks are

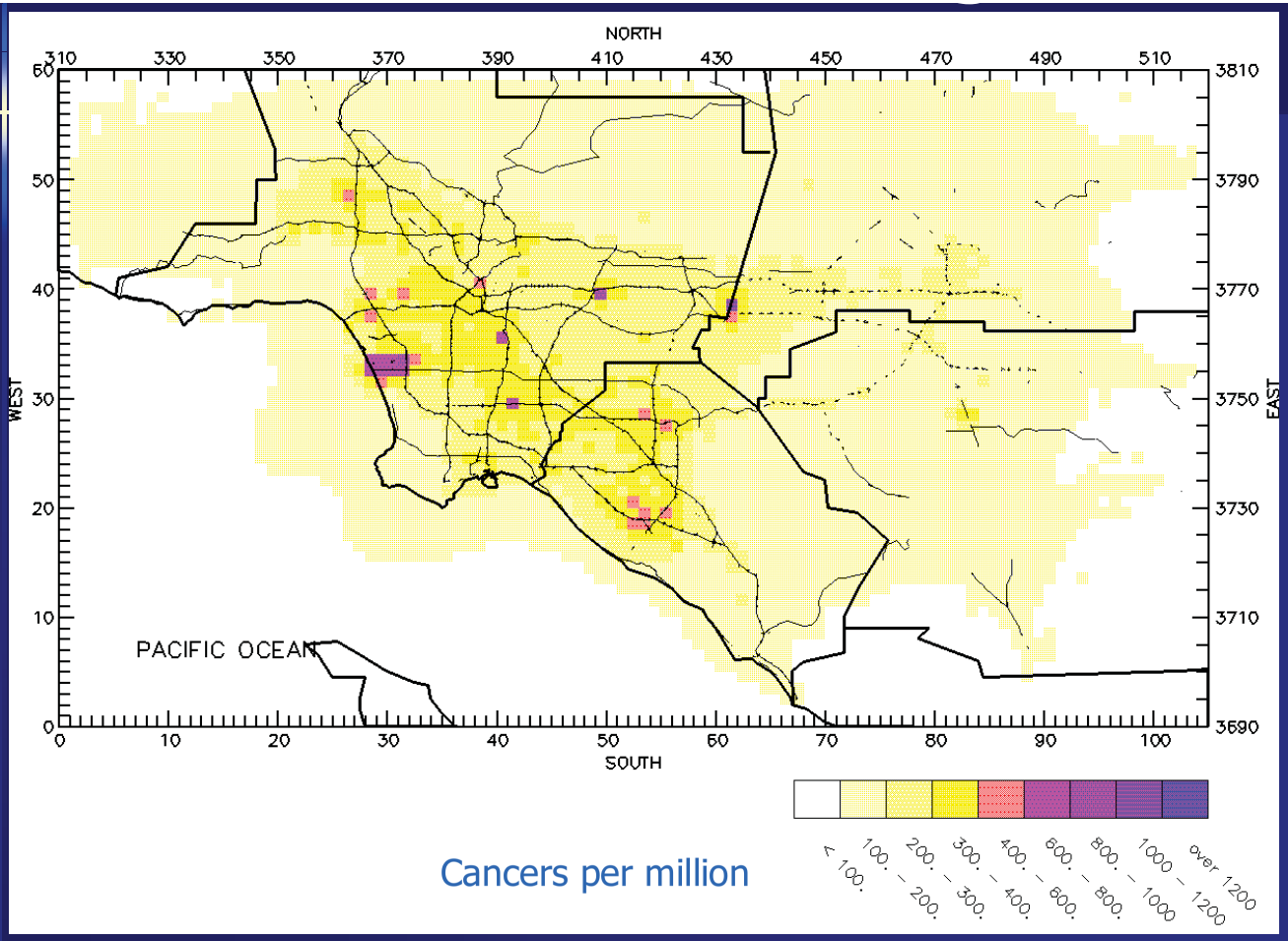
expressed on a per-million basis for comparative purposes. According to the South Coast Air Quality Management District (SCAQMD) Multiple Air Toxics Exposure (MATES-II) Study, diesel particulates account for 71% of the cancer risks (1,400 in one million) relating to pollutants in the South Coast Air Basin. For comparative purposes, Figures 5 and 6 display the cancer risk from airborne toxics with and without diesel emissions for the counties of Los Angeles, Orange, Riverside, San Bernardino, and Ventura.[13] Based on a comparison of Figures 4 and 5, and a cancer risk of 1,400 per million; individuals in areas of maximum risk are 14 times more likely to contract cancer due to diesel emissions.

Figure 5
Estimated Risk of Cancer from All Toxics: All Emission Sources



Source: SCAQMD, Multiple Air Toxics Exposure Study II, March 2000

Figure 6
Estimated Risk of Cancer from Airborne Toxics: Excluding Diesel



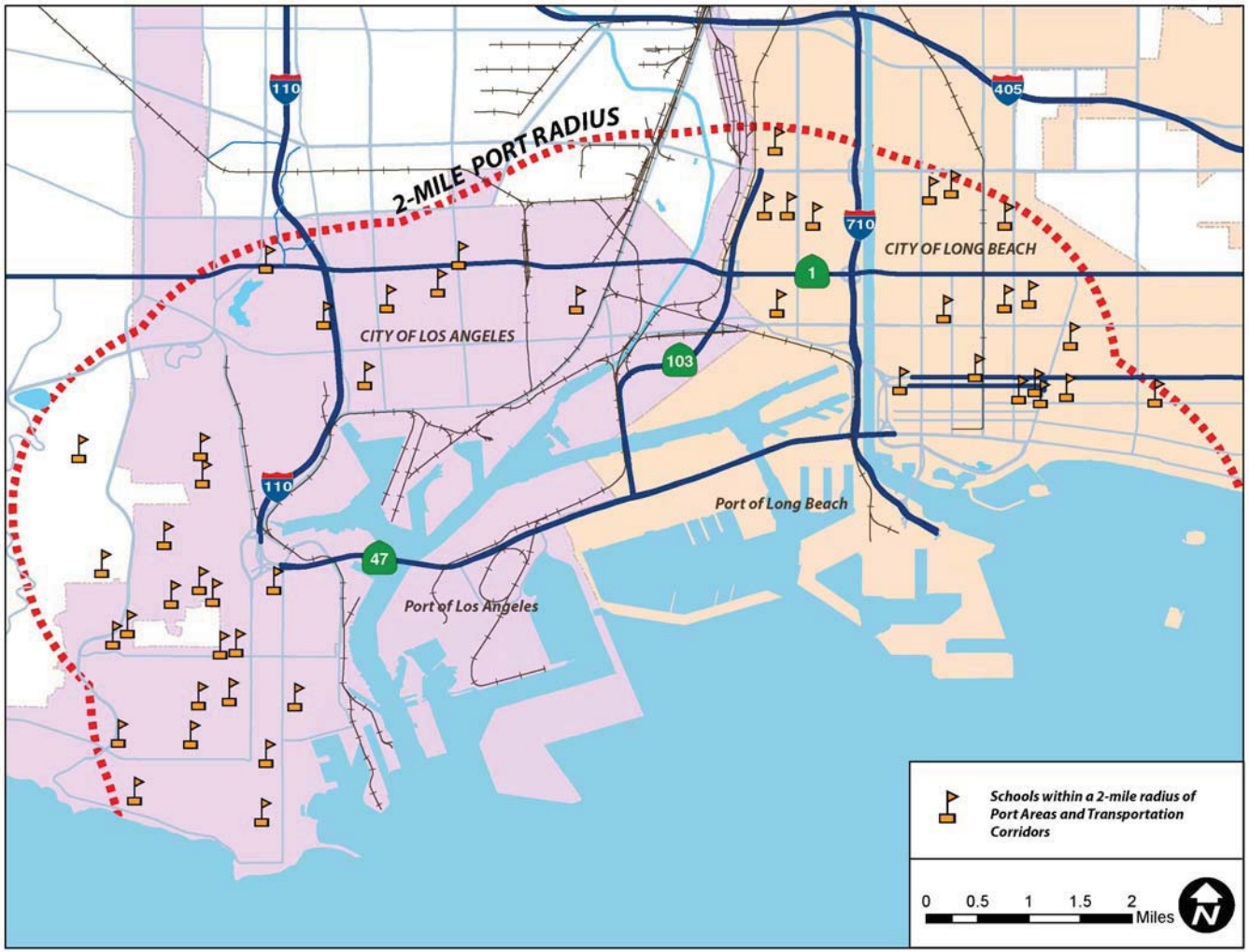
Source: SCAQMD, Multiple Air Toxics Exposure Study II, March 2000

Further health effects are attributable to diesel particulate matter according to research compiled by the Keck School of Medicine of USC[14], including increased incidences of:

- Asthma
- Preterm and low birth weight babies
- Cardiac birth defects
- Thickening of arterial walls
- Oropharyngeal (mouth and throat) cancer
- Slowed lung development in children

This can lead to concern in areas near goods movement facilities and corridors where people live and their children go to school. Additionally, recent CARB analysis shows 5,400 premature deaths (up to 14 years premature) each year in the South Coast Air Basin just due to PM2.5 pollution. CARB previously estimated that 2,400 people die prematurely each year of that in the South Coast Air Basin. Taking the study area's ports for example, 46 schools are located within 2 miles of either the Port of Los Angeles or the Port of Long Beach (i.e., San Pedro Bay ports) as displayed in Figure 7. A list of the schools is located in Appendix B.

Figure 7
Schools Located Within a 2-Mile Radius of San Pedro Bay Ports



Source: 2000 U.S. Census TIGER Data

Fortunately, there is evidence that vehicle-related pollutants decrease to "near background levels" within about 300 meters (approximately 1,000 feet) of freeways.[15] Establishing appropriate distances between community facilities and heavily traveled roadways can minimize exposure to pollutants.

Similar to diesel particulate matter emissions, NOx also poses health threats to individuals, albeit indirectly. NOx precursor emissions are required to form ground-level ozone (O_3).[16] Ozone can affect the health and condition of individuals by aggravating asthma and causing lung tissue inflammation. Children and the elderly are the most susceptible, although the U.S. EPA estimates that ozone can result in a 15 to 20% temporary decrease in lung capacity in some healthy adults.[17] In addition to the human health effects, ozone can affect the health of the surrounding physical environment, including vegetation, buildings, rubber, and some plastics. Ozone increases plant and tree vulnerability to disease, pests, and harsh weather crop yield loss.[18] This is unfortunate in part because vegetation assists in cleaning the air communities breathe through photosynthesis. Photosynthesis is a process whereby vegetation absorbs carbon dioxide and certain other pollutants, and releases oxygen.

Air Quality Impacts by Goods Movement Mode

Following is a discussion of the affect on air quality associated with the various transportation modes of goods movement: airports, seaports, railways, trucking, and warehousing and distribution centers.

Commercial service airports are a vital component to cargo movement in the U.S. While large volumes of aircraft use the study area's major airports, environmental regulatory compliance and standards for aircraft are established at the federal level. However, airport operations do affect local basin air quality and are accounted for in air quality management plans.

Major commercial service airports within the South Coast Air Basin include:

- Los Angeles International Airport
- Long Beach Airport
- John Wayne Airport (Orange County)
- Burbank/Bob Hope Airport
- Ontario International Airport

At the time of this printing, aircraft emissions data was readily available only for the South Coast Air Basin as compiled by the South Coast AQMD in their 2003 Air Quality Management Plan and is presented here in Table 5 to represent how aircraft contribute to air quality at the regional level. Data for airports in other basins in the study area are not available.

Table 5
Estimated 2005 Annual Average Aircraft Emissions in SCAB

	Pollutant (Tons per Day)				
	NOx	SOx	PM10	PM2.5	CO
Aircraft	26.53	0.95	0.65	0.65	50.79
TOTAL All Sources	975.3	58.48	291.95	112.49	4100.19
Aircraft % of Total	2.7%	1.6%	0.2%	0.6%	1.2%

Source: South Coast AQMD 2003 Air Quality Management Plan.

Commercial aircraft emissions are a growing segment of the transportation emissions inventory due to air traffic demand. This growth is occurring at a time when other significant mobile and stationary sources are drastically reducing emissions, thereby accentuating the growth in aircraft emissions. Recently, the Federal Aviation Administration (FAA) reported that flights of commercial air carriers are expected to increase by 34% from 2002 to 2020.[19]

Ground support equipment (GSE) supporting airport operations also contribute to air quality impacts at airports. GSE perform a variety of functions, including: starting aircraft, aircraft maintenance, aircraft fueling, transporting cargo to and from aircraft, loading cargo, transporting passengers to and from aircraft, baggage handling, lavatory service, and food service. As a group, GSE are largely comprised of off-road types of equipment fueled by either gasoline or diesel. Their overall contribution is relatively negligible and is combined with aircraft in emissions reporting. According to the FAA, the combined emissions from aircraft and GSE typically represent approximately three to five percent of emissions regulated under SIPs nationwide.[20]

Additional contributors to airport-related emissions are trucks transferring air cargo and passenger vehicles accessing airline terminals. Independently, these airport users contribute to air quality, with emissions increasing due to increased passenger and cargo demands, as well as added national security precautions that can delay terminal access. Additionally, interactions between these modes on airport can cause increased congestion and idling. Fortunately, this is generally minimized due to the layout of commercial airports. Airport land use typically provides for the separation of passenger and cargo facilities, generally located on opposite sides of the airfield. This segregation helps to keep ingress and egress for both modes optimized while on the airport. Further discussion on the effects of goods movement trucking is provided later in this section.

The San Pedro Bay ports (POLA and POLB) contribute significantly to air quality within the study area. Ports have such a significant impact because three major modes of goods movement transportation converge there – ships, trucks, and rail. These modes predominantly use particulate-producing diesel fuel. Not only are more diesel-powered vehicles accessing the ports due to goods movement growth, but they are also spending more time there due to port capacity constraints, thereby resulting in increased diesel emissions from idling. In addition, support vehicles such as harbor craft and cargo handling equipment typically rely on diesel fuel as well.

At the time of this printing, ship emissions data was readily available only for the South Coast Air Basin as compiled by the South Coast AQMD in their 2003 Air Quality Management Plan and is presented here in Table 6 as a representation of how ships contribute to air quality at the regional level.

Table 6
Estimated 2005 Annual Average Ship Emissions in SCAB

	Pollutant (Tons per Day)				
	NOx	**SOx**	**PM10**	**PM2.5**	**CO**
Ships & Commercial Boats	51.88	29.89	3.59	3.32	6.19
TOTAL All Sources	975.3	58.48	291.95	112.49	4100.19
Ships % of Total	5.3%	51.1%	1.2%	3.0%	0.2%

Source: South Coast AQMD 2003 Air Quality Management Plan.

Ships use a low-grade diesel fuel – commonly referred to as *bunker fuel* – that contributes significantly more particulate matter than diesel used by trucks and locomotives. In December 2005, CARB established a requirement that ocean-going vessels approaching within 24 nautical miles of the California coast must use cleaner-burning diesel fuel in their diesel-electric and auxiliary engines. This applies to both domestic and international ships to become effective January 1, 2007. From this, reductions are expected for diesel PM by 2.7 tons per day (TPD), NOx by 1.9 TPD, and SOx by 22 TPD within the first year. A movement toward the use of cold ironing is occurring to further reduce ship emissions.

Railways are a key component to the goods movement network. Railway cargo is transported on locomotives that primarily use diesel fuel. The locomotive engine is the primary source of diesel emissions associated with rail. Rail support equipment and switchers are also diesel PM contributors. Like other modes of transportation, railroad lines are becoming increasingly congested due to higher demand for rail service from both commuter and freight users. Higher usage is resulting in increased environmental impacts.

Rail emissions data for the South Coast Air Basin as compiled by the South Coast AQMD in their 2003 Air Quality Management Plan is presented here in Table 7 to represent how rail contributes to air quality at the regional level.

Table 7
Estimated 2005 Annual Average Rail Emissions in SCAB

	Pollutant (Tons per Day)				
	NOx	SOx	PM10	PM2.5	CO
Rail	31.79	3.33	1.05	0.97	6.55
TOTAL All Sources	975.3	58.48	291.95	112.49	4100.19
Rail % of Total	3.3%	5.7%	0.4%	0.9%	0.2%

Source: South Coast AQMD 2003 Air Quality Management Plan.

Rail diesel emissions are affected by fuel efficiency. According to industry figures, railroad fuel efficiency has increased by 72 percent since 1980. Then, a gallon of diesel fuel moved one ton of freight an average of 235 miles. In 2001, the same amount of fuel moved one ton of freight an average of 406 miles. Railroads and rail suppliers have reduced the weight and increased the capacity of rail cars also to improve fuel efficiency and reduce emissions. The average freight car capacity is now nearly 93 tons, up 17 percent in just the past 20 years.

Emissions caused by vehicle delays at rail crossings contribute further to air quality issues relating to goods movement rail activity. For example, simulations conducted by Leachman and Associates in the *Inland Empire Railroad Main Line Study* commissioned by SCAG demonstrate the impact caused by vehicle delay at highway-railroad grade crossings along the mainline infrastructure from downtown Los Angeles east and north to Barstow and Indio. Total vehicle hours of delay was calculated to be 2,622 hours per peak day. Assuming 300 peak days per year, extrapolation yields nearly 790,000 vehicle hours of annual delay at these crossings. The Leachman study further established year 2000 baseline emissions generated from delayed vehicles at grade crossings as follows: 9.65 tons of ROG; 100.46 tons of CO; 13.85 tons of NOx; 0.54 tons PM10; and 0.09 tons of SOx.[21] Cumulative emissions from trains and vehicles are summarized in the Table 8.

Table 8
Rail Crossing Emissions Due to Delay

	Overall Emissions for Year 2000 (Tons)				
	ROG	CO	NOx	PM10	Sox
Rail Emissions	498.43	721.29	15,424.10	347.56	958.36
Traffic Delay Emissions	9.65	100.46	13.85	0.54	0.09
Cumulative Emissions	508.08	821.74	15,4397.95	348.10	958.45

Source: Leachman and Associates LLC.

Trucks entering the rail yard to transfer freight introduce further emissions into the rail yard environment. Trucks and their effects on air quality are discussed below.

Like other modes of transportation, trucking corridors are becoming increasing congested due to higher demand from freight users. Truck engines primarily utilize diesel fuel.

Truck corridors are also shared-use facilities in that cars use the same infrastructure. An increase in automobile traffic coupled with an increase in truck traffic causes even greater congestion. This negatively affects transportation efficiency for all users by creating congestion from overlapping user groups (total number of vehicles on the road) and especially inadequate capacity during peak hours, thereby increasing idling and related emissions. In addition to unavoidable congestion-related idling, some idling is caused for purposes of cab comfort, engine warmth, and on-board auxiliaries operations and is, therefore, considered avoidable.

Truck emissions data for the South Coast Air Basin as compiled by the South Coast AQMD in their 2003 Air Quality Management Plan is presented here in Table 9 to represent how trucks contribute to air quality at the regional level.

Table 9
Estimated 2005 Annual Average Truck Emissions in SCAB

	Pollutant (Tons per Day)				
	NOx	**SOx**	**PM10**	**PM2.5**	**CO**
Trucks	216.82	2.22	4.28	3.57	35.16
TOTAL All Sources	975.3	58.48	291.95	112.49	4100.19
Trucks % of Total	22.2%	3.8%	1.5%	3.2%	0.9%

Source: South Coast AQMD 2003 Air Quality Management Plan.

While warehousing and distribution centers do not directly emit emissions per se, on-site operations relating to goods movement transport does. Like ports, warehousing and distribution centers are locations where diesel-fueled transportation modes congregate. Therefore, warehousing and distribution centers are a significant source of concentrated fuel emissions within the goods movement network.

Ports are not singular in experiencing increased bottlenecking and idling emissions due to increasing goods movement activities. Congestion at warehousing and distribution centers is not uncommon and is centered upon the following key constraints:

- Gates (points of entry)
- Docks
- Yard design and layout

Warehousing and distribution centers are the key destination point for trucks equipped with Transport Refrigeration Units (TRU). TRUs are refrigeration systems powered by diesel internal combustion engines designed to refrigerate or heat perishable products that are transported in various containers, including semi-trailers, truck vans, shipping containers, and rail cars. Although TRU engines are relatively small, the fact that they congregate in significant numbers and are a discernable source of emissions at warehousing and distribution centers results in the potential for health risks to those who live and work nearby. Since diesel particulate matter has been identified as a toxic air contaminant, CARB adopted an Airborne Toxic Control Measure (ATCM) for TRUs and TRU generator sets in February 2004 to be phased in beginning in 2008.[22] Analysis of year 2000 TRU emissions revealed a health-diesel emissions connection and is presented in Table 10 below.

Table 10
Estimated Cancer Risk versus Distance from Center of TRU Activity

Distance from Center of Source	Potential Cancer Risk
275 meters (~900 feet)	> 100 per million
1,050 meters (~3,450 feet)	>= 10 and < 100 per million

Source: *Air Quality and Land Use Handbook: A Community Health Perspective.* Cal/EPA and California Air Resources Board. April 2005.

2.5 Visual Impacts

Large goods movement service areas (ports, rail yards, and warehousing and distribution centers) are sources of undesirable visual impacts to neighboring communities. For example, there can be a lack of appropriate height controls on new structures in port pier development/redevelopment resulting in visual incongruity and intrusion in the landscape of the adjacent community.

The continuing growth of marine container terminals is causing increasing environmental concerns among neighboring communities. Container storage yards are becoming constrained as port activity increases. Additionally, fewer shipping containers are returned than are received as a result of a domestic export deficit, thus requiring local storage. The footprint of the storage yard, when not expanded, leads to the need to increase the height of container stacks. The sight of stacked containers has a negative visual aesthetic on the community. Stack heights can block an otherwise scenic vista (the coast) and can prevent natural lighting from reaching residential properties adjacent to container storage yards (shadowing). In the Wilmington area, the demand for additional storage space has resulted in a proliferation of “temporary” storage facilities near the port in areas not zoned for such use and encroachment into surrounding neighborhoods.[23]

Similar to seaports, rail yards and warehousing and distribution centers are a source of undesirable visual impacts on neighboring communities. Increased stacking of containers and operating equipment has a

negative visual aesthetic on the community. Like marine container terminals, increasingly higher stacked containers can cause shadowing on residential properties adjacent to container storage yards.

Cranes required to transfer cargo have visual impacts, as well. The height of the crane can create a visual impact, which is further compounded by crane lighting that can spill over into residential areas. Crane size/height has increased to correspond with increases in cargo container size and quantity.

Overhead-electrified catenary systems providing traction power for the locomotives, signal power for train traffic, and overhead feeders for power distribution are further visual impacts related to rail facilities.

Goods movement service areas, which operate 24 hours per day and 7 days per week (24/7), require appropriate facility lighting. A potential result of such operations is lighting spillover into residential neighborhoods. Continuous light can disrupt the sleep patterns of residents and otherwise negatively affect community quality of life. It has been suggested that artificial lighting can also negatively affect wildlife by potentially causing disorientation or confusion of biological rhythms, and potentially cause high mortality in birds attracted to brightly lit buildings or towers.[24]

In addition, increasingly congested truck corridors prompt trucks to use surface streets within neighboring communities in search of alternate routes to ports, rail yards, and distribution centers and warehouses. This is an added unwelcome intrusion whose visual effects are felt by the community.

2.6 Noise Impacts

Railway activity is a significant source of noise for people who live and work nearby. Propulsion of locomotive diesel engines creates significant noise levels. In addition to the engine, the guideway (or tracks) is a source of noise during locomotive wheel interaction. For example, tight curves can cause wheel squeal, and track joints and switches can cause audible impacts.

Train horns and crossing bells are added noise sources associated with rail. The horns are installed to warn motorists and pedestrians of an approaching train at a grade crossing. In many geographic regions and during most of the year, cars operate with windows rolled up, climate control on, and radios in use. Therefore, audible warning signals must be sufficiently loud to be perceived. Noise from idling engines coupled with blowing whistles produce a significant number of railway noise complaints, according to Illinois EPA noise advisor, Greg Zak.[25] Table 11 below summarizes the average noise level resulting from common rail activity.

Table 11
Rail Noise Levels

Rail Source	Average Noise Level From 50-feet
Horn	90 dBA
Train traveling 50 mph at grade	75 dBA
In station	65 dBA

Source: *Transit Noise and Vibration Impact Assessment Final Report*, Federal Transit Administration, April 1995.

The Federal Railroad Administration (FRA) estimates that 4.6 million people nationwide are severely affected by locomotive horns.[26]

Effective June 2005, the FRA issued a new regulation permitting the establishment of "quiet zones" to help address the issue of train horns on residential communities. Trains have been mandated to use their horns at public highway (street)-grade rail crossings for safety reasons since 1994. The new regulation provides for six types of quiet zones, ensures the involvement of state agencies and railroads in the quiet zone development process, gives communities credit for pre-existing safety warning devices at grade crossings, and addresses other issues including pedestrian crossings within a quiet zone. The establishment of a new quiet zone requires at minimum that each grade crossing be equipped with flashing lights and gates. Additional safety measures may be required to compensate for the absence of the horn as a warning device. New quiet zones can be in effect 24-hours a day or just during the overnight period between 10 p.m. and 7 a.m.

Rail noise issues arise beyond that of at-grade train operations. Increasingly, rail yards and switching facilities are at issue. Associated noise results from:

- Auxiliary equipment operations and air-release activity
- Train car coupling/uncoupling
- Locomotive and switcher[27] idling, braking, and cooling fan operation
- Rail yard PA systems and signal horns

Closely associated and interrelated with noise is the issue of vibration. The effects of ground-borne vibration from trains include detectable movement of building floors, window rattling, shaking walls, and rumbling sounds. Factors that influence ground-borne vibration include operational and vehicle characteristics, guideway type and condition, geology, and building foundation.

Trucks entering the rail yard to transfer freight introduce further source of noise into the rail yard environment, and is discussed below.

Noise from trucks comes from several different sources. Five major sources of truck noise are:

- Tires

- Exhaust systems
- Fans
- Air intake
- Mechanical (engine and drive train)

The first nationwide regulation of truck noise was established with the Noise Control Act of 1972 (P.L. 92-574-86 STAT.1234). These regulations apply to trucks greater than 10,000 pounds gross vehicle weight (GVW) and apply to total truck noise, not just exhaust noise.

Aftermarket regulations for total truck also apply. When measured at a distance of 50 feet, total truck noise is not to exceed:

- 83 dBA for 1986 models or newer
- 86 dBA for 1985 models or older

Speed is a major factor affecting truck noise. A steady vehicle speed (e.g., 60 mph) will be perceived as less noisy compared to accelerating or decelerating activity, including the use of engine (Jake) brakes. The Jake brake is an add-on engine brake for diesel engines. Heavy trucks moving freight can weigh as much as 80,000 pounds. Consequently, stopping or slowing down results in a great deal of wear on the tire brakes, which have to be replaced frequently. The Jake brake, as an engine system, causes no wear and tear and can help slow the truck before the wheel brakes need to be applied. Its primary use is on long downhill grades where the wheel brakes would otherwise have to be frequently pumped to keep the truck from gaining dangerous speed.

Pavement surface type and its interaction with truck tires also affects noise. Asphalt generally produces less noise due to its flexibility properties than does typical transversely tined Portland Cement Concrete, which is more rigid and grooved.

The noise of engine idling, in addition to contributing to air quality as discussed above, is another impact that affects communities. Due to the nature of the trucking industry, noise is a 24/7 source of community irritation. Recent programs aimed at reducing congestion at ports during peak hours have shifted more trucking operations to nighttime hours. As a result, communities near ports, distribution centers, and warehouses are exposed with increased truck noise for greater durations. Increased nighttime trucking activity appears amplified during the evening hours when ambient noise levels are lower.

Further, increasingly congested truck corridors prompt trucks to use surface streets within neighboring communities in search of alternate routes to ports, rail yards, and distribution centers and warehouses. This is an added unwelcome intrusion whose noise effects are felt by the community.

In 1990, Congress passed the Airport Noise and Capacity Act. The Act required all commercial airlines to convert their fleets from Stage 2 to Stage 3 noise certification levels (a quieter plane) by the year 2000. Since then, commercial aircraft have become quieter; however, air traffic growth is offsetting the noise reduction benefits of Stage 3 aircraft.

Jet engines are major sources of intense aircraft noise. The contribution to the overall airport noise environment of propeller-driven aircraft is relatively minor when compared to jet-powered aircraft. Jet engines are generally more powerful and produce noise of higher magnitude than turboprop or piston aircraft engines. Also, jet engines produce a greater amount of noise in the high-frequency range, thus increasing their relative annoyance factor. In jet-powered aircraft, the primary sources of engine noise are the roar of the jet exhaust stream and the high-pitched noise generated by the engine's turbo-machinery, compressor, and blades. The exhaust roar during high-speed operations and flight is created by the rapid expansion of high-velocity exhaust gases.[28]

Jet engine noise sources are readily apparent, and may even be dominant during stationary or low-speed ground operations. The high frequency whine of the engine's fans and compressors tend to be particularly annoying to most human listeners. In contrast, the loudest noise generated by propeller aircraft (typically serving general aviation) generally occurs during takeoff, when the engine is operated on a high power setting. Propeller-powered noise is composed of a wide range of frequencies, but the major portion is at the lower end of the frequency spectrum.

Aircraft noise levels are reported in units of A-weighted sound level in decibels (dBA). Noise levels of a particular aircraft at the source can differ due to variations in weight and operating procedures. Generally speaking, the lower the weight during takeoff, the lower the noise level. Aircraft noise levels from a relative distance can also differ due to variations in climate and meteorological conditions.

Closely associated and interrelated with noise is the issue of vibration. The effects of ground-borne vibration from aircraft often include window rattling and shaking walls of buildings in close proximity. Factors relating to vibration level include aircraft operating characteristics, airport approach and takeoff procedures, and building construction.

The impacts of noise from commercial service airports on the study area's surrounding communities are increasing due to increases in passenger and cargo air traffic added to an increase in residential development in the vicinity of airports. Airport noise impacts relating to the community are established using noise exposure maps that depict noise contours expressed in yearly day-night average sound levels (Ldn). In addition, 49 USC Title 14 CFR Part 150 identifies those land uses that are normally compatible with various levels of exposure to noise by individuals. Residential land uses and schools are considered compatible with airports when exposed to average noise levels below 65 dBA. Parks and open space are considered compatible when exposed to average noise levels below 75 dBA.

Recognizing that noise impacts are significant to the community, Los Angeles Worlds Airports unveiled in December 2004 the LAX Community Benefits Agreement that will, among other things, provide funding to soundproof nearby schools ($500M) and homes ($30M).[29]

In addition to aircraft noise, the rumble of trucks transporting cargo to and from airports results in noise impacts on neighboring communities. While passenger air traffic is concentrated during hours of residential activity, trucking of air cargo extends overnight. Compounding this situation are lower nighttime ambient noise levels, thus causing truck noise to be more noticeable by sensitive populations in the adjacent community.

Port-related noise emanates from several sources, most notably from cargo loading/unloading of ships, and truck and rail traffic accessing the ports. As with airports, this situation is compounded by the nature of cargo operations that extend throughout the night. During nighttime hours ambient noise levels are lower, thus causing port-related noise to be more noticeable by sensitive populations in the adjacent community. Noise from ship engines may also disturb hearing and behavior patterns of marine mammal populations, as well as feeding and nesting sites for birds.[30] Increased traffic congestion at the ports' entries necessitates idling of truck engines, contributes further noise to the area. In addition, trucks in the immediate vicinity of ports tend to use the surface streets abutting residential properties, thus creating an impact to the community.

Noise from warehousing and distribution centers is primarily associated with interfacing truck and rail traffic, which have been discussed in previously in this technical memorandum. As with seaports and airports, concentrated noise sources can negatively affect nearby sensitive populations.

2.7 Environmental Justice

Environmental justice is defined by State law as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." Environmental justice violations occur when there are disproportionate impacts[31] to minority and low-income[32] communities. It is fundamentally about fairness toward the disadvantaged and often addresses the exclusion of racial and ethnic minorities from decision making. Environmental justice issues relating to goods movement arise most frequently when some minority and low-income communities suffer disproportionately from transportation programs' negative impacts, like air pollution. Environmental justice issues can also arise when some communities are less represented than others when policy-making bodies debate and decide what should be done with transportation resources. The modal capacity expansion/land use connection often raises the issue of environmental justice.

On February 11, 1994, Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was issued. The Executive Order directs federal agencies to take necessary and appropriate steps to identify and address disproportionately high and adverse human health or environmental effects of federal projects and programs on minority and low-income populations to the greatest extend practical and permitted by law. The intent of the EO is to focus federal attention on the environment and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities.

Environmental justice arose because of a history of actions that (a) caused effects to be predominately borne by minority or low-income populations, or effects borne by minority and low-income populations that were more severe than those borne by others (unequal effects), or (b) excluded minority or low-income groups from participating in meaningful decision making relating to industrial, governmental, and commercial operations and policies. The environmental justice (EJ) movement was started by individuals, primarily of color who sought to address the inequity of environmental protection in their communities.[33] Grounded in the struggles of the 1960s Civil Rights Movement, the EJ movement sounded the alarm about the public health dangers for their families, their communities, and themselves. Some events leading to EO 12898 include[34]:

- 1964 – Civil Rights Act is passed in the United States Congress; Title VI prohibits the use of federal funds to discriminate on the basis of race, color, and national origin.
- 1969 – The National Environmental Policy Act (NEPA) is passed in the U.S. Congress. This policy requires federal agencies to incorporate environmental values into the process of decision-making. Thinking about environmental impacts of proposed projects and considering reasonable alternatives is accomplished through Environmental Impact Statements (EIS).
- 1971 – The annul report on the U.S. Council on Environmental Quality (CEQ) acknowledges that racial discrimination adversely affects the environmental quality of urban people of color.
- 1972 – In California, Ralph Abascal of the California Rural Legal Assistance wins a court case on behalf of six nursing mothers that are California farm workers. This ultimately resulted in a DDT ban in 1972.
- 1978-1979 – In Houston, TX, residents of the black, middle-income Northwood Manor subdivision protest Whispering Pines Sanitary landfill siting in their neighborhood. Linda McKeever Bullard files suit on behalf of Northwood Manor residents, Bean v. Southwestern Waste Management. This is the first civil rights suit to challenge the siting of a waste facility.
- 1982 – In Warren County, NC, local residents and national environmental and social activists protest against the siting of over 30,000 cubic yards of polychlorinated biphenyl (PCB) contaminated soil near the economically poor and black town of Afton. This protest gained national media coverage; more than 500 protestors were arrested. This non-violent civil disobedience campaign, modeled after 1960s protests of the Civil Rights movement, coined the term "environmental racism."
- 1983 – U.S. General Accounting Office (GAO) published Siting of Hazardous Landfills and Their Correlation with Racial and Economic Status of Surrounding Communities. GAO found that:

    - 75% of off-site commercial hazardous and toxic waste landfills were in communities of color although they made up only 20% of the population.
    - 60% of Latinos and Blacks live in areas with uncontrolled toxic waste sites.

- Also, in Triana, AL, the Olin Corporation settles a $25 million lawsuit regarding DDT contamination of their town and fishing holes. Members of this tiny-all black town had the highest DDT blood serum levels ever reported in medical history. Despite the lawsuit, in 2005 the Olin Corporation continues to remediate the fishing holes to the Food and Drug Administration (FDA) safe level of DDT (5 parts per million).
- 1987 – The United Church of Christ Commission for Racial Justice publishes Toxic Wastes and Race in the United States: A National Report on the Racial and Socioeconomic Characteristics of Communities with Hazardous Waste Sites. This report found that race was the most significant factor in determining where a waste facility was located. Moreover, 3 out of 5 Black and Latino Americans communities and 1 of 2 Asian-Pacific Islander Americans and American Indians lived with at least one uncontrolled toxic waste site in their neighborhood.
- 1991 – In Kettleman City, CA, a judge rules in the El Pueblo para el Aire y Agua Limpio v County of Kings case that the permit process for a toxic waste incinerator is unsound. Moreover, the judge found that the local community was not "meaningfully involved" due to the failure to translate documents into Spanish.

The term "environmental justice" carries with it two associations. The community-at-large associates environmental justice with any existing condition perceived to be of negative consequence to low income and minority neighborhoods. From a statutory perspective under NEPA, the meaning is much more specific and certain qualifiers must exist in order for an impact to bear such consideration. A key factor to be weighed is the effect of a new project and its future impact. Under NEPA, the issue of "disproportionate impact" to minorities and low-income populations of proposed federal "actions" or projects generally must be demonstrated, as it was in several of the events listed above. It is not the purpose of NEPA to address existing social inequities or to remedy existing environmental problems.

A 2005 study established a link in heavily traveled corridors in southern California and the risk of childhood asthma, using a population group that was 55% Hispanic, and a substantial number were non-minority (refer to Figure 8 for the study area).[35] Clearly, there exists an environmental health issue for children of any race living near heavily traveled corridors. While community members may consider this an environmental justice violation, the goal of this Multi County Goods Movement Action Plan, in addition to the various agency plans discussed in Section 1 of this document, is to reduce the risk of impacts to all populations from goods movement activity as the industry continues to grow.

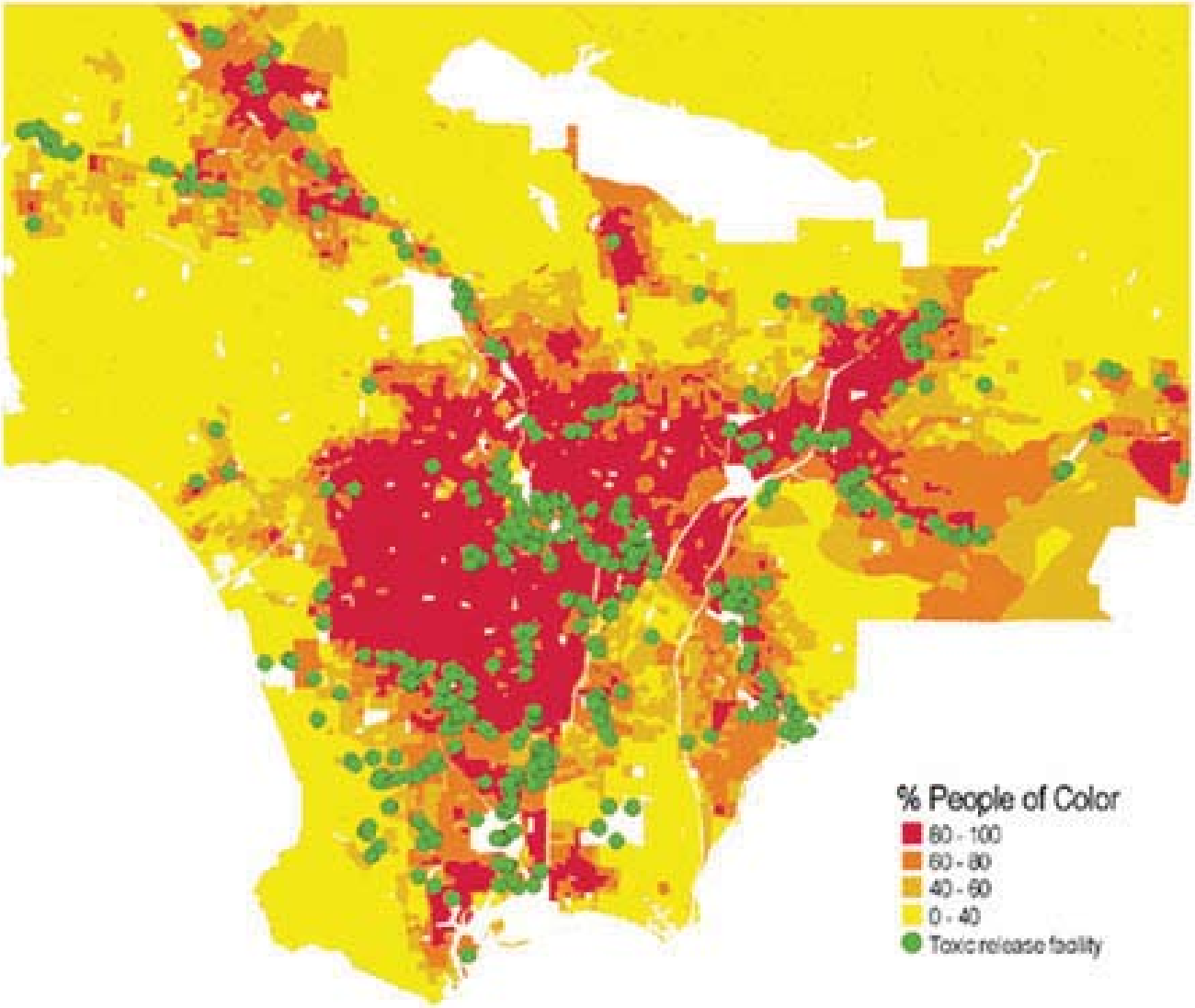
Environmental justice is of particular concern in the communities surrounding the ports (Long Beach, Los Angeles, Hueneme, and San Diego). Some key facts are:

- According to the 2000 census, approximately 23% of the population in the City of Long Beach was below the poverty line, and approximately 67% of the population was defined as a minority group.
- In the City of Port Hueneme, the 2000 census identified approximately 12% of the population living below the poverty line and approximately 43% of the population was defined as a minority group.
- Of the City of Los Angeles' 3.9 million residents, 70,000 live in San Pedro, a working class community where about two-thirds of residents are Latino, and 22 percent live below the poverty line.[36]
- In the Barrio Logan neighborhood surrounding the Port of San Diego, the 1990 census identified approximately 41% of the population living below the poverty line and approximately 93% of the population was defined as a minority group.

Figure 8 highlights environmental justice concerns throughout the MCGMAP region.

Figure 8

Toxic Release Facilities Relative to Racial/Ethnic Composition of Neighborhoods, Los Angeles, 1996



Reproduced with permission from Communities for a Better Environment, "Holding Our Breath", 1996.

Source: McConnell, Rob et al. "Traffic, Susceptibility, and Childhood Asthma." *Environmental Health Perspectives*, Vol. 114, Number 5, May 2006. Viewable at www.ehponline.org/members/2006/8594/8594.html

Figure 9
Traffic, Susceptibility, and Childhood Asthma in the Study Area

Source: ibid

2.8 Water Quality & Wetlands

Storm water runoff at ports is a primary concern with respect to water quality. Sediments, mainly contaminated, are an issue associated with runoff. Accumulated when precipitation travels across paved surfaces, deposits from air pollution, automotive fluids, pesticides, sediments, nutrients, and metals are released into the storm system. Storm water is the largest source of pollution and water quality impairment in U.S. coastal waters and the second-largest source of water pollution in U.S. estuaries.[37] Port waste sumps (constructed for the disposal of oil field residuals, solvents, paint sludge and other industrial wastes) are a source of wetland and groundwater contamination as rainwater runs through the pollutants and deposit into the seaports' harbors.

Operations to improve port operations pose added environmental risks to water quality. Dredging deeper channels and harbors has a tendency to increase water turbidity (cloudiness), harm habitat, and disturb or kill threatened and endangered species. In addition, dredged sediment is of concern to water quality. It is estimated that five to ten percent of dredged sediment nationwide is contaminated with toxic chemicals, including polychlorinated biphenyls (PCBs), mercury and other heavy metals, polycyclic aromatic hydrocarbons, and pesticides.[38] Sediment deposits from filling coastal land at ports to increase surface area can disrupt tidal influence necessary for vital coastal wetlands.

Diesel fuel from ship exhaust affects the quality of water and the vitality of marine life in and around port harbors. Pollutants can result in hypoxia – the condition where water has extremely low dissolved oxygen content typically insufficient to support marine life. Ship emissions can also result in the eutrophication of coastal ecosystems.[39] Eutrophication is a process whereby water bodies receive excess nutrients that stimulate excessive plant growth (algae, nuisance plants, and weeds). This enhanced plant growth, often called an algal bloom, reduces dissolved oxygen in the water when dead plant material decomposes and can cause other organisms to die. Other water quality impacts may include bacterial and viral contamination of commercial fish and shellfish, and bioaccumulation of certain toxins in fish.

Marine shipping of hazardous materials (HAZMAT) cargo could negatively affect water quality in an incident involving the accidental release of such cargo. The resulting coastal water contamination would thus pose health risks to marine life and recreational users.

Ships carrying ballast water for vessel stability and ease of steering and propulsion are frequently discharged in port areas. The release of ballast water is significant to introducing aquatic invasive alien species into U.S. waters. As summarized within the US-Thailand Free Trade Agreement IER, "A growing body of evidence points to commercial marine traffic as a source of dispersal both for marine species and pathogens. Pathogens identified in ballast water include Clostridium perfringins, Salmonella species, Escherichia coli, Vibrio cholerae, and enteroviruses. Public health impacts include paralytic shellfish poisoning, which can cause severe illness or death in humans. The risks exist in part because the water in many international ports is highly contaminated with sewage and agricultural runoff. In addition to pathogens, ballast water may also transfer micro-algae, including those species known to form harmful algae blooms or red tides."[40]

In addition to the marine life impacts, the effect of poor port water quality affects recreational use of coastal waters by the community. Recreational users risk exposure to potential harmful bacteria hosted by poor water quality.

The same issues posed by stormwater runoff to coastal wetlands also affect inland wetlands. These wetlands are most common on floodplains along rivers and streams (riparian wetlands), in isolated depressions surrounded by dry land (for example, playas, basins, and "potholes"), along the margins of lakes and ponds, and in other low-lying areas where the groundwater intercepts the soil surface or where precipitation sufficiently saturates the soil (vernal pools and bogs). Many of these wetlands are seasonal (they are dry one or more seasons every year), and, particularly in the arid and semiarid West, may be wet only periodically. The quantity of water present and the timing of its presence in part determine the functions of a wetland and its role in the environment. Even wetlands that appear dry at times for significant parts of the year – such as vernal pools – often provide critical habitat for wildlife adapted to breeding exclusively in these areas. Runoff from inland goods movement activities (rail yards, transportation corridors, and warehousing and distribution centers) has the potential to negatively affect these wetlands.

Of note are airports and their often-unique relationship to wetlands in the region. While typical goods movement expansion activities can displace existing wetlands, airports located near water sources have evolved into a sort of wetlands protector, as well. Due to airport land use compatibility issues, adjacent airport development is restricted. Therefore, adjoining wetlands experience limited displacement from off-airport development. Interestingly, wetlands near airports present safety hazards to aircraft–birds attracted to wetlands can cause minimal to extensive damage to aircraft and potentially cause the loss of life. The situation is most dangerous when bird strikes directly impact aircraft engines.

2.9 HAZMAT Movements

During hazardous materials (HAZMAT) movements, potential releases of hazardous materials pose risks to the environment and communities near goods movement corridors and facilities. The potential for a release can be summarized during three general scenarios:

1. Hazardous materials transport
2. Fueling operations
3. Fuel storage

All three scenarios are applicable to commercial service airports. The transporting of HAZMAT via aircraft is primarily viewed as a safety issue to passengers and aircraft operators. The issue is regulated by federal hazardous material transportation law in 49 USC 5101 et seq. and 49 CFR Part 175. However, there is potential that a safety accident could release HAZMAT materials into the airport environment. This occurrence is relatively rare and the small quantities released are an insignificant contribution to regional environmental quality. However, there are federal reporting requirements.

Airport fueling operations are an area with significant HAZMAT implications. Of major concern is the potential for fuel spills that could be released into the storm drain system and reach navigable waters of the U.S. Therefore, commercial service airports implement operational safeguards and programs to prevent

these occurrences and to minimize their impacts should they occur. The safeguards and programs are in compliance with NFPA 407 (Standard for Aircraft Fuel Servicing), 14 CFR Part 139.321 (Federal Commercial Airport Certification), and AC 150/5230-4A (Aircraft Fuel Storage, Handling, and Dispensing on Airports).

Fuel storage is a final area of major concern for airports in relation to HAZMAT. Commercial service airports like LAX store aviation and ground vehicle fuel in expansive storage tanks (up to 1.26 million gallons, or 30,000 barrels), either above ground or below ground in underground storage tanks (UST). Potential ground water contamination is a key concern. Therefore, airports comply with federal regulations and standards pertaining to the operation, corrosion protection, release detection and reporting of USTs (40 CFR Parts 280 and 281). In addition, large commercial service airports are required to comply with the federal Oil Pollution Prevention regulation (40 CFR Part 112) for Spill Prevention Control and Countermeasures (SPCC) Plans. SPCC Plans are a cornerstone of EPA's strategy to prevent oil spills from reaching our Nation's waters. Unlike oil spill contingency plans that typically address spill cleanup measures *after* a spill has occurred, SPCC Plans ensure that facilities put in place containment and other countermeasures that would prevent oil spills from reaching navigable waters. Under EPA's Oil Pollution Prevention regulation, facilities must detail and implement spill prevention and control measures in their SPCC Plans. A spill contingency plan is required as part of the SPCC Plan if a facility is unable to provide secondary containment (e.g., berms surrounding the oil storage tank).

Transport of HAZMAT materials via ships, rail, and truck includes transportation of bulk liquid chemicals and liquefied gases, hazardous bulk solids, and packaged hazardous cargoes. Ships may also transport hazardous materials used as ships' stores and used for shipboard fumigation of cargo. Potential releases into the environment could occur during ship docking operations and during cargo transfer for all modes. The potential for fuel spills and leaks during fueling transfers, operations, and storage exists where releases could enter into the storm drain system and reach navigable waters of the US. Therefore, each goods movement facility is responsible for implementing operational safeguards and programs (like those discussed above for airports) to prevent these occurrences and to minimize their impacts should they occur.

The potential for HAZMAT accidents during transit by rail and truck are increasing due to (1) the stand-alone increase in freight activity for rail operators, (2) the increase in potential safety conflicts between freight and commuter rail, and (3) the increase in potential safety conflicts at grade crossings with vehicular traffic. If accidents were to occur for any of these reasons, communities within the vicinity could be exposed to HAZMAT materials via toxic releases into the air or through soil and groundwater contamination if not properly contained or remediated.

As with the goods movement transportation modes above, warehousing and distribution centers handle bulk liquid chemicals and liquefied gases, hazardous bulk solids, and packaged hazardous cargoes. Potential releases into the environment could occur en route during cargo transfer and storage. The increased potential for HAZMAT accidents are due to the larger quantities and increased frequencies of goods movement resulting from trade demands.
Warehousing and distribution centers are unique in that some centers are constructed specifically for HAZMAT warehousing. Primarily established for the agricultural and high tech manufacturing industries, these specialized HAZMAT facilities are constructed to house chemicals requiring specific flammable,

oxidizer, and temperature-control space. The warehousing and distribution center sector segregates these specialized facilities from general commodities facilities (which handle typical consumer goods.)

Similar to the other goods movement modal facilities, the potential for fuel spills and leaks during fueling transfers, operations, and storage exists where releases could enter into the storm drain system and reach navigable waters of the US. While warehousing and distribution centers have their own fueling systems permanently located on-site, some are designed for the exchange of depleted tanks by contracted service providers. Regardless of the fuel storage supply, these facilities implement operational safeguards and programs to prevent these occurrences and to minimize their impacts should they occur.

2.10 Safety

Railroad crossing safety is a consideration as travel demand for rail (passenger and freight) and passenger vehicles increase. A highway-railroad grade crossing is an intersection where a roadway crosses railroad tracks at the same level. Because many crossings are located in populated areas, the blocking of a crossing by a train can be frustrating, time-consuming, and cause potentially dangerous situations. Such situations can ensue when emergency vehicles are unable to cross, when drivers attempt to “beat the train” to avoid long waits, or school bus drivers are distracted by the noise and activity inside their bus. The potential for these scenarios to occur more frequently could rise as travel demand increases.

With the recent federal regulation allowing quiet zones under certain conditions, the reduction of train horns at crossings in residential communities does have safety implications. The regulation does address this concern and results are to be monitored.

In spite of the potential risks, the FRA announced in March 2006 that train accidents and derailments declined in 2005, and that the highway-rail grade crossing collision rate is at an all-time record low. U.S. Transportation Secretary Norman Y. Mineta announced, “Amid a strong economy and increased demand for rail services in 2005, the number of overall train accidents and derailments declined according to the latest statistics compiled by the Federal Railroad Administration.”[41]

Since 1995, the highway-rail grade crossing collision rate has declined from 6.92 to 3.84 per million train miles.[42] Preliminary full year data comparing 2005 with 2004 shows that overall train accidents decreased 7.9 percent, including an 8.4 percent reduction in the number of derailments. In addition, the total number of highway-rail grade crossing fatalities declined 3.5 percent and the grade crossing collision rate reached an all-time record low of 3.81 per million train-miles. The preliminary data also reveals that human-factor caused train accidents—the leading cause of all train accidents—decreased 12.8 percent in 2005. Trespassing remains the largest single cause of rail-related fatalities accounting for 53.7 percent of the total.[43]

That being said, the FRA has recently announced a renewed focus on improving the safety at the nation’s largely unregulated private highway-rail grade crossings. Private crossings are owned by private property owners primarily to allow roadway access over railroad tracks to residential, commercial, or agricultural areas not meant for general public use. Each year, about 400 accidents, and between 30 and 40 fatalities, occur at the over 94,000 private crossings used by both freight and passenger trains.[44]

In addition, U.S. Transportation Secretary Mineta is calling for the universal implementation of a toll-free emergency notification system at all public grade crossings.

In a FRA report, toll-free emergency telephone numbers posted at highway-rail grade crossings used to report problems with warning equipment or other emergencies have been found effective in enhancing motorist and rail passenger safety.[45] The report determined that malfunctioning warning lights and gates at grade crossings have been repaired more quickly by railroads thanks to people using the telephone number. Also, freight and passenger trains have been slowed or stopped to prevent collisions with stalled vehicles, trespassers, and other obstructions on the tracks. Currently, such an emergency number is posted at over 75 percent of grade crossings with flashing lights and gates, and over 60 percent of all public grade crossings.

To accommodate ever-increasing passenger rail and freight demands, shared-track usage is occurring more frequently. More traffic on railways could give rise to an increase in potential safety conflicts between rail users. While the most salient risk involving shared track operations is that of a collision between a light rail transit vehicle and a freight railroad vehicle, a Federal Transit Administration (FTA) report asserts that this type of accident has never occurred.[46, 47] Sharing of track between light rail and freight railroad vehicles on the general railroad system results in little or nor additional risk to passenger compared to non-shared track transit operations, in the opinions of "knowledgeable persons in transit and insurance industries" based on limited cases and statistical evidence.[48]

Highway corridors are also shared-use facilities in that passenger vehicles and trucks use the same infrastructure. An increase in automobile traffic coupled with an increase in truck traffic causes even more congestion and more points of potential conflicts while users vie for lane presence. Trucks are at a disadvantage from preemptively avoiding collisions – they contain significant blind spots, are slower to stop, need greater stopping distance, possess less lateral vehicle responsiveness, and cause significant physical impacts due to their size and weight.

Further, increasingly congested freeway corridors prompt trucks to deviate and use surface streets within neighboring communities in search of alternate routes to enter ports, rail yards, and distribution centers and warehouses. This added unwelcome intrusion into the surrounding community could create conflict between trucks and passenger cars and trucks and pedestrians, thereby creating greater safety risks to trucks, cars, and pedestrians.

As a stationary source, warehousing and distribution centers do not pose safety issues per se. However, they do serve as a goods movement traffic generator. Therefore, related safety issues associated with trucks and rail do arise as discussed above.

E.0 – Executive Summary

[1] *The California Almanac of Emissions and Air Quality – 2006 Edition*. p. 114. California Air Resources Board.

[2] *ibid.*

[3] The area is in non-attainment for both state PM10 and PM2.5.

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[5] PM2.5 refers to particulate matter that is 2.5 micrometers or smaller in size (approximately 1/30 the size of a human hair.)

[6] *The California Almanac of Emissions and Air Quality – 2006 Edition*. California Air Resources Board.

[7] New Emission Standards for New Commercial Aircraft Engines" EPA Office of Transportation and Air Quality, November 2005.

[8] One nautical mile is equal in length to 6,076 feet or 1.15 statute miles, which is the distance of one minute of longitude measured at the equator.

[9] United States Trade Representative, established by federal law, plays the leading role in the development of policy on trade and trade-related investment, as well as in the coordination of the interagency process on trade policy formulation.

[10] *2003 Air Quality Management Plan*. South Coast Air Quality Management District. p. ES-1.

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[12] *Appendix C – Performance Measures*. 2004 Regional Transportation Plan, Southern California Association of Governments (SCAG).

[13] *Chapter 2- Transportation Planning Challenges and Trends*. 2004 Regional Transportation Plan, Southern California Association of Governments (SCAG).

[14] Reebie Associates, et al. *Draft Rail Freight Solutions to Roadway Congestion – Interim Report on Transportation Trends, Road-to-Rail Diversion and Model Elements for Decision-Making*. National Cooperative Highway Research Program, Transportation Research Board. April 2004.

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[22] Traffic Pollutants and Health Effects Advisory. South Coast Air Quality Management District. May 20, 2005.

[23] Other precursor emissions affect ozone; however, Goods Movement-related diesel emissions are not significant sources of these other precursors.

[24] Health and Environmental Effects of Ground-Level Ozone – Fact Sheet. US EPA Office of Air and Radiation. July 17, 1997.

[25] "New Emission Standards for New Commercial Aircraft Engines" EPA Office of Transportation and Air Quality, November 2005.

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[27] *Inland Empire Railroad Main Line Study – Final Report*. Leachman and Associates LLC for Southern California Association of Governments. June 30, 2006.

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[38] *ibid*.

[39] *ibid*.

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[7] Ultrafine particulates average 0.02 micrometers (um). For comparative purposes, the diameter of a human hair averages 60um.

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[47] Within the context of FTA's report, the definition of shared track is limited to freight rail and light rail transit, not commuter rail. Commuter rail (a regional passenger rail system) often shares track with freight service, but uses equipment under different safety standards than light rail transit.

[48] *ibid*.

Multi-County Goods Movement Action Plan

Technical Memorandum 6a:
Evaluation of Initial Goods Movement Strategies

Prepared for:

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California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
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Executive Summary
Introduction E-1
Role of Scenarios in Project and Strategy Evaluation E-1
Qualitative Evaluation of Projects and Strategies E-2
Results of the Initial Screening E-2

Chapter 1 – Initial Goods Movement Strategies
Initial List of Projects and Strategies 1-1
Expansion of the List of Projects and Strategies 1-1

Chapter 2 – Refined Goods Movement Strategies and Initial Screening
Refinement of the List of Projects and Strategies and Initial Screening 2-1
Qualitative Evaluation of Projects and Strategies 2-3

Chapter 3 – Results of the Initial Screening Process
Initial Screening Highlights 3-1
Results of the Initial Screening 3-11

Introduction

This Technical Memorandum, Technical Memorandum 6a (Tech Memo 6a) presents the initial results of Task 6 of the Multi-County Goods Movement Action Plan (MCGMAP). The purpose of this task of the MCGMAP is to identify and investigate a wide range of transportation options to address the identified issues, challenges and problems related to goods movement within the MCGMAP Region. The identification and investigation of transportation options will result in a list of projects and strategies that will be incorporated into the Action Plan. This Technical Memorandum outlines the first of two phases to identify and investigate the various projects and strategies that will be refined for incorporation into the Action Plan. This first phase focuses on a screening level evaluation of a wide range of projects and strategies.

This Tech Memo documents the development of the comprehensive list of projects and strategies, the development of evaluation criteria and associated methodologies for evaluation, and the results of the initial screening. At the conclusion of this Tech Memo, a refined list of projects and strategies is presented. These projects and strategies will be subject to a detailed evaluation, according to the developed evaluation criteria presented herein, which will be documented in the subsequent Tech Memo 6b. Following the detailed evaluation, a list of projects and strategies with associated evaluation results (both detailed and qualitative) will be available for use in the MCGMAP. The Action Plan will be developed with an understanding of the projects and strategies, and the evaluation results will provide the means for comparison.

Role of Scenarios in Project and Strategy Evaluation

As stated above, the purpose of this Task is to identify and investigate a wide range of transportation options to address the identified issues, challenges and problems related to goods movement within the MCGMAP Region. The projects and strategies discussed in this Tech Memo represent options above and beyond those options currently included in the committed funding plans of the MCGMAP project partners. As discussed in Tech Memo 4a, the committed funding plans of the MCGMAP project partners represent one of the four scenarios investigated as a part of the MCGMAP. The scenarios (from Tech Memo 4a) are:

- Scenario 1: High Growth - Current Investment Levels
- Scenario 2: Low Growth – Current Investment Levels
- Scenario 3: Moderate Growth - Current Investment Levels
- Scenario 4: High Growth - Full Investment Levels

Specifically, the committed funding plans of the MCGMAP project partners represent the "current investment levels" specified under Scenarios 1, 2, and 3.

The "full investment levels" would require additional investment beyond the existing committed funding plans of the MCGMAP project partners; which is exactly what this Tech

Memo summarizes. Therefore, the projects and strategies described in this Tech Memo are assumed to be implemented under Scenario 4: High Growth - Full Investment Levels.

Note that under the "current investment level" scenarios, the MCGMAP Region's infrastructure and goods movement system would perform differently. As summarized in Tech Memo 4b, future highway and rail system performance will deteriorate if the "high growth" of international container cargo occurs while maintaining "current investment levels." When the existing system performance is reviewed, as summarized in Tech Memo 3, it is clear that the existing system performs at constrained levels under significant daily and peak hour congestion. Therefore, it can be concluded that if "current investment levels" are maintained, any additional growth in highway and rail volumes will result in further degraded system performance as well as the associated environmental and community impacts. Tech Memo 4a clearly showed that even if the significant growth in international container cargo is offset through diversion to other Ports or other factors (e.g. changes in trade policy, global unrest), there would still be growth at the Ports of Los Angeles and Long Beach and associated growth in volumes on the MCGMAP Region's rail and highway system. In conclusion, the scenarios assuming "current investment levels" would result in impacts to both system performance and the MCGMAP Region's environment and communities.

Qualitative Evaluation of Projects and Strategies

The purpose of the qualitative evaluation of projects and strategies is to provide an overview of the various effects of different goods movement projects and strategies. This qualitative evaluation is not meant to be a final technical analysis of the effects of various goods movement projects and strategies. The results of this qualitative evaluation will serve as guidance for the further planning and analysis of goods movement projects. The results of the qualitative analysis, combined with the more detailed analysis, will provide the project team with the information necessary to identify the recommended Action Plan. All results presented in subsequent sections serve as stand-alone analyses, and do not take into account the additive benefits or impacts when combined with other goods movement projects or strategies.

The categories of projects described above were evaluated based on the following criteria. The criteria were developed through coordination with the TAC and by comments received through stakeholder outreach. The qualitative evaluations presented later in this document reflect that many of the evaluation criteria could be grouped into broader categories:

Results of the Initial Screening

The detailed evaluation will focus on those projects and strategies that can be quantifiably evaluated using analytical tools (such as travel demand models, economic models, and GIS tools). The methodology for detailed evaluation (including the type and application of travel demand modeling and other software) was determined through the coordination of a Modeling Working Group. The Modeling Working Group was composed of members of the TAC and key modeling staff from the various project partners. For the purposes of this

project, the Modeling Working Group identified a set of projects and strategies for evaluation using the Regional Travel Demand Model. The initial objective was to perform a detailed evaluation of a set of projects and strategies that would have regional effects and could be compared across consistent criteria.

The 15 projects and strategies to be included in the Action Plan come from the qualitative evaluations, with the results of the qualitative evaluation used as a method of comparison. The additional data gathered through the detailed evaluation of projects and strategies will allow for a more in-depth comparison of various projects and strategies.

The projects and strategies are:

1. Expansion of On-Dock Rail at Ports
2. Additional Intermodal Facilities / Freight Yards
3. Increase Port/Rail Yard Freight Capacity
4. Implement Alternative Technologies to Additional Intermodal Terminals
5. Mainline Rail Capacity Improvements
6. Modification of Port Hours of Operation / Delivery Hours
7. Modification of Construction of Exclusive Truck Lanes
8. Allow Use of LCVs on Dedicated Facilities
9. Rail Grade Separations and Grade Crossing Safety Upgrades
10. Application of ITS Technology for Vehicle Management and Routing
11. Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel
12. Data and Analytical Methods
13. Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
14. Additional Freeway Lanes/Capacity
15. Additional Freeway Operational/Safety Improvements

Chapter 1 – Initial Goods Movement Strategies

Initial List of Projects and Strategies

In order to identify the projects and strategies to improve goods movement in the MCGMAP Region, a comprehensive list of all projects identified by the public and private sector was first compiled. This list was compiled based on published lists of projects provided by the various County Transportation Commissions and public Agencies, as well as initial lists provided by private industry stakeholders. In addition, the Consultant Team identified projects based on documented existing system constraints described in Tech Memo 3.

An initial list of the types of projects and strategies that could improve the movement of goods was identified by the project partners based on the existing and forecast future system constraints. This list focused on specific modes or areas of the goods movement system (e.g. rail, highway, warehousing) and the integration of supply-chain components.

The specific sources for the comprehensive project list are:

- BNSF Railroad
- Caltrans District 7
- Caltrans District 8
- Caltrans District 12
- Caltrans District 11
- Caltrans Headquarters
- FHWA Intermodal Connectors
- Metro
- OCTA
- RCTC
- SANBAG
- SCAG 2004 RTP
- UP Railroad
- VCTC

The initial list of projects compiled from the sources described above included all projects, not only goods movement related projects. Therefore, the initial list of projects required an initial screening.

Expansion of the List of Projects and Strategies

With input from the Project Partners, the initial list was expanded to include identified short- and near-term projects included in County planning and programming documents. Using the input from the Project Partners, the project team further supplemented the list of projects and

strategies to include all projects identified in regional planning and programming documents (including SCAG's 2004 Regional Transportation Plan, Railroad projects, CALMITSAC, State GMAP. FHWA intermodal connectors, and all individual County-supplied projects). This resulted in a broad list of all potential projects and strategies without financial constraints.

As noted previously in this Tech Memo, the evaluation of the projects and strategies to be included in the Action Plan consists of two primary phases. The first phase serves to refine a wide range of projects and strategies into a more discrete list. This phase is accomplished through an initial screening level evaluation. The second phase consists of a more detailed evaluation that will document, to the extent of available analysis and data, the performance of various types of projects and strategies compared to a number of evaluation criteria.

The sources of the evaluation criteria used for both the initial screening and more detailed evaluation are derived from the following elements:

- Understanding of the MCGMAP Region goods movement system
- Existing issues and constraints (both environmental/community and system)
- Forecast future issues and constraints (both environmental/community and system)
- Implementation and funding constraints

Chapter 2 – Refined Goods Movement Strategies and Initial Screening

Refinement of the List of Projects and Strategies and Initial Screening

This section documents the two-step approach of refinement and initial screening of the lost of projects and strategies. Using the following initial screening criteria, the broad list of projects and strategies was refined:

1. Is the project or strategy related to goods movement?
   a. Does the project or strategy address a direct or indirect component of the goods movement system?
2. Is the project or strategy fully funded and programmed for short- or near-term implementation?
3. Is the project or strategy duplicated or a part of a similar project or strategy?

The result is a comprehensive list of 249 projects and strategies that is included in Appendix A.

The project team has identified 15 categories for the projects and strategies identified for improving the movement of goods.

1. Expansion of On-Dock Rail at Ports
2. Additional Intermodal Facilities / Freight Yards
3. Implement Alternative Technologies to Additional Intermodal Terminals
4. Addition of Mainline Rail Capacity
5. Modification of Port Operation / Delivery Hours
6. Construction of Exclusive Truck Lanes
7. Allow Use of LCVs on Dedicated Facilities
8. Additional Rail Grade Separations
9. Additional ITS Technology for Vehicle Management and Routing
10. Operational Techniques to Optimize Freight Travel
11. Improve Data and Analytical Methods
12. Implement Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
13. Additional Freeway Lanes/Capacity
14. Additional Freeway Operational/Safety Improvements
15. Increase Port/Rail Yard Freight Capacity

The projects and strategies are summarized below. Note that some of the projects and strategies listed below are already implemented to some extent within the MCGMAP Region's goods movement system, while other projects and strategies are relatively new. For the purposes of the qualitative analysis, the projects and strategies described below are assumed to be in addition to any similar strategy currently in place or included in planning and programming documents.

1. **Expansion of On-Dock Rail at Ports:** Increase the capacity for the loading and unloading of direct-rail intermodal and carload rail at the port facilities; thereby reducing the need for drayage trucking from the port to near-dock or off-dock yards.

2. **Additional Intermodal Facilities / Freight Yards:** The construction of more intermodal facilities and freight yards throughout the region to reduce bottlenecks and increase the speed and efficiency of goods movement and transfer between modes.

3. **Implement Alternative Technologies to Additional Intermodal Terminals:** Use non-truck alternatives to transfer goods between the ports and intermodal terminals, thereby reducing truck volumes and associated environmental and community impacts. Some of the technologies include:
   a. Shuttle trains – Rail linkage between the ports and intermodal yards with reduced headways and higher speeds; most likely using diesel-electric or other hybrid engine technology to reduce emissions.
   b. Maglev – Zero-emission technology to move goods with reduced headways and greater speeds.
   c. Fixed guideway systems – Similar to a conveyor belt; low- to zero-emissions with reduced headways and greater speeds.

4. **Addition of Mainline Rail Capacity:** Increase the capacity of regional rail mainlines to move more goods faster and also to reduce congestion and delays for passenger service on shared freight / passenger lines.

5. **Modification of Port Operation / Delivery Hours:** Allow for the movement of goods during non-commuter peak travel periods (e.g. the existing PierPass off-peak program).

6. **Construction of Exclusive Truck Lanes:** Separate truck traffic from vehicle traffic on regional highways in order to reduce emissions, improve congestion and delay, and move towards a "dedicated freight guideway" system.

7. **Allow Use of LCVs on Dedicated Facilities:** Long Combination Vehicles (LCVs) allow for more goods to be carried by fewer trucks; however, these larger vehicles would require separate facilities in order to maintain passenger vehicle safety as well as reduce emissions and improve congestion and delay.

8. **Additional Rail Grade Separations:** Construct rail grade separations at locations where roadways cross rail lines, thereby reducing vehicle delays due to train crossings, reducing emissions due to idling vehicles, and reduce noise impacts from trains.

9. **Additional ITS Technology for Vehicle Management and Routing:** Improve the technology to move all vehicles through the regional system more efficiently, thereby reducing congestion, delays, and emissions.

10. **Operational Techniques to Optimize Freight Travel:** Numerous techniques are available to the public and private sectors to improve operational efficiency. This includes inventory management tools, improved efficiency in monitoring and

enforcement, and improvements to manage the shared use of passenger and freight facilities.

11. **Improve Data and Analytical Methods:** Compile more real-time statistics on the movement of goods and passengers throughout the system, allowing for better management and control of the entire multimodal transportation system.

12. **Implement Institutional Changes to Improve Feasibility of Large Scale/Mega Projects:** Strategies, such as Public-Private Partnerships (3P), can be implemented in order to make large scale projects more feasible; this would require changes to how local, regional, and State agencies do business.

13. **Additional Freeway Lanes/Capacity:** Adding capacity (most likely as new general purpose lanes) for all vehicles using the region's roadway network can reduce congestion and improve mobility for both passenger and freight traffic.

14. **Additional Freeway Operational/Safety Improvements:** Operational improvements (such as auxiliary lanes) and safety improvements (such as truck climbing lanes) can reduce congestion due to bottlenecks and improve mobility for both passenger and freight traffic.

15. **Increase Port/Rail Yard Freight Capacity:** Overall increases to the capacity of both port and rail yards would be added in order to reduce bottlenecks and improve the efficient movement of goods, thereby reducing the time spent waiting by rail and trucks for the loading/transfer of goods (most likely with an associated reduction in emissions).

For any of the projects and strategies listed above, associated environmental mitigation measures would be required. SCAG has recently released a draft study summarizing measures for mitigating the environmental impacts of goods movement, with a focus on the cost-benefit analyses of various measures. The SCAG study complements the information presented in this Tech Memo; together, these documents provide a summary of goods movement improvements and associated environmental mitigation measures with corresponding analyses. The SCAG study is titled "Analysis of Goods Movement Emission Reduction Strategies," and the Task 1 Draft Report was submitted in February 2007.

Qualitative Evaluation of Projects and Strategies

The purpose of the qualitative evaluation of projects and strategies is to provide an overview of the various effects of different goods movement projects and strategies. This qualitative evaluation is not meant to be a final technical analysis of the effects of various goods movement projects and strategies. The results of this qualitative evaluation will serve as guidance for the further planning and analysis of goods movement projects. The results of the qualitative analysis, combined with the more detailed analysis, will provide the project team with the information necessary to identify the recommended Action Plan. All results presented in subsequent sections serve as stand-alone analyses, and do not take into account the additive benefits or impacts when combined with other goods movement projects or strategies.

In order to complete the qualitative evaluation, the project team first identified a set of criteria. Next the list of projects and strategies was refined into a set of discrete elements that were suitable for incorporation in a broad strategic sense. This approach allowed for the purpose of the qualitative evaluation to be achieved.

The categories of projects described above were evaluated based on the following criteria. The criteria were developed through coordination with the TAC and by comments received through stakeholder outreach. The qualitative evaluations presented later in this document reflect that many of the evaluation criteria could be grouped into broader categories:

1. **Modal Diversion:** How much does the project or strategy shift freight from truck to rail?

2. **Highway Congestion/Delay:** How much will the project or strategy reduce highway congestion and delay for both passenger and freight movement?

3. **Rail Congestion/Delay:** How much will the project or strategy reduce rail congestion and delay for both passenger and freight movement?

4. **Travel Time/Reliability:** How much will the project or strategy improve travel time and reliability for both passenger and freight movement?

5. **Freight Trip Times - Specific Trade Lanes/Corridors:** How much will the project or strategy improve trip time for freight movement?

6. **Truck Trips - Transport Corridors:** How much will the project or strategy change truck trips along transport corridors?

7. **Truck Trips - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy change truck trips between ports, intermodal yards, and warehouse facilities?

8. **Truck Traffic Peak/Off-Peak Shares - Transport Corridors:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times along transport corridors?

9. **Truck Traffic Peak/Off-Peak Shares - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities?

10. **Regional Vehicle Miles of Travel:** How much will the project or strategy reduce regional vehicle miles of travel?

11. **Regional Vehicle Hours of Travel:** How much will the project or strategy reduce regional vehicle hours of travel?

12. **Impact on Adjacent Corridors/Regional Balance:** How much will the project or strategy impact adjacent corridors or change the regional balance of passenger and goods movement?

13. **Overall Emissions - Transport Corridors:** How much will the project or strategy reduce overall emissions along transport corridors?

14. **Overall Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce overall emissions between ports, intermodal yards, and warehouse facilities?

15. **PM Emissions - Transport Corridors:** How much will the project or strategy reduce diesel particulate matter emissions along transport corridors?

16. **PM Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce diesel particulate matter emissions between ports, intermodal yards, and warehouse facilities?

17. **Health Effects - Transport Corridors:** How much will the project or strategy improve health effects (or reduce the current negative health effects) of goods movement along transport corridors?

18. **Health Effects - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy improve health effects (or reduce the current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities?

19. **Community Impacts - Transport Corridors:** How much will the project or strategy reduce community impacts associated with goods movement along transport corridors?

20. **Community Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?

21. **Land Use Impacts - Transport Corridors:** How much will the project or strategy reduce land use impacts associated with goods movement along transport corridors?

22. **Land Use Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?

23. **Project Revenue/User Fees:** How much will the project or strategy maximize project revenue or user fee generating potential?

24. **Regional Economic Output/Competitiveness:** How much will the project or strategy improve the economic output and competitiveness of the region?

25. **Jobs/Economic Opportunity:** How much will the project or strategy increase the number of jobs and economic opportunity associated with goods movement in the region?

26. **Cost:** What is the overall cost of the project or strategy?

The qualitative evaluation was completed according to the following methodology:

- The list of 15 projects and strategies presented earlier in this section was revised in order to directly link specific projects and strategies to discrete components.
- Each project or strategy was evaluated independently.
- The 26 evaluation categories described above are broad; therefore, for each specific project or strategy, the evaluation category included discrete and independent components.
- Many of the projects and strategies evaluated focus on specific modes, locations, or components of the broader regional goods movement system; therefore, the evaluation results will be specific to those elements.

The categories of projects and strategies for qualitative evaluation were refined in order to identify improvement needs in a broad strategic sense. The 15 categories of projects and strategies evaluated are:

1. On-Dock Rail Improvements at Ports (projects outside of terminals)
2. Intermodal Facilities / Yards (includes Ports and rail yards)
3. Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals
4. Mainline Rail Capacity Improvements
5. Modification of Port Hours of Operation
6. Modification of Delivery Hours
7. Truck Lanes/Facilities
8. Use of LCVs on Dedicated Facilities
9. Rail Grade Separations and Grade Crossing Safety Upgrades
10. Application of ITS Technology for Vehicle Management and Routing
11. Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel
12. Data and Analytical Methods
13. Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
14. Construction of Additional Freeway Lanes/Capacity
15. Freeway Operational/Safety Improvements

This evaluation was completed using available documentation, previous studies, and new analyses by the project team. In many cases the evaluations were completed through roundtable-type discussions of available data and information among project team experts. Information and data presented in previous technical memoranda (Tech Memos 2a, 3, 4a, 4b, 5a, and 5b) served as the primary basis for qualitative evaluations. A summary of the evaluation of the categories projects and strategies is included in the following pages. The evaluations use a qualitative measurement of project and strategy performance on a level from "least" to "most". A more detailed

evaluation of specific projects and strategies was performed in a subsequent task (as documented in Tech Memo 6b).

It is understood that the evaluation methodology described above will not produce results suitable for documenting project-specific environmental impacts, nor will the qualitative evaluations result in a true cost-benefit analysis of various projects or strategies. A description of the evaluation for each criteria, including a discussion of the "least" and "most" rated projects or strategies is included in the following Chapter.

The results of the qualitative evaluation are meant to offer comparisons between each project and strategy for each specific evaluation criteria. Since each project or strategy was evaluated independently, the results of the qualitative evaluation cannot be summed across all categories; therefore, the qualitative evaluation will not provide a summary of prioritized projects and strategies based on criteria.

Summary of Qualitative Evaluations
(Chart 1 of 4)

Least ○ ◔ ◑ ◕ ● Most Project Category	Modal Diversion	Reduction of Highway Congestion / Delay	Reduction of Rail Congestion / Delay	Improvement of Travel Time / Reliability
On-Dock Rail Improvements at Ports (projects outside of terminals)	●	◑	◑	◔
Intermodal Facilities / Yards	◑	◔	◑	◔
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	◑	◑	◑	◔
Mainline Rail Capacity Improvements	◔	◔	●	◕
Modification of Port Hours of Operation	○	◔	◔	◔
Modification of Delivery Hours	○	◔	◔	◔
Truck Lanes/Facilities	◔	◑	○	◑
Use of LCVs on Dedicated Facilities	◔	◑	◔	◔
Rail Grade Separations and Grade Crossing Safety Upgrades	○	◑	○	◔
Application of ITS Technology for Vehicle Management and Routing	○	◔	○	◔
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	◑	◔	○	◔
Data and Analytical Methods	○	○	○	◔
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◑	◕	◕	◑
Construction of Additional Freeway Lanes/Capacity	○	◑	○	◔
Freeway Operational/Safety Improvements	○	◔	○	◔

Summary of Qualitative Evaluations
(Chart 2 of 4)

○ ◔ ◑ ◕ ●
Least ⟷ Most

Project Category	Improvement of Freight Trip Times - Specific Trade Lanes / Corridors	Change in Truck Trips - Transport Corridors	Change in Truck Trips - Ports / Intermodal / Warehouse Facilities	Change in Truck Traffic Peak / Off-Peak Shares - Transport Corridors	Change in Truck Traffic Peak / Off-Peak Shares - Ports / Intermodal / Warehouse Facilities	Reduction of Regional Vehicle Miles of Travel	Reduction of Regional Vehicle Hours of Travel
On-Dock Rail Improvements at Ports (projects outside of terminals)	◕	◔	◑	○	○	◔	◔
Intermodal Facilities / Yards	◕	◔	◕	○	○	◔	◔
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	◔	◔	○	○	◑	◑
Mainline Rail Capacity Improvements	●	◔	◔	○	○	◔	◔
Modification of Port Hours of Operation	◔	◔	◔	◑	◑	◔	◔
Modification of Delivery Hours	◔	◔	◔	◑	◑	◔	◔
Truck Lanes/Facilities	●	●	●	●	●	●	●
Use of LCVs on Dedicated Facilities	◔	◔	◔	◕	◕	◕	◕
Rail Grade Separations and Grade Crossing Safety Upgrades	◔	◔	◔	○	○	○	○
Application of ITS Technology for Vehicle Management and Routing	○	◔	◔	◔	◔	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	◔	◔	◔	◔	◔	○	○
Data and Analytical Methods	○	○	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◑	◕	◕	○	○	◕	◕
Construction of Additional Freeway Lanes/Capacity	◕	◕	◕	◔	◔	◕	◕
Freeway Operational/Safety Improvements	◑	◑	◑	◔	◔	◑	◑

Summary of Qualitative Evaluations
(Chart 3 of 4)

Least ○ ◔ ◑ ◕ ● Most Project Category	Impact on Adjacent Corridors / Regional Balance	Reduction of Overall Emissions - Transport Corridors	Reduction of Overall Emissions - Ports / Intermodal / Warehouse Facilities	Reduction of PM Emissions - Transport Corridors	Reduction of PM Emissions - Ports / Intermodal / Warehouse Facilities	Improved Health Effects - Transport Corridors	Improved Health Effects - Ports / Intermodal / Warehouse Facilities	Reduction of Community Impacts - Transport Corridors	Reduction of Community Impacts - Ports / Intermodal / Warehouse Facilities
On-Dock Rail Improvements at Ports (projects outside of terminals)	◔	◑	◕	◑	◕	◑	◕	◑	◕
Intermodal Facilities / Yards	◔	◔	●	◔	●	◔	●	◔	●
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	◕	●	●	●	●	●	●	●
Mainline Rail Capacity Improvements	◔	◕	◑	●	◑	●	◑	●	◑
Modification of Port Hours of Operation	◔	◔	◔	◔	◔	◔	◔	◔	◔
Modification of Delivery Hours	◔	◔	◔	◔	◔	◔	◔	◔	◔
Truck Lanes/Facilities	●	◕	◕	◕	◕	◕	◕	◕	◕
Use of LCVs on Dedicated Facilities	◕	◕	◕	◕	◕	◕	◕	◕	◕
Rail Grade Separations and Grade Crossing Safety Upgrades	○	◔	◔	◔	◔	◔	◔	◔	◔
Application of ITS Technology for Vehicle Management and Routing	◔	○	○	○	○	○	○	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	○	○	○	○	○	○	○	○
Data and Analytical Methods	○	○	○	○	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	◕	◕	◕	◕	◕	◕	◕	◕
Construction of Additional Freeway Lanes/Capacity	◑	◑	◔	◑	◔	◑	◔	◑	◔
Freeway Operational/Safety Improvements	◑	◑	◔	◑	◔	◑	◔	◑	◔

Summary of Qualitative Evaluations
(Chart 4 of 4)

Least ○ ◔ ◑ ◕ ● Most Project Category	Reduction of Land Use Impacts - Transport Corridors	Reduction of Land Use Impacts - Ports / Intermodal / Warehouse Facilities	Maximization of Project Revenue / User Fees	Improvement of Regional Economic Output / Competitiveness	Increase in Jobs / Economic Opportunity	Cost
On-Dock Rail Improvements at Ports (projects outside of terminals)	◑	◕	◔	◕	◕	●
Intermodal Facilities / Yards	◔	◕	◔	◕	◕	●
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	●	●	◕	◕	●
Mainline Rail Capacity Improvements	●	◑	◕	◕	◕	●
Modification of Port Hours of Operation	◔	◔	●	◑	◑	○
Modification of Delivery Hours	◔	◔	●	◑	◑	○
Truck Lanes/Facilities	◕	◕	◕	◕	◕	●
Use of LCVs on Dedicated Facilities	◕	◕	◑	◕	◕	◔
Rail Grade Separations and Grade Crossing Safety Upgrades	◔	◔	◔	◕	◕	●
Application of ITS Technology for Vehicle Management and Routing	○	○	◔	◔	◔	◔
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	○	○	◕	◕	○
Data and Analytical Methods	○	○	○	◕	◕	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	◕	◕	◕	◕	○
Construction of Additional Freeway Lanes/Capacity	◑	◔	◔	◑	◑	●
Freeway Operational/Safety Improvements	◑	◔	◔	◑	◑	◑

Chapter 3 – Results of the Initial Screening Process

Initial Screening Highlights

Highlights of the initial screening are summarized below:

1. **Modal Diversion:** How much does the project or strategy shift freight from truck to rail?
    a. The **Most** modal diversion would occur with increased on-dock rail at the ports, with additional potential to increase modal diversion from improvements linking intermodal and freight yards through capital or operational improvements.
    b. The **Least** modal diversion would occur with projects focused on improving the movement of trucks and passenger vehicles.
        i. The biggest constraint to the movement of goods is intermodal lift capacity. Shifting freight from trucks to rail will require increased capacities and systems to allow more goods to quickly transfer from various modes (intermodal lifts); minimize the interim drayage truck movements.

2. **Highway Congestion/Delay:** How much will the project or strategy reduce highway congestion and delay for both passenger and freight movement?
    a. The **Most** reduction in highway congestion/delay would result from large scale/mega projects (such as a regional dedicated freight guideway system) to link the primary origins and destinations in the goods movement system and separate the movements between those locations from other regional travel. Therefore, the institutional changes to allow for large scale/mega projects are shown to have the most reduction.
        i. It is important to note that these institutional changes alone would not affect highway congestion or delay; however, for the purposes of this study it is assumed that these institutional changes are the necessary first-step towards implementation of these large scale/mega projects. The planning, design, construction, and operation of such large scale/mega projects would not occur without the required institutional changes.
    b. The **Least** reduction in highway congestion/delay would result from increased data and analysis of the system; with minimal reductions resulting from smaller scale improvements to the regional highway system (e.g. "spot" fixes instead of a large scale regional system).
        i. The regional highway system is currently at capacity and is forecast to continue to be capacity constrained. The passenger and freight traffic on the existing system is diffuse and extensive; solutions with the greatest benefit must be large scale and separate the traffic that travels through or leaves the region from the traffic within the region.
        ii. Truck lanes would provide a medium reduction in highway congestion and delay, with the greatest change evident to the trucks themselves. The changes to congestion and delay for vehicles traveling in the mixed-flow

lanes adjacent to the truck lanes would be minimal, as the excess capacity created by the removal of truck traffic would be quickly absorbed by the significant additional vehicle demand along corridors. In addition, the reduction to highway congestion and delays would be limited to on or surrounding the designated truck lane corridors; within the MCGMAP Region, highway congestion and delay would remain significant due to overwhelming demand.

3. **Rail Congestion/Delay:** How much will the project or strategy reduce rail congestion and delay for both passenger and freight movement?
    a. The **Most** reduction in rail congestion/delay would result from mainline rail capacity increases, with additional reduction from large scale/mega projects.
    b. The **Least** reduction in rail congestion/delay would result from those projects and strategies that do not affect rail travel.
        i. Rail capacity is the second largest constraint to the goods movement system. Additional mainline rail is necessary to improve capacity.

4. **Travel Time/Reliability:** How much will the project or strategy improve travel time and reliability for both passenger and freight movement?
    a. The **Most** improvement in travel time/reliability would result from additional mainline rail capacity; both for passenger and goods movement.
    b. The **Least** improvement in travel time/reliability would result from improvements to the regional highway system or modifications to operational systems.
        i. The goods movement network in the region shares capacity with passenger and freight traffic. The sheer demand for passenger mobility results in a highly constrained system. Although improvements to the regional network would certainly improve travel time and reliability, the improvements may not be as substantial as desired simply due to the huge demand on the system from both passenger and freight.

5. **Freight Trip Times - Specific Trade Lanes/Corridors:** How much will the project or strategy improve trip time for freight movement?
    a. The **Most** improvement in freight trip times along specific trade lanes/corridors would result from direct capacity enhancements to the specific trade lanes/corridors; with rail representing the area for maximum benefit.
    b. The **Least** improvement in freight trip times along specific trade lanes/corridors would result from increased data and analysis of the system; with limited benefit from projects and strategies not directly adding capacity.
        i. Since the majority of the goods movement within the region moves on a broad and diverse system, the most benefit would occur with improvements to those corridors where the movement of goods can be discretely targeted (e.g. rail lines).
        ii. Note that by improving the corridors where the movement of goods can be discretely targeted, the benefits of improved freight trip times will likely be discretely focused. Within the entire MCGMAP Region, changes to freight trip times would be virtually imperceptible. For the purposes of

this project, the most improvement to freight trip times would be evident on the discrete segment of the goods movement supply chain utilizing the corridor (e.g. international intermodal cargo without an origin or destination within the MCGMAP Region).

6. **Truck Trips - Transport Corridors:** How much will the project or strategy increase truck trips along transport corridors?
    a. The **Most** change in truck trips along transport corridors would result from the addition of truck lanes or facilities; with additional potential from the construction of additional mainline freeway capacity.
    b. The **Least** change in truck trips along transport corridors would result from increased data and analysis of the system; with limited benefit from projects and strategies not directly adding capacity or those that focus on rail goods movement.
        i. The region's highway system serves local, regional, and national goods movement via trucks; therefore, improvements to the region's highway system will change truck trips, and the most change would result from a dedicated system serving trucks. The best solutions will most likely require a large scale / mega project.

7. **Truck Trips - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy increase truck trips between ports, intermodal yards, and warehouse facilities?
    a. The **Most** increase in truck trips between ports, intermodal yards, and warehouse facilities would result from the addition of truck lanes or facilities; with additional potential from the construction of additional mainline freeway capacity as well as improvements and increases to intermodal facilities and yards.
    b. The **Least** increase in truck trips between ports, intermodal yards, and warehouse facilities would result from increased data and analysis of the system; with limited benefit from projects and strategies not directly adding capacity or those that focus on rail goods movement.
        i. Similar to transport corridors, the most change to truck trips between ports, intermodal yards, and warehouse facilities would result from a dedicated system serving trucks; improvements to on-dock rail and increases to intermodal facilities and yards would also change truck trips, specifically drayage truck trips associated with transloaded intermodal cargo.

8. **Truck Traffic Peak/Off-Peak Shares - Transport Corridors:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times along transport corridors?
    a. The **Most** shift in the share of truck traffic from peak to off-peak times along transport corridors would result from the addition of truck lanes or facilities; with additional potential benefits from the use of LCVs on dedicated facilities.
    b. The **Least** shift in the share of truck traffic from peak to off-peak times along transport corridors would result from increased data and analysis of the system and any improvements to rail capacity.

i. The greatest shift in peak and off-peak truck travel along transport corridors would result from increased opportunities for trucks to either travel during peak hours congestion on dedicated facilities with limited congestion (e.g. truck lanes) or to allow increased volumes to travel during off-peak times (e.g. changes to operating hours).

9. **Truck Traffic Peak/Off-Peak Shares - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities?
   a. The **Most** shift in the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities would result from the addition of truck lanes or facilities; with additional potential benefits from the use of LCVs on dedicated facilities.
   b. The **Least** shift in the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities would result from increased data and analysis of the system and any improvements to rail capacity.
      i. The greatest shift in peak and off-peak truck travel a between ports, intermodal yards, and warehouse facilities would result from increased opportunities for trucks to either travel during peak hours of congestion on dedicated facilities with limited congestion (e.g. truck lanes) or to allow increased volumes to travel during off-peak times (e.g. changes to operating hours).

10. **Regional Vehicle Miles of Travel:** How much will the project or strategy reduce regional vehicle miles of travel?
   a. The **Most** reduction in regional VMT would result from the addition of truck lanes or facilities; with additional potential benefit from the addition of mainline freeway capacity.
   b. The **Least** reduction in regional VMT would result from increased data and analysis of the system; with limited benefit from any improvements to rail capacity.
      i. By concentrating truck travel along specific corridors, total congestion could be reduced resulting in changes to travel routes and an overall reduction in VMT; this would occur through capacity enhancements to the region's highway system.
      ii. Note that the MCGMAP Region's overall VMT will maintain a relatively constant level with any assumed highway or rail projects described in this Tech Memo. As a function of total lane-miles of roadway and total vehicle volumes on the regional system, total VMT will show minimal changes when considering projects and strategies located along specific routes or corridors. The qualitative evaluations presented above reflect nominal differences between the least and most reduction. The key point of this qualitative evaluation is that the greatest reduction in VMT would occur through enhancements to the highway system that allow for vehicles to utilize the most direct routes between destinations, without selecting routes based on reduced congestion levels (thereby reducing overall miles traveled). Rail capacity improvements would serve a specific segment of

the MCGMAP Region's goods moved by truck; however, a greater share of the Region's trucks would not be affected by rail capacity improvements and therefore the reduction in VMT would be limited.

11. **Regional Vehicle Hours of Travel:** How much will the project or strategy reduce regional vehicle hours of travel?
    a. The **Most** reduction in regional VHT would result from the addition of truck lanes or facilities; with additional potential benefit from the addition of mainline freeway capacity.
    b. The **Least** reduction in regional VHT would result from increased data and analysis of the system and any improvements to rail capacity.
        i. By concentrating truck travel along specific corridors, total congestion could be reduced resulting in an overall reduction in VHT; this would occur through capacity enhancements to the region's highway system.

12. **Impact on Adjacent Corridors/Regional Balance:** How much will the project or strategy impact adjacent corridors or change the regional balance of passenger and goods movement?
    a. The **Most** impact on adjacent corridors or regional balance would result from projects and strategies that enhance specific goods movement routes or corridors (such as dedicated truck facilities or advanced technologies).
    b. The **Least** impact on adjacent corridors or regional balance would result from increased data and analysis of the system; with limited impact resulting from operational improvements or location-specific improvements.
        i. By providing enhanced capacity along specific goods movement corridors or routes, goods movement traffic would be more likely to shift from adjacent corridors, while non-goods movement traffic may shift to the adjacent corridors; the net result would be noticeable changes to regional balance.

13. **Overall Emissions - Transport Corridors:** How much will the project or strategy reduce overall emissions along transport corridors?
    a. The **Most** reduction to overall emissions along transport corridors would result from alternative technologies (e.g. low- or zero-emission technologies) and improvements to the speed and congestion of goods movement throughout the region.
    b. The **Least** reduction to overall emissions along transport corridors would result from those improvements not enhancing capacity, congestion, and travel speeds.
        i. The key to reducing overall emissions along transport corridors is either maximizing the volume of low- or zero-emission vehicles (e.g. maximize the volume of goods carried by rail or "clean" emerging technologies) or by reducing congestion and delays throughout the regional system for both passenger and freight travel.
        ii. Note that the changes to overall emissions would be centered along the specific corridors utilized by the specific project or strategy; within the MCGMAP Region there would still be significant overall emissions related

to both goods movement and other sources (e.g. automobiles, stationary sources).

14. **Overall Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce overall emissions between ports, intermodal yards, and warehouse facilities?
    a. The **Most** reduction to overall emissions between ports, intermodal yards, and warehouse facilities would result from alternative technologies (e.g. non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **Least** reduction to overall emissions between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. Similar to transport corridors, the most reduction to overall emissions between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g. reducing wait times and bottlenecks at intermodal yards).
        ii. Also similar to transport corridors, the changes to overall emissions between ports, intermodal yards, and warehouse facilities would be centered around the facilities accessed by the specific project or strategy; within the MCGMAP Region there would still be significant overall emissions related to both goods movement and other sources (e.g. automobiles, stationary sources).

15. **PM Emissions - Transport Corridors:** How much will the project or strategy reduce diesel particulate matter emissions along transport corridors?
    a. The **Most** reduction to PM emissions along transport corridors would result from alternative technologies (e.g. non-diesel sources) and a shift from truck to rail .
    b. The **Least** reduction to PM emissions along transport corridors would result from those improvements not enhancing capacity, congestion, and travel speeds.
        i. The key to reducing PM emissions along transport corridors is maximizing non-diesel technologies (e.g. maximize the volume of goods carried by rail or "clean" emerging technologies).
        ii. Note that the changes to PM emissions would be centered along the specific corridors utilized by the specific project or strategy; within the MCGMAP Region there would still be significant PM emissions related to goods movement along other routes.

16. **PM Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce diesel particulate matter emissions between ports, intermodal yards, and warehouse facilities?
    a. The **Most** reduction to PM emissions between ports, intermodal yards, and warehouse facilities would result from alternative technologies (e.g. non-diesel

sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.

b. The **Least** reduction to PM emissions between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
    i. Similar to transport corridors, the most reduction to PM emissions between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g. reducing wait times and bottlenecks at intermodal yards).
    ii. Also similar to transport corridors, the changes to PM emissions between ports, intermodal yards, and warehouse facilities would be centered around the facilities accessed by the specific project or strategy; within the MCGMAP Region there would still be significant PM emissions related to goods movement along other routes.

17. **Health Effects - Transport Corridors:** How much will the project or strategy improve health effects (or reduce the current negative health effects) of goods movement along transport corridors?
    a. The **Most** improvement in health effects (or reduction in current negative health effects) of goods movement along transport corridors would result from alternative technologies (e.g. non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **Least** improvement in health effects (or reduction in current negative health effects) of goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By reducing the volume or congestion of truck traffic along transport corridors, alternative "clean" technologies can be implemented to improve health effects.

18. **Health Effects - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy improve health effects (or reduce the current health effects) of goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **Most** improvement in health effects (or reduction in current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **Least** improvement in health effects (or reduction in current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.

i. The most improvement in health effects between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g. reducing wait times and bottlenecks at intermodal yards).

19. **Community Impacts - Transport Corridors:** How much will the project or strategy reduce community impacts associated with goods movement along transport corridors?
    a. The **Most** reduction in community impacts associated with goods movement along transport corridors would result from those projects that allow for more goods to move on systems separated from communities.
    b. The **Least** reduction in community impacts associated with goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By increasing rail mainline capacity, more trucks could be removed from local communities; also, dedicated truck facilities can separate truck traffic from passenger traffic and direct truck traffic to specific routes to separate from local traffic.
        ii. The evaluation assumes that the benefits of increased rail mainline capacity will offset the impacts; for example, the benefits due to reduced truck volumes, noise, congestion, and emissions would offset (or outweigh) community impacts associated with increased rail mainline capacity, such as increased noise and need for additional right-of-way.
        iii. In addition, the community impacts of goods movement occur along entire routes and are not unique to transport corridors. Therefore, improvements to a transport corridor may lessen community impacts in one designated segment, while having no effect on, or even increasing, community impacts at the end- or mid-points of the corridor. Increased freight volumes along improved separated corridors could also lead to increased community impacts at the end- or mid-points where loading and transloading occur.

20. **Community Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **Most** reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **Least** reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. The most reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would be through the clear separation of goods movement systems and the local system, thereby reducing truck trips and/or truck congestion.

ii. The evaluation assumes that the benefits of separating the goods movement system from the local system will offset the impacts; for example, the benefits due to reduced truck volumes, noise, congestion, and emissions would offset (or outweigh) community impacts associated with separated facilities, such as increased noise and need for additional right-of-way.

iii. In addition, the community impacts of goods movement occur along entire routes and are not unique to ports, intermodal yards, and warehouse facilities. Therefore, improvements to the ports, intermodal yards, and warehouse facilities may lessen community impacts in one designated area, while having no effect on, or even increasing, community impacts along the corridor. Increased freight volumes along improved separated corridors could also lead to increased community impacts at the end- or mid-points where loading and transloading occur.

21. **Land Use Impacts - Transport Corridors:** How much will the project or strategy reduce land use impacts associated with goods movement along transport corridors?
    a. The **Most** reduction in land use impacts associated with goods movement along transport corridors would result from those projects that allow for more goods to move on systems separated from communities.
    b. The **Least** reduction in land use impacts associated with goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By increasing rail mainline capacity, more trucks could be removed from local communities; also, dedicated truck facilities can separate truck traffic from passenger traffic and direct truck traffic to specific routes to separate from local traffic.

22. **Land Use Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **Most** reduction in land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **Least** reduction in land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. The most reduction in land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would be through the clear separation of goods movement systems and the local system, thereby reducing truck trips and/or truck congestion.

23. **Project Revenue/User Fees:** How much will the project or strategy maximize project revenue or user fee generating potential?

a. The **Most** project revenue or user fee generating potential would result from those projects and strategies that target specific market segments of the goods movement system (e.g. national distribution).
b. The **Least** project revenue or user fee generating potential would result from those projects and strategies that do not serve a specific market segment or need.
    i. In order to maximize project revenues and user fees, the users must see a direct benefit in terms of productivity, reliability, efficiency, or another metric of performance.

24. **Regional Economic Output/Competitiveness:** How much will the project or strategy improve the economic output and competitiveness of the region?
    a. The **Most** improvement to the economic output and competitiveness of the region would result from projects and strategies that maintain the system for the movement of goods and associated industries throughout the region, State, nationally, and internationally.
    b. The **Least** improvement to the economic output and competitiveness of the region would result from projects and strategies that do not specifically maintain or enhance the goods movement system.
        i. In general, the region will maintain its competitive economic edge due to a number of factors (e.g. access to Asian trade, role as international gateway, large manufacturing base, large population base).

25. **Jobs/Economic Opportunity:** How much will the project or strategy increase the number of jobs and economic opportunity associated with goods movement in the region?
    a. The **Most** increase to the number of jobs and economic opportunity associated with goods movement in the region would result from projects and strategies that maintain the system for the movement of goods and associated industries throughout the region, State, nationally, and internationally.
    b. The **Least** increase to the number of jobs and economic opportunity associated with goods movement in the region would result from projects and strategies that do not specifically maintain or enhance the goods movement system.
        i. In general, the region will maintain its competitive economic edge due to a number of factors (e.g. access to Asian trade, role as international gateway, large manufacturing base, large population base). This will ensure an increase in jobs and economic opportunity; however, the region must ensure that appropriate training and opportunity is continually provided.

26. **Cost:** What is the overall cost of the project or strategy?
    a. The **Most** costly projects and strategies are those that would require large capital expenditures (e.g. right-of-way acquisition, structures) as well as those projects and strategies requiring extensive regional environmental mitigation.
    b. The **Least** costly projects and strategies are those that would not require new capital expenditures.
        i. The costs for any projects and strategies will be substantial; however, the cost can be offset by improvements in the other 25 categories mentioned above.

ii. Note that it is very difficult to prepare an equitable assessment of costs between all evaluated projects and strategies. For the purposes of this evaluation, any project or strategy that would require right-of-way acquisition (e.g. along specific transport corridors, around existing facilities) was assumed to have the most cost. Although specific costs will vary between the projects and strategies, and some projects and strategies will be substantially less cost than others or could present opportunities for cost savings (e.g. using existing utility easements for new corridor alignments), all projects or strategies requiring right-of-way acquisition will have high costs.

In addition to the initial screening described above, a more detailed evaluation of specific projects and strategies was performed. This detailed evaluation is documented in Tech Memo 6b.

Results of the Initial Screening

The detailed evaluation will focus on those projects and strategies that can be quantifiably evaluated using analytical tools (such as travel demand models, economic models, and GIS tools). The methodology for detailed evaluation (including the type and application of travel demand modeling and other software) was determined through the coordination of a Modeling Working Group. The Modeling Working Group was composed of members of the TAC and key modeling staff from the various project partners. The Modeling Working Group met a number of times in the late summer and fall of 2006 to identify 1) the approach to detailed evaluations, 2) the methodology for detailed evaluations, and 3) the specific strategies/projects for detailed evaluations. It is understood that there are many tools available to model a variety of projects and strategies. For the purposes of this project, the Modeling Working Group identified a set of projects and strategies for evaluation using the Regional Travel Demand Model. The initial objective was to perform a detailed evaluation of a set of projects and strategies that would have regional effects and could be compared across consistent criteria. Therefore, the projects and strategies to be evaluated in Tech Memo 6b are:

1. Expansion of On-Dock Rail at Ports
2. Additional Intermodal Facilities / Freight Yards
3. Implement Alternative Technologies to Additional Intermodal Terminals
4. Construction of Exclusive Truck Lanes
5. Allow Use of LCVs on Dedicated Facilities
6. Additional Freeway Lanes/Capacity
7. Additional Freeway Operational/Safety Improvements
8. Increase Port/Rail Yard Freight Capacity

The eight projects and strategies described above represent a subset of the 15 projects and strategies that will be considered for the Action Plan. The 15 projects and strategies to be included in the Action Plan come from the qualitative evaluations, with the results of the qualitative evaluation used as a method of comparison. The additional data gathered through

the detailed evaluation of projects and strategies will allow for a more in-depth comparison of various projects and strategies.

The projects and strategies are:

1. Expansion of On-Dock Rail at Ports
2. Additional Intermodal Facilities / Freight Yards
3. Increase Port/Rail Yard Freight Capacity
4. Implement Alternative Technologies to Additional Intermodal Terminals
5. Mainline Rail Capacity Improvements
6. Modification of Port Hours of Operation / Delivery Hours
7. Modification of Construction of Exclusive Truck Lanes
8. Allow Use of LCVs on Dedicated Facilities
9. Rail Grade Separations and Grade Crossing Safety Upgrades
10. Application of ITS Technology for Vehicle Management and Routing
11. Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel
12. Data and Analytical Methods
13. Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
14. Additional Freeway Lanes/Capacity
15. Additional Freeway Operational/Safety Improvements

Multi-County Goods Movement Action Plan

Technical Memorandum 6b: Evaluation of Detailed Goods Movement Strategies

Prepared for:

Los Angeles County Metropolitan Transportation Authority
California Department of Transportation
Orange County Transportation Authority
Riverside County Transportation Commission
San Bernardino Associated Governments
Southern California Association of Governments
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EXECUTIVE SUMMARY
Introduction E-1
Purpose of Detailed Evaluation of Projects E-1
Role of Scenarios in Project and Strategy Evaluation E-2

CHAPTER 1 – SYSTEM PERFORMANCE AND REGIONAL ECONOMIC IMPACT OF THE SCENARIOS
System Performance under Scenario 1 1-2
System Performance under Scenarios 2 and 3 1-3
System Performance under Scenarios 4 1-4
Summary of Value and Share of Trade under High Growth 1-5
Economic Impact of Scenarios 1-5
Summary of System Performance and Regional Economic Impact of Scenarios 1-7

CHAPTER 2 – EVALUATION OF PROJECTS AND MODELING RESULTS
Discussion of Detailed Evaluation of Projects 2-1
Application of Travel Demand Model 2-3
Impact of Truck Lanes on Different Sub-Regions 2-17
Are Truck Lanes a Viable Alternative? 2-21
Land Use Analysis 2-29
Conclusions Based on Travel Demand Model and Land Use Analysis 2-33

CHAPTER 3 – POTENTIAL REVENUE GENERATION AND COST ESTIMATE
Evaluation of Potential Revenue Generation 3-1
Evaluation of Longer Combination Vehicles 3-3
Evaluation of the Long-Haul LCV Market Potential 3-4
Evaluation of the Intra-Regional LCV Market Potential 3-5
Combined LCV Market Potential 3-8
Evaluation of Container Fees 3-8
Conclusions Based on Potential Revenue Generation 3-10
Truck Toll Revenue 3-10
Container Fees 3-11
Truck Lane Cost Estimates 3-11
Conclusions Based on Cost Estimates 3-14
Results of Detailed Evaluation 3-16

REFERENCES R-1

FIGURES

Figure 1 – Travel Demand Model Truck Trip Evaluation – Port Trip Attractions vs. Secondary Trip Productions 1-4
Figure 2 – Value and Share of Trade Los Angeles Customs District, 2005-2030 ($billions) 1-5
Figure 3 – Bundle 1 – Year 2030 Truck Volumes 2-5
Figure 4 – Bundle 2 – Year 2030 Truck Volumes 2-6
Figure 5 – Bundle 3 – Year 2030 Truck Volumes 2-7
Figure 6 – Bundle 4 – Year 2030 Truck Volumes 2-8
Figure 7 – Bundle 5 – Year 2030 Truck Volumes 2-9
Figure 8 – Bundle 6 – Year 2030 Truck Volumes 2-10
Figure 9 – Bundle 7 – Year 2030 Truck Volumes 2-11
Figure 10 – Bundle 8 – Year 2030 Truck Volumes 2-12
Figure 11 – Bundle 9 – Year 2030 Truck Volumes 2-13
Figure 12 – Bundle 10 – Year 2030 Truck Volumes 2-14
Figure 13 – Bundle 11 – Year 2030 Truck Volumes 2-15
Figure 14 – Bundle 12 – Year 2030 Truck Volumes 2-16
Figure 15 – Year 2030 Heavy Truck Volume External (Outside the Region) Origin/Destination 2-19
Figure 16 – Reduction in Hours of Delay for Vehicles and Trucks (Year 2030 Baseline vs. Bundles Containing Truck Lanes from the SPB Ports to Victorville) 2-20
Figure 17 – Comparison of Year 2030 Truck and Vehicle Volumes along the Bundle 2 Network (Compares Baseline Volumes with the Operational and the Truck Lane Improvements from the SPB Ports to Victorville) 2-22
Figure 18 – Reduction in Hours of Delay for Vehicles and Trucks (Year 2030 Baseline vs. All Bundles) 2-24
Figure 19 – Comparison of Year 2030 Truck and Vehicle Volumes along the Bundle 2 Network (Compares Baseline Volumes with the Operational and the Advanced Technology Improvements from the SPB Ports to Victorville) 2-26
Figure 20 – Reduction in Hours of Delay for Vehicles and Trucks (Year 2030 Baseline Volumes Vs. Bundles containing Truck Lanes and Advanced Technology Corridor Alternative from the SPB Ports to Victorville) 2-28
Figure 21 – Attraction Density of Heavy Trucks (Daily 2030) from Port (TAZ 1164) 3-6
Figure 22 – Potential Bonding Capacity from Container Fees Range of Container (FEU) Fee: $10 – $200 Per FEU 2030 Projection of FEU's: Low, Medium, and High (in Millions) 3-9

Figure 23 – Potential Bonding Capacity from Container Fees Range of Fee per FEU: $10 – $200 Per FEU Projected FEU's: 1,215,000 ($, 000) 3-10

TABLES

Table 1 – Average Daily Volumes by Bundle – Year 2030 2-17
Table 2 – Summary of Year 2030 Truck and Vehicle Volumes along Bundle 2 Network ... 2-23
Table 3 – Summary of Year 2030 Truck and Vehicle Volumes along Bundle 2 Network (Compares Baseline Volumes with the Operational and the Advanced Technology Improvements from the SPB Ports to Victorville)..... 2-27
Table 4 – Schools and Residential Land Uses by Bundle within the SCAG Region..... 2-30
Table 5 – Warehouse/Distribution Land Uses by Bundle within the SCAG Region 2-31
Table 6 – Potential Toll Revenue Generation Year 2030 for a Truck Lane System that Includes an East-West Connection between I-710 and I-15 3-1
Table 7 – Potential Vehicle Miles Travel (VMT) Year 2030 for a Truck Lane System that Includes an East-West Connection between I-710 and I-15 3-2
Table 8 – Percent Trucks Using Toll Lanes for Each Bundle – Year 2030..... 3-2
Table 9 – LCV Market Conversion Rates Based on National Studies..... 3-4
Table 10 – 2030 SCAG Region LCV Volume & VMT from Long-Haul Truck Market..... 3-5
Table 11 – Port Container LCV Market – Daily Truck Trips (2030)..... 3-7
Table 12 – VMT and Revenue Estimates for Container Truck LCVs 3-7
Table 13 – Cost Estimates for Truck Lane Systems..... 3-13
Table 14 – Estimated Bonding Capacity from Truck Toll Lanes (Billlions) 3-15

Introduction

Technical Memorandum 6b (Tech Memo 6b) continues with the evaluation of goods movement projects and strategies first introduced in Tech Memo 6a, which is part of Task 6 of the Multi-County Goods Movement Action Plan (MCGMAP). The purpose of this task is to identify and investigate a wide range of transportation options to address the identified issues, challenges and problems related to goods movement within the MCGMAP Region. The identification and investigation of transportation options will result in a refined list of projects and strategies that will be incorporated into the Action Plan. This Tech Memo outlines the second of two phases to identify and investigate the various projects and strategies that will be refined for incorporation into the Action Plan.

This Tech Memo documents the detailed evaluation of a refined list of projects and strategies first presented in Tech Memo 6a. As discussed in Tech Memo 6a, the detailed evaluation focuses on those projects and strategies that can be quantifiably evaluated using analytical tools (such as travel demand models, economic models, and GIS tools). The methodology for detailed evaluation (including the type and application of travel demand modeling and other software) was determined through the coordination of a Modeling Working Group. The Modeling Working Group was composed of members of the TAC, key modeling staff from the various project partners, as well as consultant staff working for project partners on various modeling components. The Modeling Working Group met a number of times in the late summer and fall of 2006 to identify 1) the approach to detailed evaluations, 2) the methodology for detailed evaluations, and 3) the specific strategies/projects for detailed evaluations. It is understood that there are many tools available to model a variety of projects and strategies. For the purposes of this project, the Modeling Working Group identified a set of projects and strategies for evaluation using the Regional Travel Demand Model. The initial objective was to perform a detailed evaluation of a set of projects and strategies that would have regional effects and could be compared across consistent criteria.

Purpose of Detailed Evaluation of Projects

The purpose of the detailed evaluation is to answer the following questions, initially raised in the MCGMAP's scope of work:

- To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? In other words, would they be a cost-effective investment?
    - This will be answered by comparing the system performance of the bundles that include dedicated truck lanes.
- What portion of dedicated truck lane costs could be offset by user financing, and what additional revenues or funding sources would be needed to support dedicated truck lanes?

    - This will be answered through an evaluation of toll revenue generation potential, described in Chapter 3.
- What policy changes would facilitate or enhance truck lane feasibility? (e.g., LCV's, mandatory use, etc.)?
    - This will be answered through an evaluation of LCV operations, described in Chapter 3.
- Can dedicated truck lanes offer sufficient benefits to be a preferable alternative to other ways of accommodating increased freight traffic (such as adding mixed-flow lanes, adding rail capacity, etc.)?
    - This will be answered by comparing the system performance of the dedicated truck lane bundles to the system performance of the mixed-flow (Bundle 1), alternative technology (Bundle 11), and mixed-flow toll expressway (Bundle 10) bundles.
- What may be the differential effects of the construction of truck lanes on different sub-regions (i.e. the specific types of benefits and impacts that may occur to different sub-regions, depending on facility location)?
    - This will be answered by comparing impacts of truck lane bundles across subregions (defined as segments of each bundle route through the MCGMAP Region).

Following the detailed evaluation, a list of projects and strategies with associated evaluation results (both detailed and qualitative) will be available for use in the MCGMAP. The Action Plan will be developed with an understanding of the projects and strategies, and the evaluation results will provide the means for comparison.

Role of Scenarios in Project and Strategy Evaluation

As first introduced in Tech Memo 6a, the projects and strategies discussed in this Tech Memo represent options above and beyond those options currently included in the committed funding plans of the MCGMAP project partners. As discussed in Tech Memo 4a, the committed funding plans of the MCGMAP project partners represent one of the four scenarios investigated as a part of the MCGMAP. The scenarios (from Tech Memo 4a) are:

- Scenario 1: High Growth - Current Investment Levels
- Scenario 2: Low Growth – Current Investment Levels
- Scenario 3: Moderate Growth - Current Investment Levels
- Scenario 4: High Growth - Full Investment Levels

Specifically, the committed funding plans of the MCGMAP project partners represent the "current investment levels" specified under Scenarios 1, 2, and 3.

The "full investment levels" would require additional investment beyond the existing committed funding plans of the MCGMAP project partners; which is exactly what this Tech

Memo summarizes. Therefore, the projects and strategies described in this Tech Memo are assumed to be implemented under Scenario 4: High Growth - Full Investment Levels.

Note that under the "current investment level" scenarios, the MCGMAP Region's infrastructure and goods movement system would perform differently. As summarized in Tech Memo 4b, future highway and rail system performance will deteriorate if the "high growth" of international container cargo occurs while maintaining "current investment levels." When the existing system performance is reviewed, as summarized in Tech Memo 3, it is clear that the existing system performs at constrained levels under significant daily and peak hour congestion. Therefore, it can be concluded that if "current investment levels" are maintained, any additional growth in highway and rail volumes will result in further degraded system performance as well as the associated environmental and community impacts. Tech Memo 4a clearly showed that even if the significant growth in international container cargo is offset through diversion to other Ports or other factors (e.g., changes in trade policy, global unrest), there would still be growth at the Ports of Los Angeles and Long Beach and associated growth in volumes on the MCGMAP Region's rail and highway system. In conclusion, the scenarios assuming "current investment levels" would result in impacts to both system performance and the MCGMAP Region's environment and communities.

This Tech Memo also presents a summary analysis of the economic and system conditions under the other scenarios representing the committed funding plans of the MCGMAP project partners (i.e. Scenarios 1, 2, and 3). The summary of the regional economic impact of Scenarios 1, 2, and 3 is presented in the following chapters.

Chapter 1 – System Performance and Regional Economic Impact of the Scenarios

The concept of four Scenarios representing various trade growth and investment levels was first presented in Tech Memo 4a. The purpose of scenarios is to help stakeholders collaborate and to make strategic decisions about their future, and to identify and investigate a wide range of transportation options to address the identified issues, challenges and problems related to goods movement within the MCGMAP Region. The scenarios represent a range of future outcomes and provide a framework for evaluating and determining specific strategies.

In this Tech Memo, the Scenarios are presented with an accompanying discussion of their respective systems performance and economic impacts. For the purposes of this project, three of the four scenarios represent current investment levels, and therefore do not include assumptions for additional investment (and associated projects) above already committed funding plans. Therefore, in order to accurately evaluate projects and strategies for goods movement, only a scenario that assumes additional investment above already committed funding plans can be used.

The discussion of Scenarios 1, 2, and 3 below will show the effects of changes to forecast trade volumes on the existing goods movement system with no additional investment beyond committed funding levels. The discussion of Scenario 4 will therefore highlight the performance of various projects and strategies that will require additional investment.

As described in Tech Memo 4a, the Scenarios are based on the following assumed changes to the forecast trade volumes through the Ports of Long Beach and Los Angeles:

- Scenario 1: High Growth - Current Investment Levels
  - Assumes port throughput will increase as currently projected.
  - Assumes 42.5 million TEUs annually in 2030.
- Scenario 2: Low Growth – Current Investment Levels
  - Assumes growth will be limited to 33% of the base line growth.
  - This results in 24 million TEUs in 2030, calculated as follows:
    - The net change between the 2005 level of 14.2 million TEUs and the base case forecast of 42.5 million TEUs is 28.3 million TEUs.
    - 33% of 28.3 million TEUs is 9.3 million TEUs.
    - 9.3 million added to the 2005 base of 14.2 million is 23.5 million TEUs, or 24 million TEUs, rounded up to the nearest million.
- Scenario 3: Moderate Growth - Current Investment Levels
  - Assumes growth will be limited to 66% of the base line growth.
  - This results in a lower forecast for 2030 of approximately 33 million TEUs, calculated as follows:
    - The net change between the 2005 level of 14.2 million TEUs and the base case forecast of 42.5 million TEUs is 28.3 million TEUs.
    - 66% of 28.3 million TEUs is 18.7 million TEUs.

- 18.7 million added to the 2005 base of 14.2 million is 32.9 million TEUs, or 33 million TEUs, rounded up to the nearest million.

- Scenario 4: High Growth - Full Investment Levels
  - Assumes port throughput will increase as currently projected.
  - Assumes 42.5 million TEUs annually in 2030

The purpose of evaluating the system performance and regional economic impact of the Scenarios is to begin to answer the question "To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? In other words, would they be a cost-effective investment?"

System Performance under Scenario 1

As first defined in Tech Memo 4a, Scenario 1 represents future conditions assuming container volumes through the San Pedro Bay ports triple from 14.2 million TEUs in 2005 to 42.5 million TEUs by 2030[1] while maintaining the current level of investment for the MCGMAP Region's highway and rail system. The performance of the MCGMAP Region's system is summarized in Tech Memo 4b. Tech Memo 4b concludes that the future performance of the MCGMAP study area's rail and highway network is directly linked to the substantial increase in volumes forecast. As shown in Tech Memo 4a, both freight and passenger volumes are forecast to increase on all MCGMAP study area rail lines and highways. Current planning efforts have identified a number of required improvements to accommodate baseline future conditions; however, the system will still face performance challenges.

On the MCGMAP study area rail lines, increased freight volumes to and from the Ports of Los Angeles and Long Beach combined with increased passenger rail service along already congested lines will lead to potential delays along the rail network. The delays would increase on the BNSF freight line from 32 minutes in 2000 to 206 minutes by 2010 and on the UP freight line from 30 minutes in 2000 to 197 minutes by 2010 per train. These delays will impact both passenger service and freight supply chains. Planning efforts are underway; however, there is still an identified capacity constraint in terms of the number of tracks available and the demand for both passenger and freight service along shared lines.

The MCGMAP study area highways will see a similar increase in both freight and passenger volumes. The baseline forecasts for the SCAG region show approximately 3,096,000 truck trips per day. Truck trips would account for approximately 39,482,000 vehicle miles of travel (VMT) per day out of the approximately 508,807,000 VMT for all vehicles. Significant delays and capacity constraints will occur along portions of I-5, I-405, I-15, I-215, SR-14, I-10, I-710, SR-60, US-101, and I-110. The performance measures discussed in this report take into account baseline improvements identified through recent planning efforts; however, it is clear that substantial congestion and delays would continue to persist without improving system capacity.

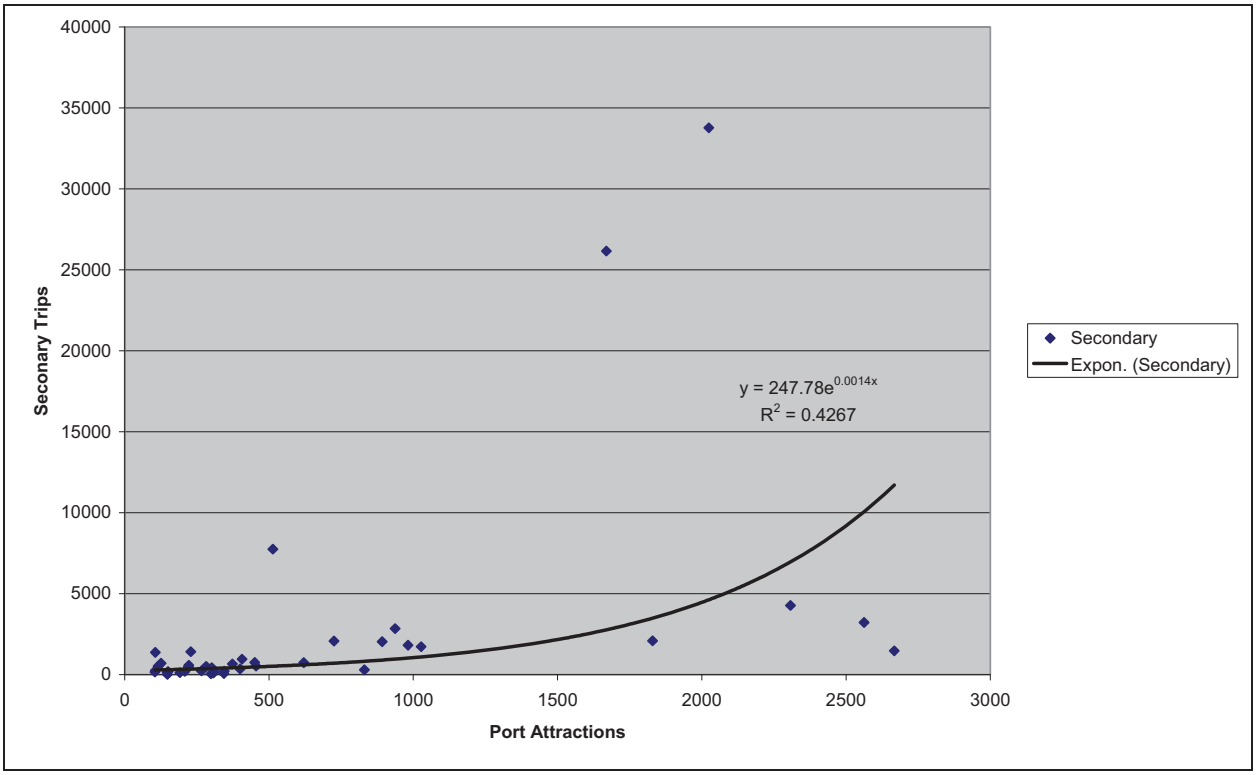
System Performance under Scenarios 2 and 3

An important question stemming from the development of the lower trade scenarios is whether lower than expected trade volumes will have a sustainable impact on the study area's transportation system. In order to evaluate the performance of the highway and rail systems as a result of the low to moderate trade forecasts under Scenarios 2 and 3, respectively, it is critical to determine whether there is a relationship between the San Pedro Bay Port trade volumes and regional truck trips. Heavy truck trips that are generated (produced) at the same zone as the attraction for heavy truck trips from the port are considered secondary truck trips. An example of this would be a truck that travels from the San Pedro Bay ports with a loaded container, stops at a warehouse location in the Inland Empire to unload the container, and the goods within the container are then separated and transferred to a number of other trucks for regional or local delivery; the truck trips for regional or local delivery would be classified as secondary trips.

Based on an evaluation of port-related and secondary trips at various zones, there is no direct linkage (currently) between travel demand model generated regional truck traffic and San Pedro Bay Port trade volume forecasts, as is shown in the following graph. Therefore, application of a travel demand forecasting model was not available as an evaluation method for the systems performance of Scenarios 2, and 3.

Figure 1 below clearly shows the lack of a direct relationship between the number of port-related truck trips into a location (port trip attractions) compared to the non-port-related truck trips leaving a location (secondary trip productions). Therefore, it would not be possible to accurately estimate the changes in total truck trips within the MCGMAP Region if the volume of truck trips to and from the San Pedro Bay ports declined (due to reduced container cargo volumes). It is assumed that a relationship between port-related truck trips and secondary truck trips exists; however, without technical linkage, no quantifiable analysis can be completed.

Figure 1
Travel Demand Model Truck Trip Evaluation
Port Trip Attractions vs. Secondary Trip Productions



Source: Wilbur Smith Associates, 2007.

The lack of a direct linkage (currently) between travel demand model generated regional truck traffic and San Pedro Bay Port trade volume forecasts highlights the nature of goods movement by truck within the MCGMAP Region. Although port-related truck traffic is substantial, especially closer to the San Pedro Bay Ports, it is not the only generator of truck traffic in the study area. A substantial amount of truck traffic within the study area is dedicated to local and regional delivery of domestic cargo; therefore, changes in port container cargo volumes would have little direct effect.

Later in this Tech Memo, the systems performance of a strategy to reduce truck traffic out of the San Pedro Bay Ports is evaluated. Although not specifically related to the Scenarios described above, the systems performance discussion of a strategy to reduce port-related truck trips can provide valuable information relating to potential lower than expected trade volumes.

System Performance under Scenario 4

As first defined in Tech Memo 4a, Scenario 4 represents future conditions assuming container volumes through the San Pedro Bay ports reach 42.5 million TEUs by 2030 and include additional investment for the MCGMAP Region's highway and rail system. This Tech Memo documents the

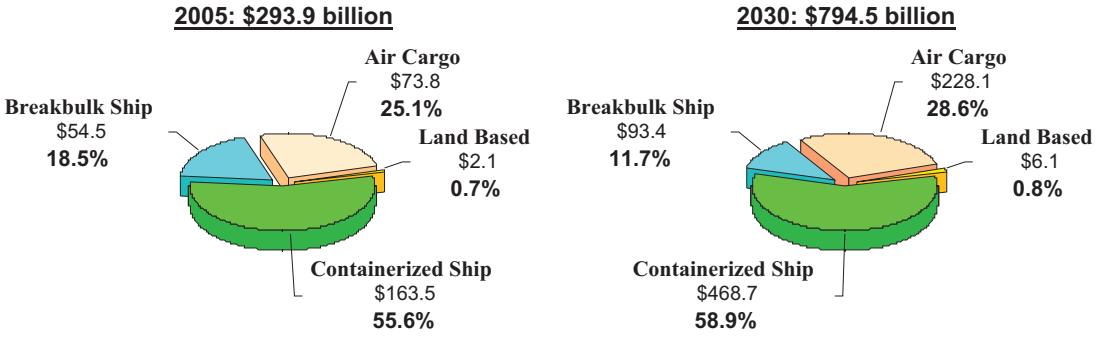
system performance of a number of projects and strategies that would require additional investment.

Summary of Value and Share of Trade under High Growth

Assuming that international containers grow at the current rate forecast by the Ports of Long Beach and Los Angeles, 42.5 million TEUs annually would travel through the San Pedro Bay Ports in 2030. The source and background statistics for this forecast was documented in Tech Memo 4a.

Based on an evaluation of Year 2005 trade through the San Pedro Bay Ports, as well as other regional goods movement, the following estimates of the value and share of trade in the MCGMAP region for the Year 2030 is presented below.

Figure 2
Value and Share of Trade
Los Angeles Customs District, 2005 – 2030 ($billions)



Source: Los Angeles Customs District & Economics & Politics, Inc.

Economic Impact of Scenarios

The economic data presented above was used to calculate the impact of reduced trade (e.g., Scenarios 2 and 3) on the region's job market. For the purposes of the MCGMAP, economic impact is primarily quantified in terms of direct and non-direct jobs due to trade volumes through the Ports of Long Beach and Los Angeles.

In addition to the economic impact of the scenarios in terms of job creation, it can be assumed that changes in container cargo volumes through the San Pedro Bay Ports would impact the MCGMAP Region's economy in other ways. Although there would be no difference in the cost of infrastructure to support any of the three trade growth forecasts under Scenarios 1, 2, and 3, the reduction in required transportation equipment (e.g., truck and rail) could result in reduced annual operation and maintenance costs.

Similar to the discussion of the relationship of container cargo forecasts to secondary truck trips, it is difficult to quantify the economic impacts of reduced trade forecasts in terms of sales tax and household income. The clearest linkage between trade forecasts and the MCGMAP Region's economy can be found in job creation statistics; therefore, job creation statistics are used to define economic impacts.

Economic Impact of Scenario 1: High Growth – Current Investment Levels

Under Scenario 1, Southern California's ports would support 857,000 direct jobs. Deducting for the jobs financed from within the region leaves 625,610 financed externally. Applying the multiplier yields a total of 1,370,086 jobs externally supported jobs of which 744,476 would be in the general economy. Adding these secondary jobs to direct port supported jobs, the total 2030 employment impact of trade through the ports would be 1,601,476 jobs.

Economic Impact of Scenario 2: Low Growth – Current Investment Levels

Under Scenario 2, Southern California's ports would support 542,142 direct jobs. Deducting for the jobs financed from within the region leaves 395,764. Applying the multiplier yields a total of 866,722 jobs supported externally of which 470,959 would be in the general economy. Adding these secondary jobs to direct port supported jobs, the total 2030 employment impact of trade through the ports would be 1,013,101 jobs. There would be 314,858 fewer direct port related jobs and 588,376 fewer jobs in the economy due to port growth being severely inhibited, reductions of -36.7%.

Economic Impact of Scenario 3: Moderate Growth – Current Investment Levels

Under Scenario 3, Southern California's ports would support 697,539 direct jobs. Deducting for the jobs financed from within the region leaves 509,203. Applying the multiplier yields a total of 1,115,155 jobs externally supported. Of these, 605,952 would be in the general economy. Adding these secondary jobs to direct port supported jobs, the total 2030 employment impact of trade through the ports would be 1,303,490 jobs. There would be 159,462 fewer direct port related jobs and 297,986 fewer jobs in the economy due to port growth being inhibited, reductions of -18.6%.

Economic Impact of Scenario 4: High Growth – Full Investment Levels

Scenario 4 would result in identical job creation as Scenario 1. Scenario 4 would allow for increased system performance and reliability, and the actual investment levels required to support

the improved system are described in greater detail under the detailed evaluation presented in subsequent sections of this Tech Memo.

Summary of System Performance and Regional Economic Impact of Scenarios

Based on the discussions of system performance and economic impacts of the various trade growth scenarios described above, the following question can begin to be answered:

1. To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? In other words, would they be a cost-effective investment?
    a. In terms of economic benefits, it is clear that additional investment in the transportation system beyond current levels will be required in order to accommodate the forecast growth in container cargo volumes through the San Pedro Bay Ports; otherwise, the system will be constrained and will perform at less than optimal levels. The forecast growth in container cargo will result in increased truck traffic on the MCGMAP Region's highway system. Therefore, not accommodating the additional truck traffic could lead to less than expected growth in container cargo, which could lead to the reduced job creation forecasts discussed above and a related economic impact; conversely, accommodating truck traffic will lead to economic benefits.
    b. Additional analysis is included later in this Tech Memo to analyze the cost of dedicated truck lanes.
    c. This Tech Memo also shows that much more detailed information and analyses would be required in order to accurately respond to the question, particularly in the area of air quality improvements and associated costs.

[1] Ports of Long Beach and Los Angeles, 2006.

Chapter 2 – Evaluation of Projects and Modeling Results

Discussion of Detailed Evaluation of Projects

The detailed evaluation will focus on the following projects and strategies. Many of these projects and strategies will be evaluated under Scenario 4; however, some of the projects and strategies are complementary to increased trade volumes and therefore are assumed to be in place and are not expressly evaluated.

1. **Expansion of On-Dock Rail at Ports:** The Year 2030 forecast of 42.5 million TEUs through the San Pedro Bay Ports assumes maximum expansion of on-dock rail at the Ports; therefore, all detailed evaluations assume this project and strategy is in place.

2. **Additional Intermodal Facilities / Freight Yards:** Additional intermodal facilities and freight yards would be required to support the volume of goods forecast through the Ports; therefore, all detailed evaluations assume this project and strategy is in place.

3. **Implement Alternative Technologies to Additional Intermodal Terminals:** The effects of alternative technologies (e.g., non-truck systems) to link the Ports to inland intermodal terminals.

4. **Construction of Exclusive Truck Lanes:** The effects of dedicated freight guideways (e.g., exclusive truck lane systems) along major regional goods movement corridors, including between the Ports and inland destinations, from within the region to external locations, and through the region from the U.S. / Mexico border to external locations. This also includes the potential toll revenue generation.

5. **Allow Use of LCVs on Dedicated Facilities:** The effects (in terms of potential toll revenue generation) of LCVs on dedicated facilities (e.g., truck lanes or a dedicated freight guideway system).

6. **Additional Freeway Lanes/Capacity:** The effects of adding general purpose mainline capacity along regional highways. This includes HOV systems.

7. **Additional Freeway Operational/Safety Improvements:** The effects of operational / safety (e.g., auxiliary lanes, truck climbing lanes) along regional highways.

8. **Increase Port/Rail Yard Freight Capacity:** Increased port/rail yard freight capacity would be required to support the volume of goods forecast through the Ports; therefore, all detailed evaluations assume this project and strategy is in place.

The projects and strategies described above will have some measurable effect by addressing an identified congestion or mobility issue for goods movement. It is likely that a combination of

complementary individual projects and strategies will be unified into a single action in order to provide maximum benefits.

In order to evaluate the projects and strategies described above, 12 bundles were identified. These bundles represent complete systems of projects and strategies and were modeled using SCAG's regional travel demand forecasting model. The 12 bundles were determined through coordination with the Modeling Working Group (described in detail in Tech Memo 6a). For the purposes of this project, the Modeling Working Group identified a set of projects and strategies for evaluation using the Regional Travel Demand Model. The initial objective was to perform a detailed evaluation of a set of projects and strategies that would have regional effects and could be compared across consistent criteria. The result is the 12 bundles summarized below:

1. Strategic freeway widening, bottleneck relief, auxiliary lanes, interchange improvements on freeways carrying heavy flows of truck traffic. This included operational and safety improvements along I-710, I-10, SR-60, I-15, I-5, SR-39, SR-55, SR-57, SR-91, I-405, I-605, I-110, and SR-86. The complete list of projects included in Bundle 1 is presented in Appendix A as well as figures identifying the locations of the projects.
    - Note that the projects included in Bundle 1 are primarily taken from SCAG's 2004 RTP and represent non-truck lane improvements not included under existing committed funding plans. For the purposes of this project, no additional non-truck lane improvements are included in this bundle. Therefore, this bundle is classified as strategic improvements, as they address already identified areas of concern.
2. Dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to SR-60), SR-60 (I-710 to I-15), and I-15 (SR-60 to Victorville).
3. Dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to I-10), I-10 (I-710 to I-15), and I-15 (I-10 to Victorville).
4. Dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to SR-91), SR-91 (I-710 to I-15), and I-15 (SR-91 to Victorville).
5. Dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to I-10), two Westbound truck lanes I-10 (I-710 to I-15), two Eastbound truck lanes SR-60 (I-710 to I-15), two Northbound truck lanes I-15 (SR-60 to I-10), and dedicated truck lanes (2 lanes in each direction) on I-15 (I-10 to Victorville).
6. Dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to SR-91), SR-91 (I-710 to SR-57), SR-57 (SR-91 to SR-60), SR-60 (SR-57 to I-15), and I-15 (SR-60 to Victorville).
7. Dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to SR-91), SR-91 (I-710 to I-605), I-605 (SR-91 to I-10), I-10 (I-605 to I-15), and I-15 (I-10 to Victorville).
8. Dedicated truck lanes (2 lanes in each direction) on I-5 (I-710 to Kern County).
9. Dedicated truck lanes (2 lanes in each direction) on I-5 (U.S./Mexico Border to Kern County).
10. Mixed-flow toll expressways (2 lanes in each direction) for autos and light trucks on I-710 (Ports to SR-60), SR-60 (I-710 to I-15), and I-15 (SR-60 to Victorville).
11. Alternative technologies (e.g., Shuttle Trains, Maglev) to move goods between POLA/POLB and inland destinations.

12. Dedicated truck lanes (2 lanes in each direction) on I-15 (U.S./Mexico Border to Victorville).

The 12 bundles above can be classified as mixed-flow, operational improvement, dedicated truck lane, mixed-flow toll lane, and alternative technology applications. The bundles above will also be used to test the revenue generating potential of truck tolls, as well as the potential for LCV application. The primary purpose of the bundles described above is to answer the following questions, initially raised in the MCGMAP's scope of work:

- To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? In other words, would they be a cost-effective investment?
    - This will be answered by comparing the system performance of the bundles that include dedicated truck lanes.
- What portion of dedicated truck lane costs could be offset by user financing, and what additional revenues or funding sources would be needed to support dedicated truck lanes?
    - This will be answered through an evaluation of toll revenue generation potential, described in Chapter 3.
- What policy changes would facilitate or enhance truck lane feasibility? (e.g., LCV's, mandatory use, etc.)?
    - This will be answered through an evaluation of LCV operations, described in Chapter 3.
- Can dedicated truck lanes offer sufficient benefits to be a preferable alternative to other ways of accommodating increased freight traffic (such as adding mixed-flow lanes, adding rail capacity, etc.)?
    - This will be answered by comparing the system performance of the dedicated truck lane bundles to the system performance of the mixed-flow (Bundle 1), alternative technology (Bundle 11), and mixed-flow toll expressway (Bundle 10) bundles.
- What may be the differential effects of the construction of truck lanes on different sub-regions (i.e. the specific types of benefits and impacts that may occur to different sub-regions, depending on facility location)?
    - This will be answered by comparing impacts of truck lane bundles across subregions (defined as segments of each bundle route through the MCGMAP Region).

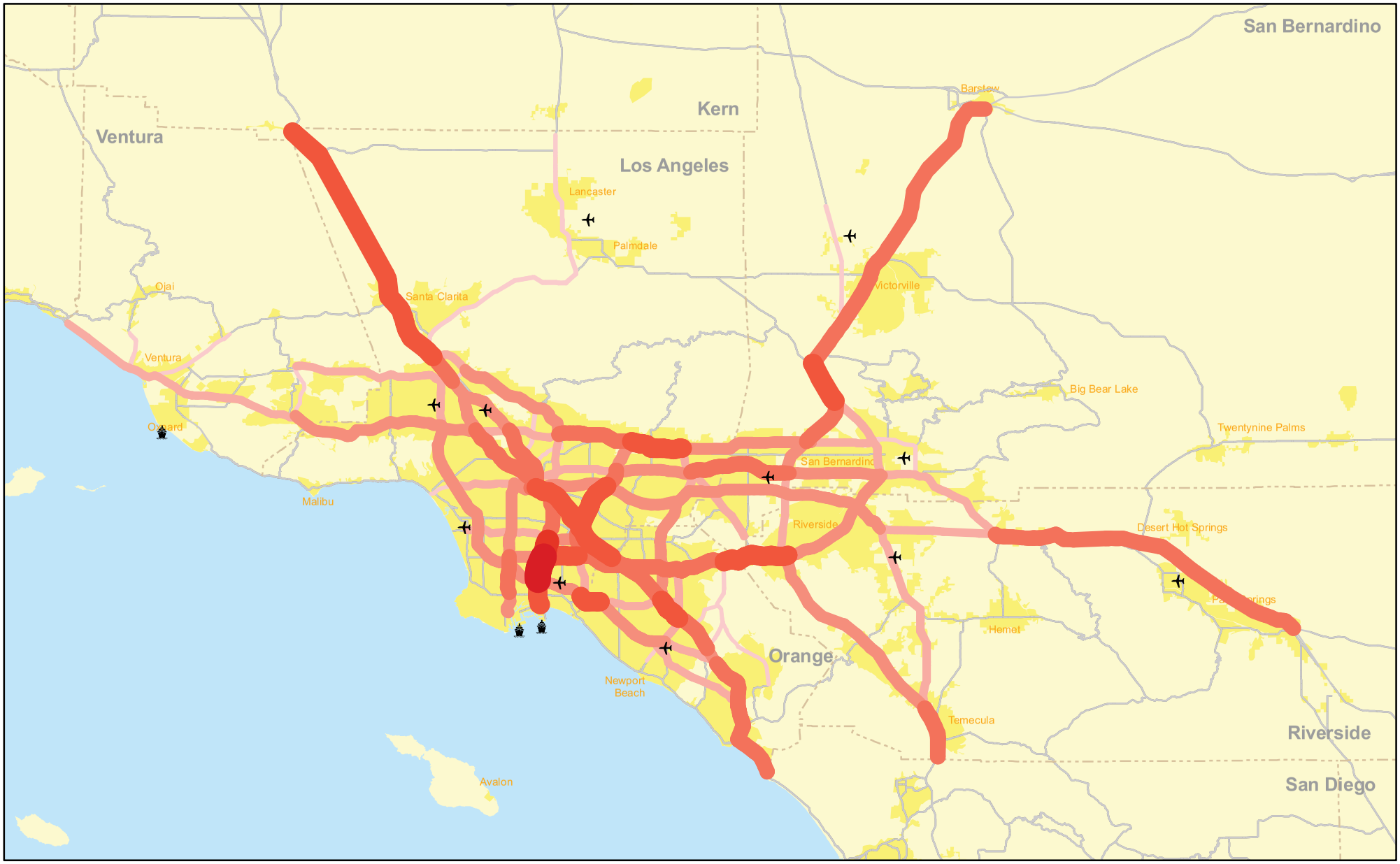
Application of Travel Demand Model

Given the congestion of the regional transportation network under Year 2030 baseline conditions, it is clear that additional capacity would be beneficial along any route. The application of the travel demand model is consistent with this understanding.

For each of the 12 bundles, network improvements were made to the Year 2030 baseline network (representing projects included under the committed funding plans of MCGMAP project partners, or Scenarios 1, 2, and 3) consistent with the specific bundles. The SCAG travel demand forecasting model was then used to evaluate system performance under each of the bundles. Year 2030 baseline network performance was documented in Tech Memo 4b.

Note that all model runs were completed by SCAG modeling staff consistent with the methodologies applied for all RTP and other regional modeling. This includes an iterative process of running the travel demand model vehicle assignment mode a number of times. Close coordination between project team and SCAG staff occurred and information was exchanged on a daily basis.

As shown on the figures below, the addition of dedicated truck lanes along any combination of regional freeways would result in increased truck volumes along those routes. The truck and vehicle volumes shown in the following figures represent one component of future systems performance under the project bundles. For the purposes of this project, volume data is used as the primary source for comparison of bundles. As the travel demand model allocates vehicle and truck volumes along routes based on available capacity, changes in volumes are indicative of changes in congestion level and therefore operational performance.



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 1

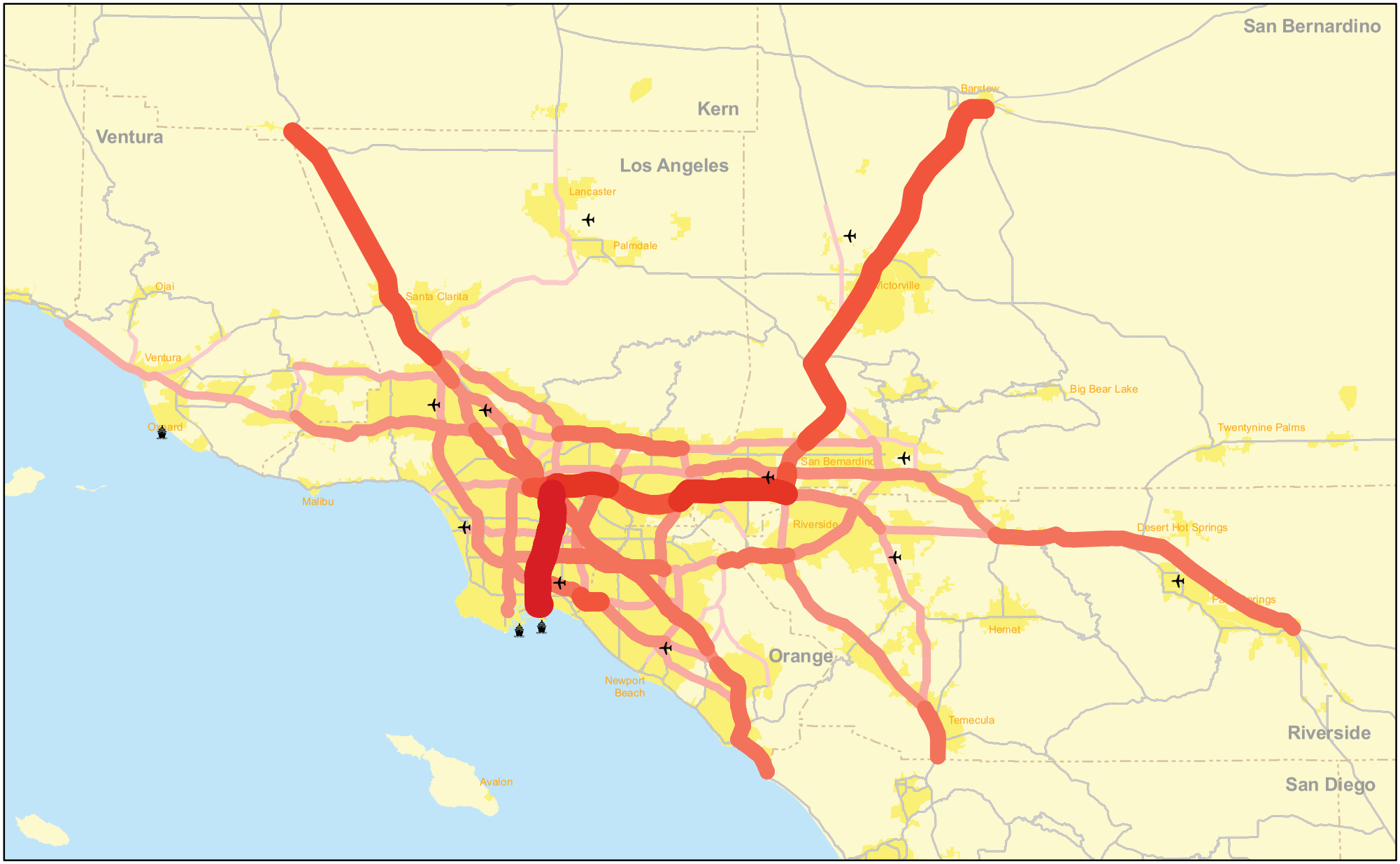
Lowest Investment/Strategic Improvements

0 5 10 20 30 40 Miles

Figure 3

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 2 Truck Lanes

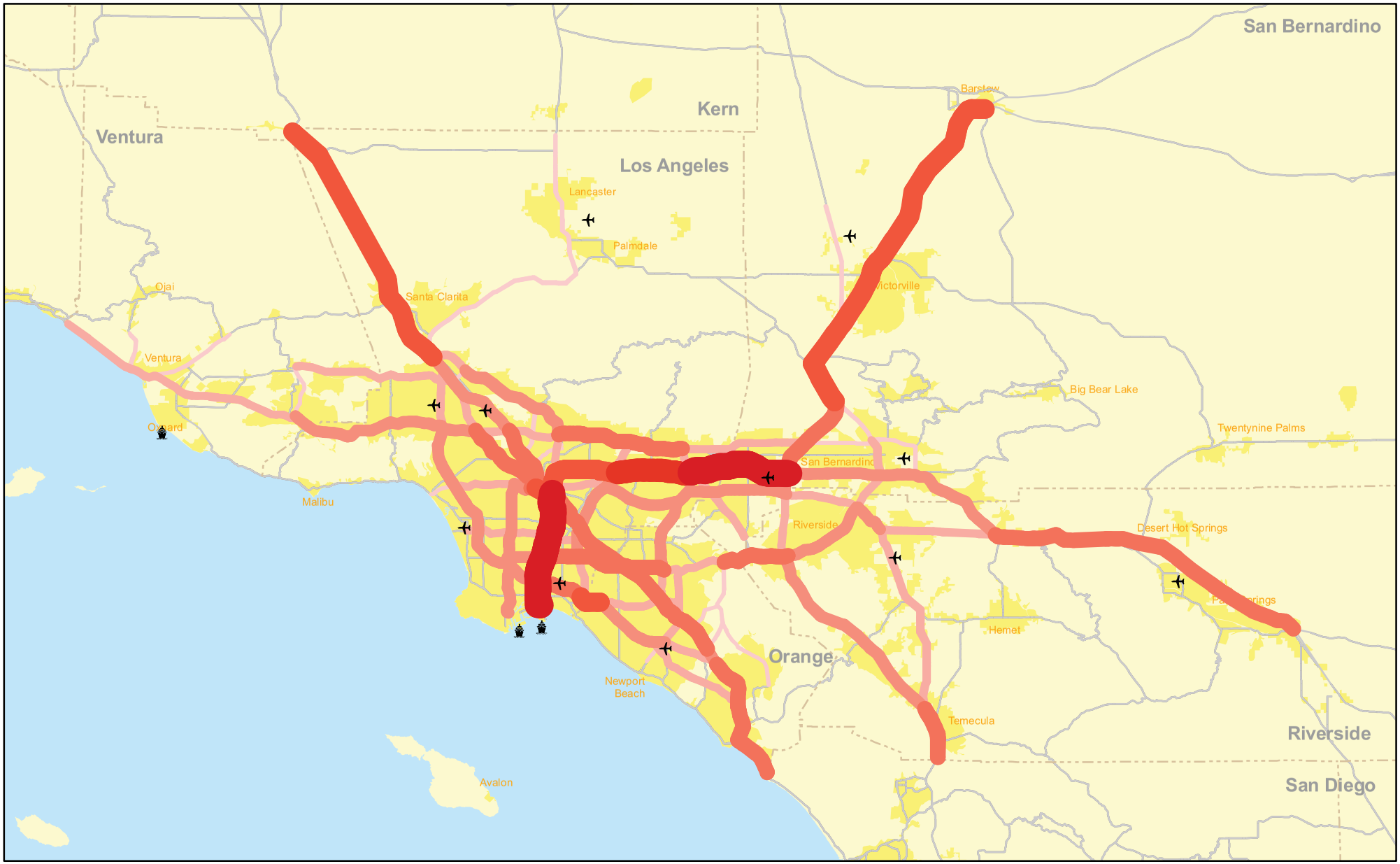
710 > 60 > 15

0 5 10 20 30 40 Miles

Figure 4

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 3 Truck Lanes

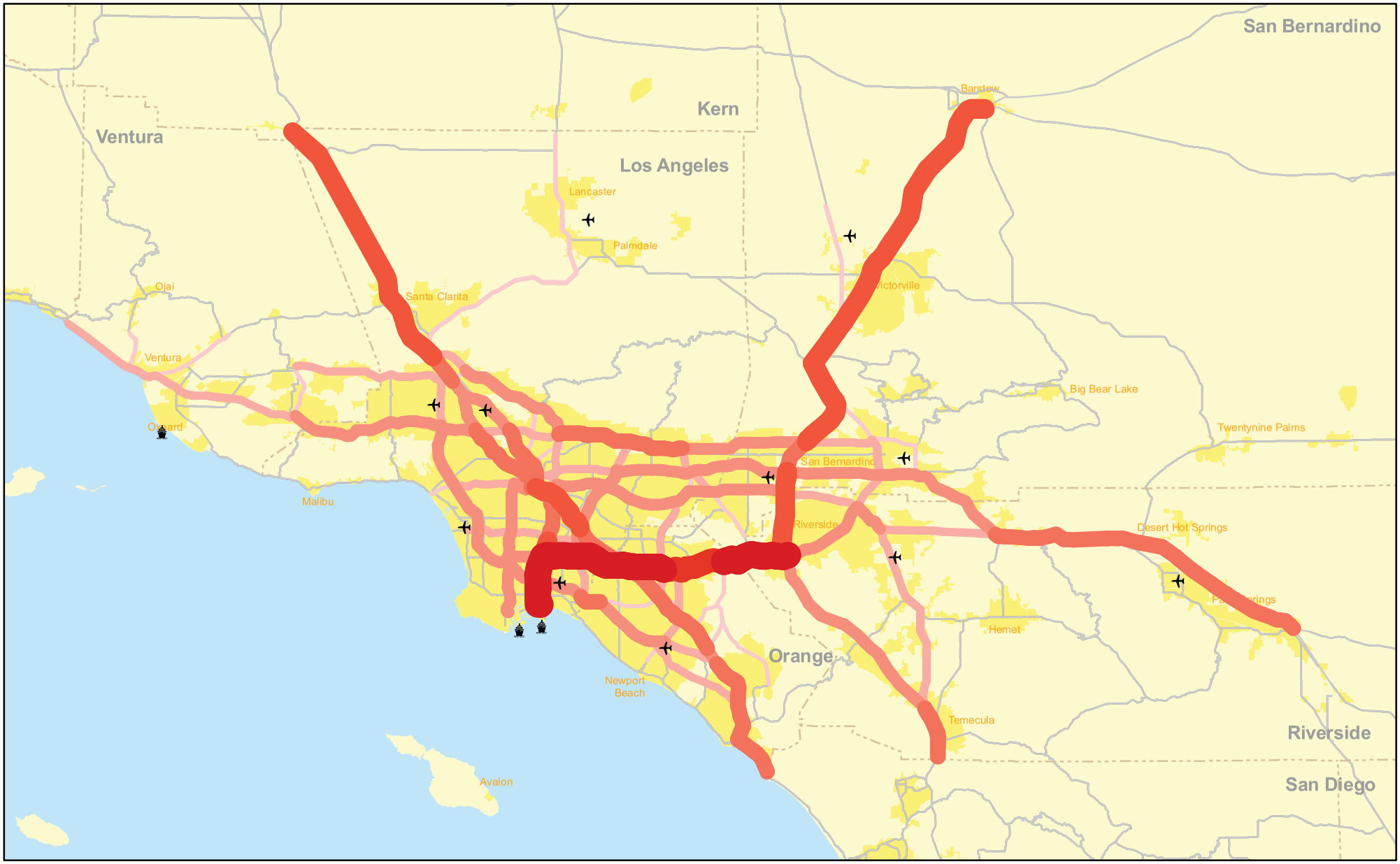
710 > 10 > 15

0 5 10 20 30 40 Miles

Figure 5

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 4 Truck Lanes

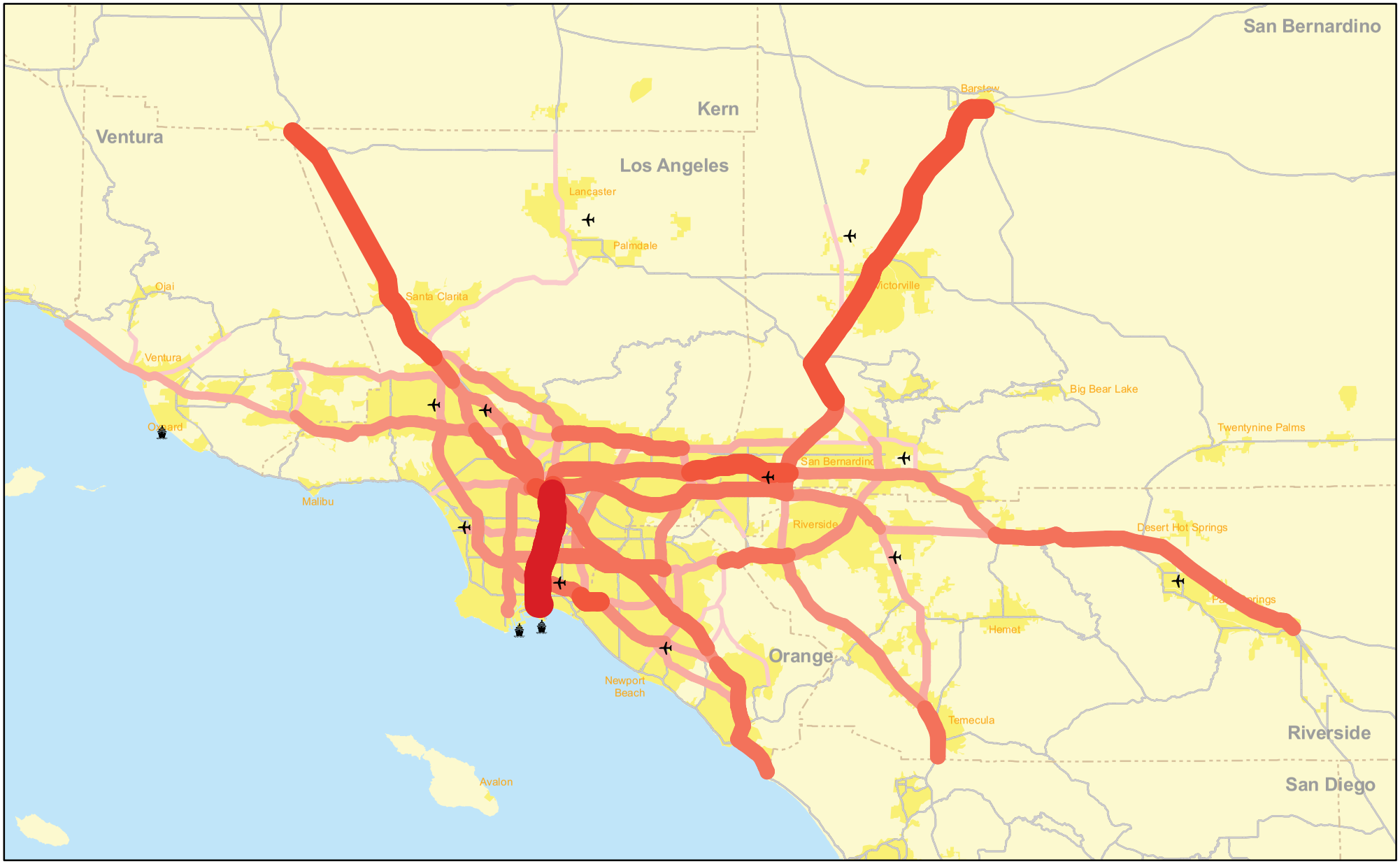
710 > 91 > 15

0 5 10 20 30 40 Miles

Figure 6

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 5 Truck Lanes

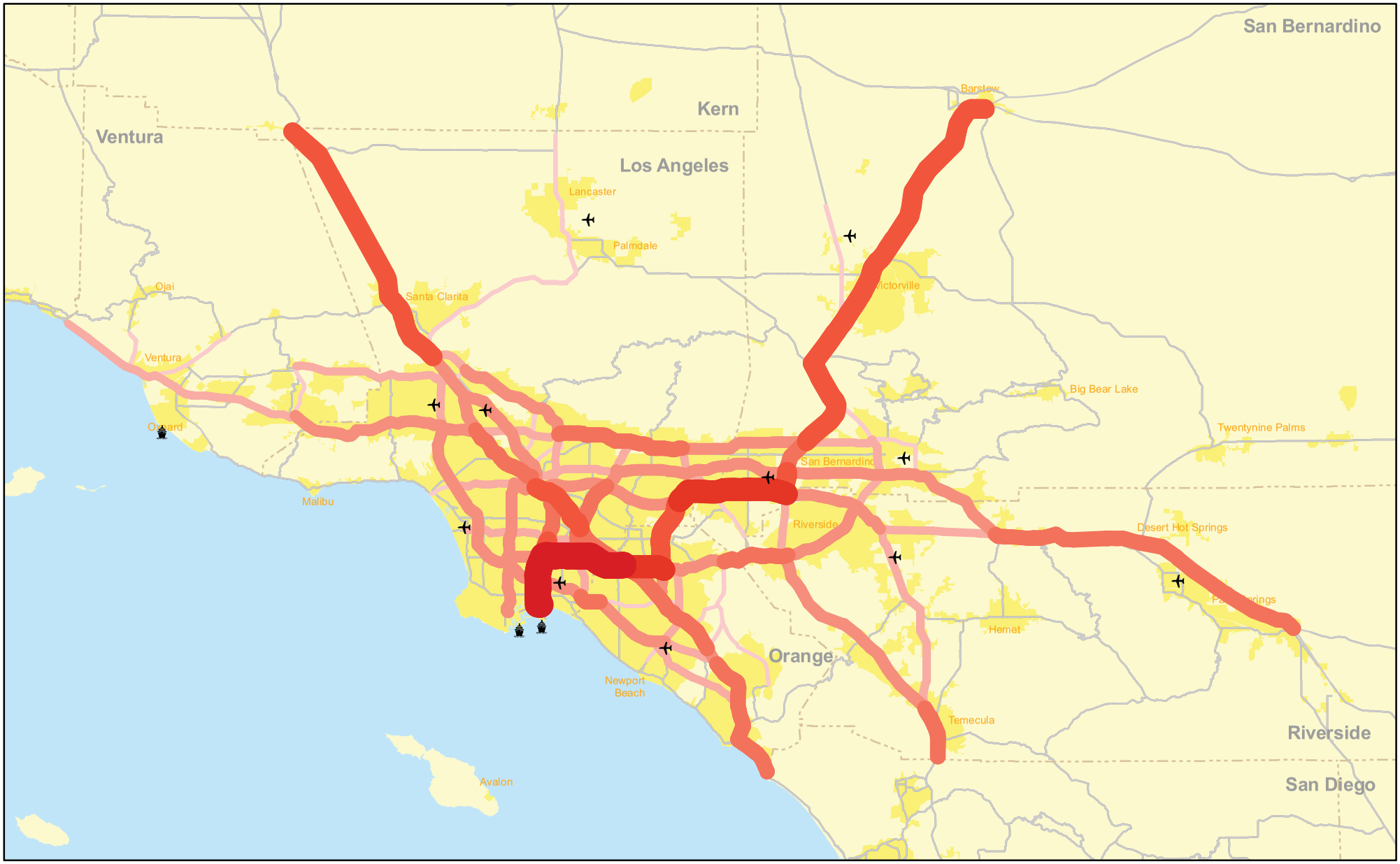
710 > 60 EB > 10 WB > 15

0 5 10 20 30 40 Miles

Figure 7

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 6 Truck Lanes

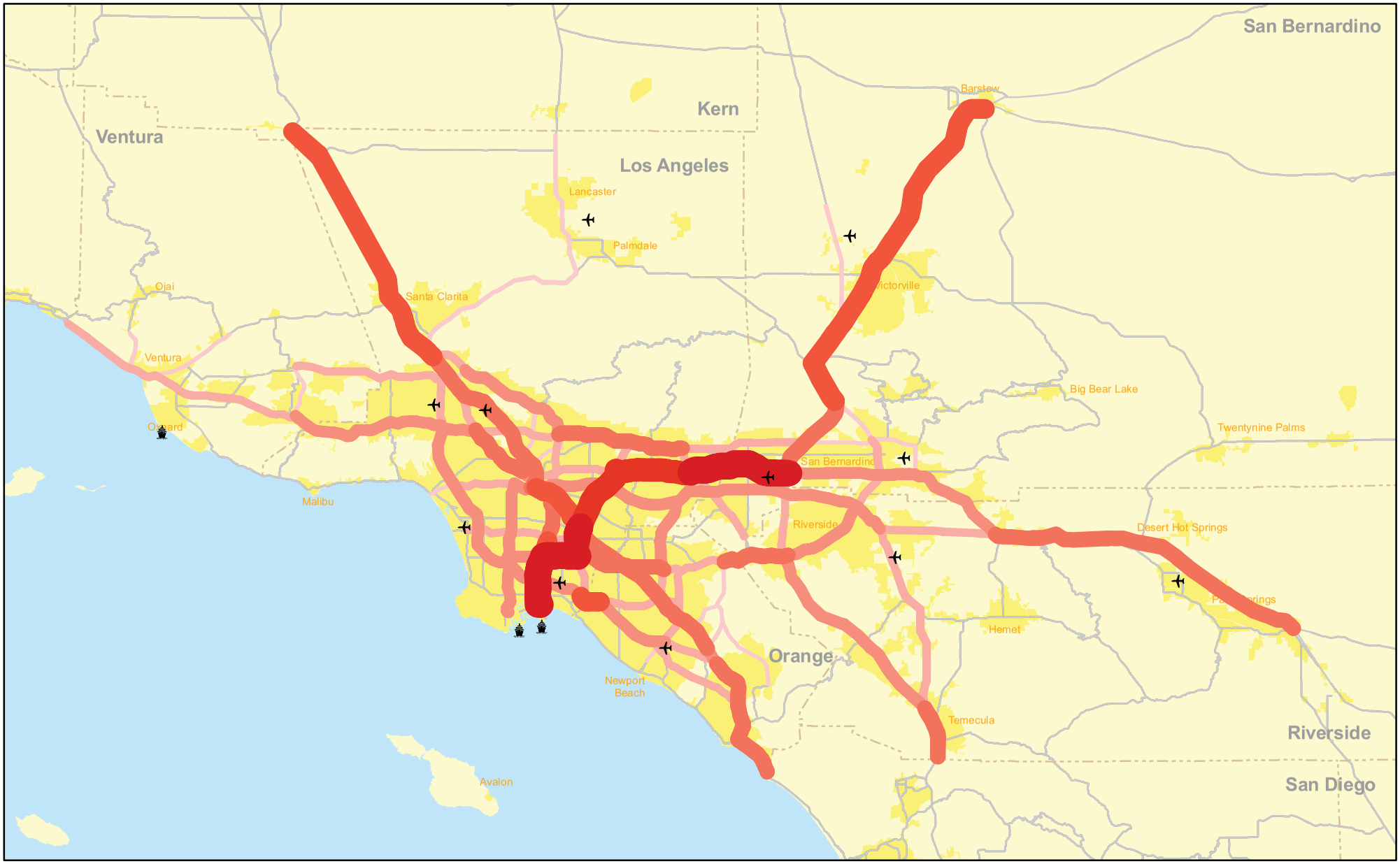
710 > 91 > 57 > 60 > 15

0 5 10 20 30 40 Miles

Figure 8

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 7 Truck Lanes

710 > 91 > 605 > 10 > 15

0 5 10 20 30 40 Miles

Figure 9

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 8 Truck Lanes

5 I-710 to Kern County

0 5 10 20 30 40 Miles

Figure 10

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 9 Truck Lanes

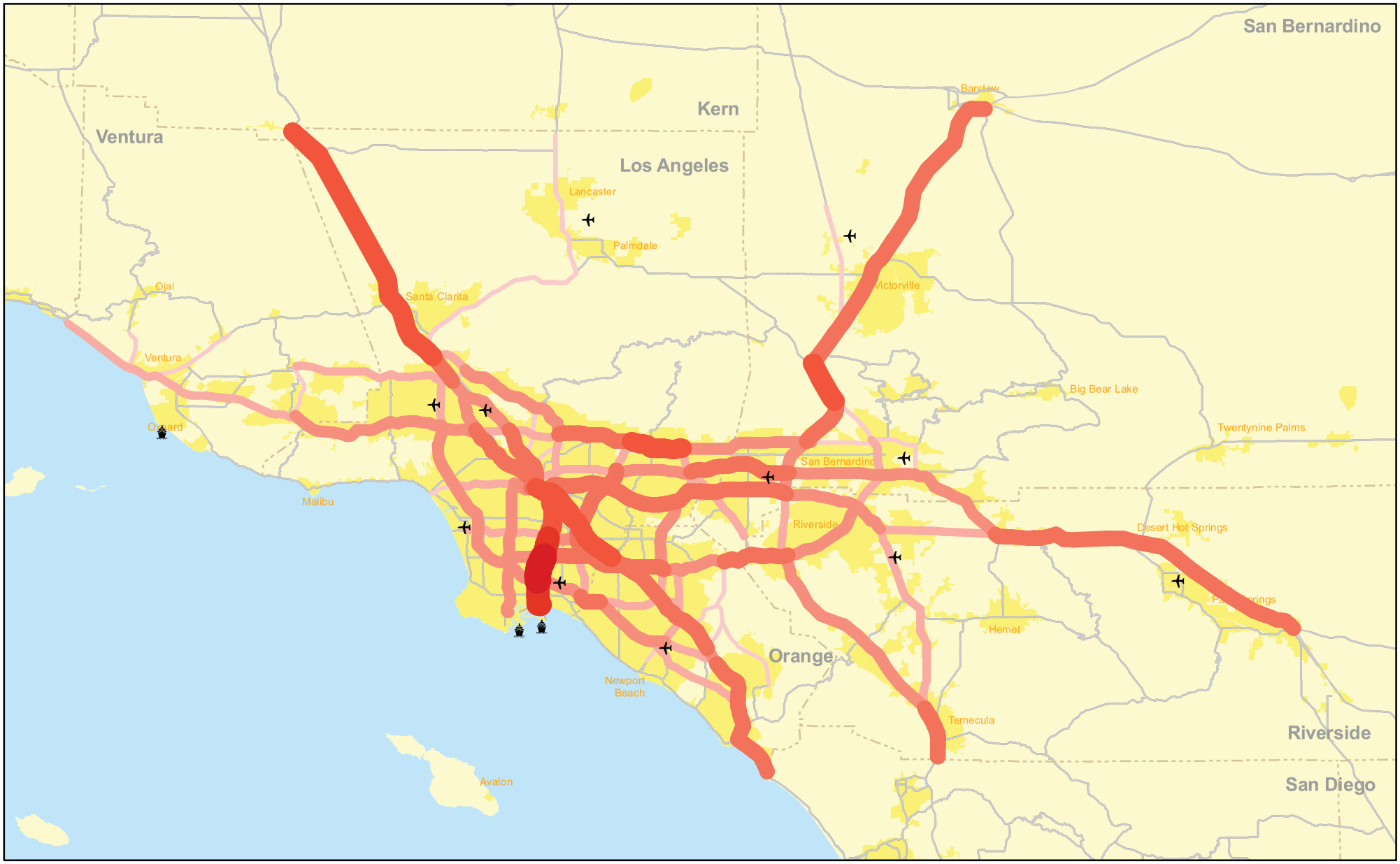
5 Mexico to Kern County

0 5 10 20 30 40 Miles

Figure 11

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 10 Mixed Flow Toll

710 > 60 > 15

0 5 10 20 30 40 Miles

Figure 12

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 11 Advanced Technology

Reducing Port Truck Related Volumes

0 5 10 20 30 40 Miles

Figure 13

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 12 Truck Lanes

15 Mexico to Victorville

0 5 10 20 30 40 Miles

Figure 14

WilburSmith Associates

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Impact of Truck Lanes on Different Sub-Regions

The first question that the application of the travel demand model answers is: What may be the differential effects of the construction and use of truck lanes on different sub-regions (i.e. the specific types of benefits and impacts that may occur to different sub-regions, depending on facility location within a broad region/corridor)? For the purposes of this analysis, subregions are defined as directional segments of the bundle routes. In general, the subregions used for comparison are:

- The north-south connection between the San Pedro Bay Ports and downtown Los Angeles.
- The east-west connection between I-710 and I-15.
- The north-south connection from downtown Los Angeles to Kern County.
- The north-south connection from San Diego County to downtown Los Angeles.
- The north-south connection from SR-91 to Victorville (along the I-15 corridor).

Bundles 2, 3, 4, 5, 6, 7, 8, 9, and 12 evaluate truck lane systems along various regional highways. Average daily volumes in one direction for both vehicles (autos) and trucks are shown on Table 1 below. Also shown on the table is the average daily vehicle and truck volumes along the entire route. Note that the average vehicle and truck volumes represent both a single (spot) location along the entire route length as well as an average of both directions along the entire route length; actual volumes may be higher or lower along various segments of the route.

Table 1
Average Daily Volumes by Bundle - Year 2030

Bundle	Description	Distance (Miles)	Avg. Veh. (ADT, One Direction, Spot Location)	Avg. Trucks (ADT, One Direction, Spot Location)	Sum of Avg. Veh. & Trucks	Entire Route	
						Vehicles (Daily, Both Directions, by Segment)	Trucks (Daily, Both Directions, by Segment)
2	I-710 to SR-60 to I-15	101.5	63,248	11,872	75,121	267,627	54,563
3	I-710 to I-10 to I-15	98.7	59,740	11,195	70,935	263,168	55,506
4	I-710 to SR-91 to I-15	87.5	61,329	10,542	71,871	271,455	56,745
5	I-710 to I-10 (WB) / SR-60 (EB) to I-15	100.1	68,080	10,328	78,407	262,397	47,248
6	I-710 to SR-91 to SR-57 to SR-60 to I-15	110.0	57,447	9,688	67,135	252,006	49,729
7	I-710 to SR-91 to I-605 to I-10 to I-15	96.1	57,935	10,328	68,264	271,079	56,415
8	I-5 (I-710 to Kern	74.6	77,752	12,328	90,080	374,735	62,541

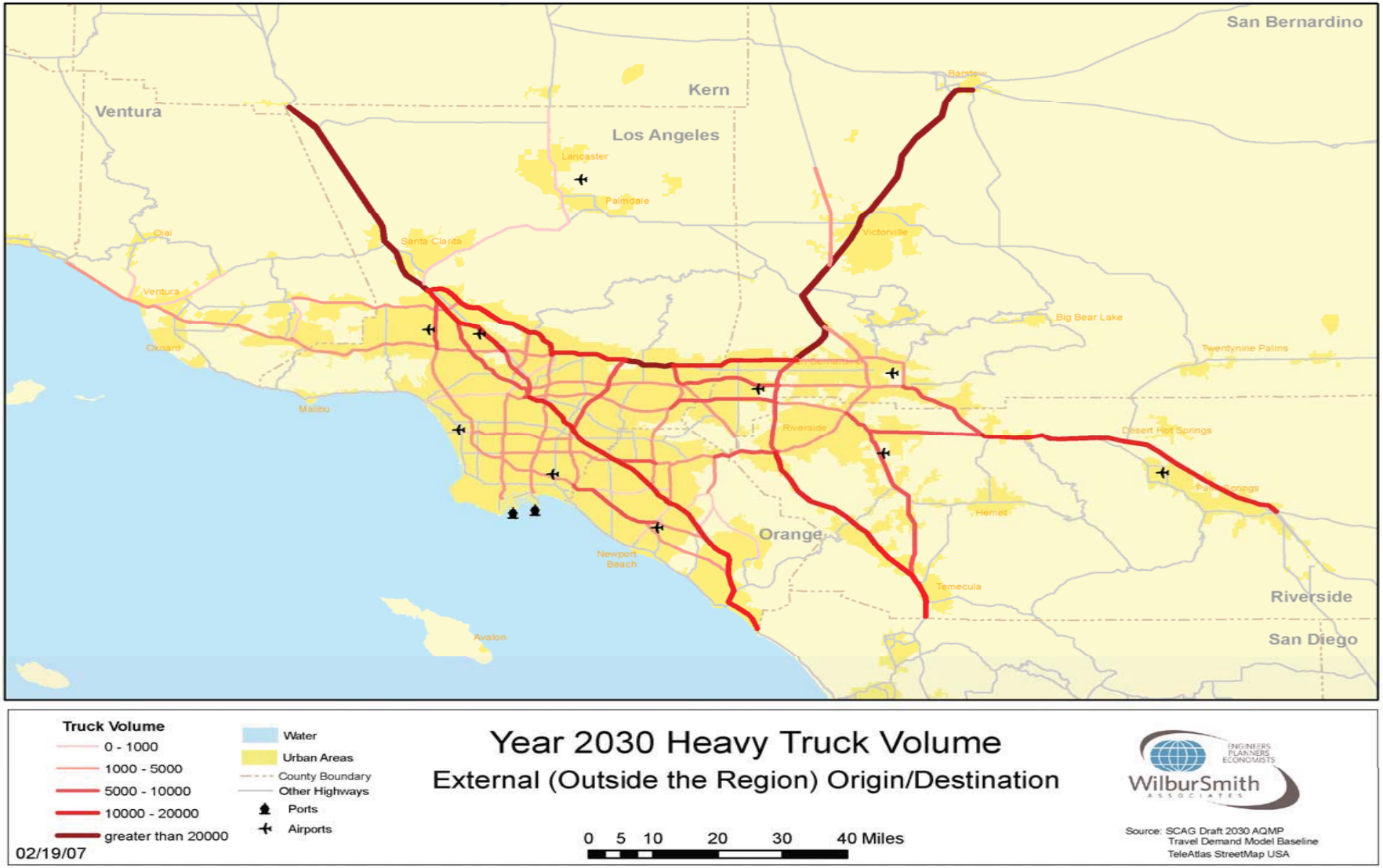
Table 1
Average Daily Volumes by Bundle - Year 2030

Bundle	Description	Distance (Miles)	Avg. Veh. (ADT, One Direction, Spot Location)	Avg. Trucks (ADT, One Direction, Spot Location)	Sum of Avg. Veh. & Trucks	Entire Route	
						Vehicles (Daily, Both Directions, by Segment)	Trucks (Daily, Both Directions, by Segment)
	County)						
9	I-5 (U.S./Mexico Border to Kern County)	204.6	77,425	10,679	88,104	376,202	56,099
12	I-15 (U.S./Mexico Border to Victorville)	161.7	52,918	8,594	61,512	221,443	37,921

The following conclusions can be drawn from the table above:

- The **highest truck and vehicle volumes** would be carried by a truck lane system on I-5 extending from I-710 (near downtown Los Angeles) to the Kern County line.
  - This reflects the large number of trucks to/from the Central Valley of California destined for the intermodal yards near downtown Los Angeles, as shown on Figure 15.
  - This also shows that I-5 carries the highest vehicle volumes of the freeways evaluated under the specific bundles.
- For the routes extending from the San Pedro Bay Ports to Victorville, the **highest truck volumes** would be carried by a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15; a truck lane system that includes I-10 as an east-west connection between I-710 and I-15 would carry nearly as much truck traffic.
- For the routes extending from the San Pedro Bay Ports to Victorville, the **highest vehicle volumes** would be carried by a truck lane system that includes both SR-60 and I-10 as an east-west connection between I-710 and I-15
  - For the routes extending from the San Pedro Bay Ports to Victorville, the **highest truck and vehicle volumes** would be carried by a truck lane system that includes both SR-60 (in the eastbound direction) and I-10 (in the westbound direction) as an east-west connection between I-710 and I-15; a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15 would carry nearly as much truck and vehicle traffic.

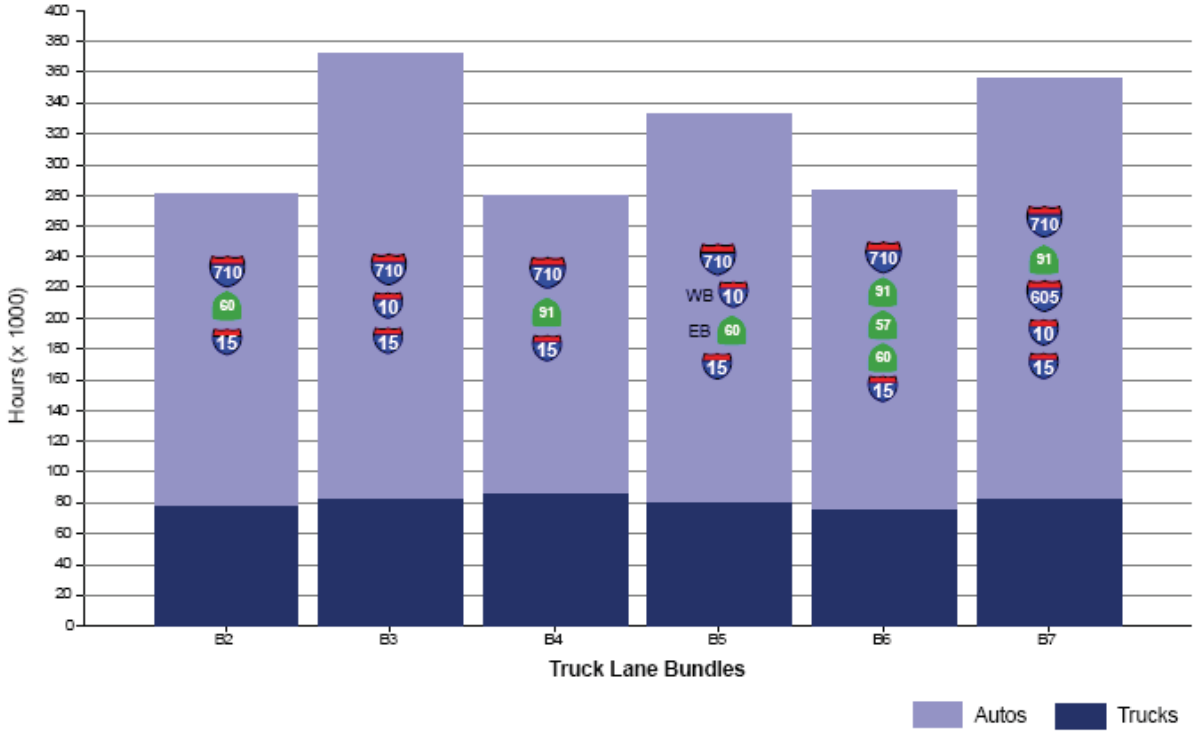
Figure 15


San Bernardino
Kern
Ventura
Los Angeles
Orange
Riverside
San Diego
Barstow
Lancaster
Palmdale
Santa Clarita
Victorville
Oxnard
Ventura
Malibu
Big Bear Lake
Twentynine Palms
Riverside
Desert Hot Springs
Palm Springs
Hemet
Newport Beach
Temecula
Avalon
Truck Volume
0 - 1000
1000 - 5000
5000 - 10000
10000 - 20000
greater than 20000
02/19/07
Water
Urban Areas
County Boundary
Other Highways
Ports
Airports
Year 2030 Heavy Truck Volume
External (Outside the Region) Origin/Destination
0 5 10 20 30 40 Miles
WilburSmith
Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Bundles 8, 9, and 12 represent truck lane systems that are independent in utility and routing and hence represent different overall corridors and regions. Therefore, the differential effects of the construction and use of truck lanes on different sub-regions (within a broad corridor and region) can be summarized based on further analysis of data for bundles 2, 3, 4, 5, 6, and 7 which represent alternatives for the broad corridor connecting the San Pedro Bay ports and the region around Victorville.

One measure is the reduction in overall congestion on regional freeways. The figure below shows the comparison of the reduction in delay for the bundles from the SPB Ports to Victorville (2, 3, 4, 5, 6, and 7). Since this is part of a regional evaluation seeking to improve mobility for all modes, the figure shows the reduction in hours of delay for both vehicles and trucks. Figure 16 is based on daily traffic volumes and incorporates congested travel time data from peak and off-peak periods. The figure below highlights the reduction in daily hours of delay over Year 2030 Baseline conditions, which are forecast to be 8,757,000 hours for vehicles (autos) and 737,000 hours for trucks.

Figure 16
Reduction in Hours of Delay for Vehicles and Trucks
(Year 2030 Baseline vs. Bundles containing Truck Lanes from the SPB Ports to Victorville)



The following conclusions can be drawn from Figure 16 above:

- For **trucks**, the difference in reduction of hours of delay is relatively consistent between bundles and **no bundle clearly offers greater improvement when compared to others**.
    - There is slightly greater reduction in hours of truck delay for a truck lane system that includes SR-91 as an east-west connection between I-710 and I-15; most likely due to the reduced overall distance of truck lane systems utilizing SR-91 (since it would represent a more direct route between the San Pedro Bay Ports and Victorville, therefore more trucks may utilize this route when analyzed with a travel demand model, resulting in a greater reduction in overall delay).
- For **vehicles (autos)**, the difference in reduction of hours of delay is much greater for those truck lane systems that include I-10.
    - This reflects the highly congested conditions (both existing and forecast future) along I-10 and the high volume of both truck and vehicle volumes.

Are Truck Lanes a Viable Alternative?

The second question that the application of the travel demand model answers is: Can dedicated truck lanes offer sufficient benefits to be a preferable alternative to other ways of accommodating increased freight traffic (such as adding mixed-flow lanes, adding rail capacity, advanced technologies, etc.)?

Additionally, the application of the travel demand model can answer the following question: To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? In other words, would they be a cost-effective investment?

Bundle 1 includes operational and safety improvements (including mixed-flow lanes) along the regional highway system. For the purposes of this study, the volumes of the first three bundles were compared, along the Bundle 2 network (a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15). The first three bundles were chosen for comparison because they represent the baseline conditions, the operational and safety improvement conditions, and the first of the dedicated truck lane system alternatives. The results are shown on the figure below and on Table 2 that follows.

Figure 17
Comparison of Year 2030 Truck and Vehicle Volumes along the Bundle 2 Network (Compares Baseline Volumes with the Operational and the Truck Lane Improvements from the SPB Ports to Victorville)

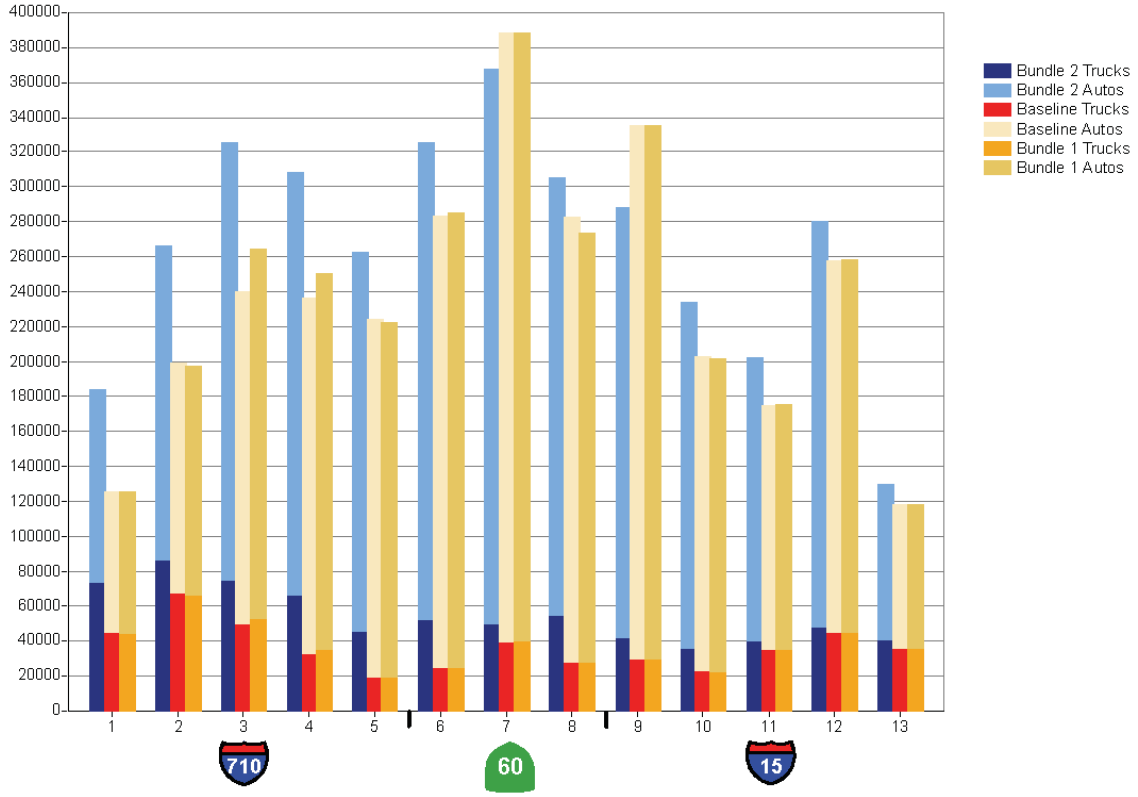


Table 2
Summary of Year 2030 Truck and Vehicle Volumes along Bundle 2 Network

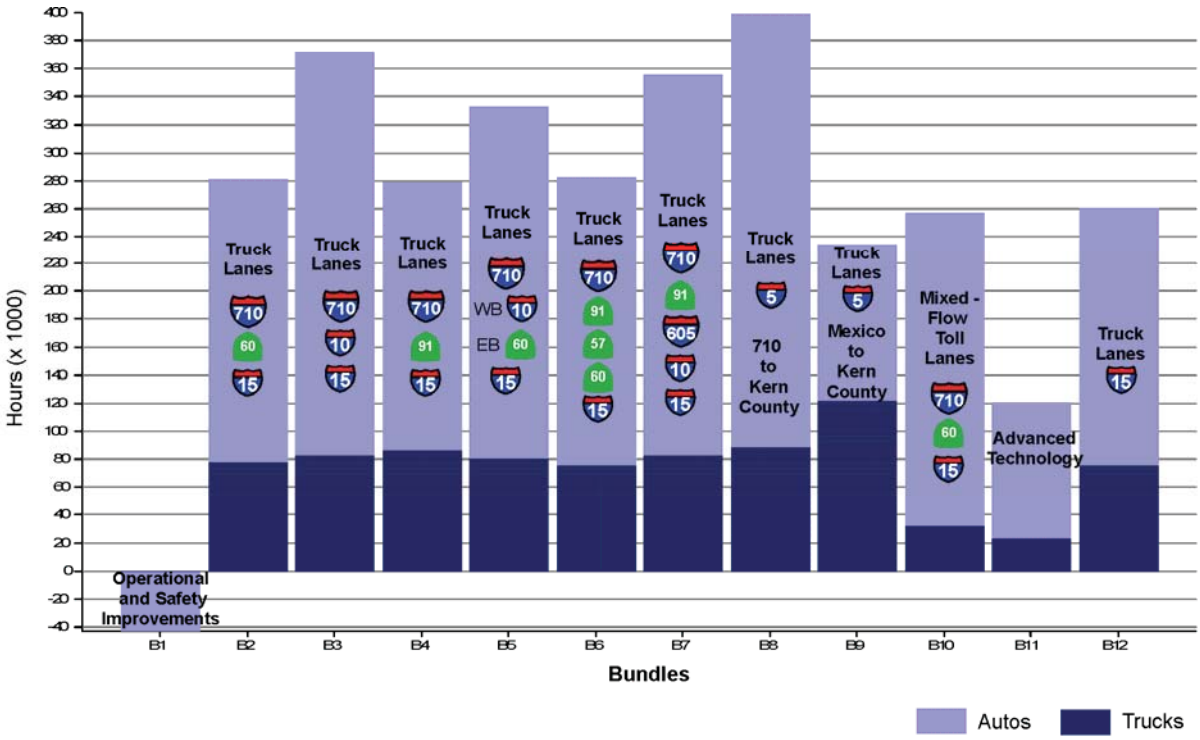
Route	Segment	Vehicles (Daily, Both Directions, by Segment)			Trucks (Daily, Both Directions, by Segment)		
		Baseline	Bundle 1	Bundle 2	Baseline	Bundle 1	Bundle 2
I-710	END to I-405	125,606	125,377	183,971	44,716	44,501	73,643
I-710	I-405 to SR- 91	198,345	197,766	266,348	67,177	66,767	86,496
I-710	SR-91 to I-105	243,111	264,310	325,109	49,601	52,767	74,787
I-710	I-105 to I-5	239,787	250,344	308,473	32,552	35,647	66,359
I-710	I-5 to SR-60	223,555	222,314	262,415	19,590	19,523	45,417
SR-60	I-710 to I-605	283,895	284,845	325,351	25,212	25,267	51,668
SR-60	I-605 to SR-57	275,634	388,350	367,638	25,901	40,075	49,696
SR-60	SR-57 to I-15	282,737	273,511	305,220	27,671	27,518	54,545
I-15	SR-60 to I-10	226,077	334,922	288,399	19,817	29,625	41,593
I-15	I-10 to I-210	203,101	201,657	233,953	22,583	22,395	36,276
I-15	I-210 to I-215	174,401	175,230	202,266	35,681	35,610	40,103
I-15	I-215 to SR-138	258,082	258,891	280,359	45,249	45,147	48,108
I-15	SR-138 to I-40	118,073	118,092	129,651	36,212	36,261	40,622

The following conclusions can be drawn from Figure 16 and Table 2 above:

- For **trucks**, operational and safety improvements (including mixed-flow lanes, as represented by Bundle 1) would not affect forecast volumes along the identified segments.
  - Therefore it can be stated that operational and safety improvements (including mixed-flow lanes) would not affect a change in truck travel patterns or volumes, as compare to the addition of truck lanes which are a successful approach for attracting trucks from other facilities.
- For **vehicles (autos)**, operational and safety improvements (including mixed-flow lanes, as represented by Bundle 1) would have the greatest effect on forecast volumes along I-710 between the western terminus and SR-91; with virtually no change to vehicle volumes along other identified segments.
  - This reflects the forecast high volume of trucks along I-710 and the associated benefit of adding additional capacity for vehicles (in this case, through interchange improvements); however, overall it shows that operational and safety improvements (including mixed-flow lanes) tend to accommodate demand rather than induce increased volumes.

The figure below shows the comparison of the reduction in delay for all evaluated project bundles. Since this is part of a regional evaluation seeking to improve mobility for all modes, the figure shows the reduction in hours of delay for both vehicles and trucks. Figure 18 is based on daily traffic volumes and incorporates congested travel time data from peak and off-peak periods.

Figure 18
Reduction in Hours of Delay for Vehicles and Trucks
(Year 2030 Baseline vs. All Bundles)



The following conclusions can be drawn from Figure 18 above:

- For **trucks**, the difference in reduction of hours of delay varies greatly, dependant on configuration (e.g., with truck lanes, with mixed-flow toll lanes) and route (e.g., I-5, I-15, or Port-to-Victorville).
    - The most reduction in hours of delay for trucks would occur when dedicated truck lanes are constructed along I-5 from the US/Mexico Border to the Kern County border, due to the improved truck operations that result from adding truck lanes to the limited capacity and highly congested segments along I-5 from the Orange County line to downtown Los Angeles.
    - There is a slight reduction in hours of delay for trucks when mixed-flow toll facilities or alternative technologies (e.g., maglev or shuttle trains) are implemented, due to the fact that the vehicle demand on the region's highways greatly exceeds capacity.
    - With only the construction of the operational and safety improvements (Bundle 1), truck hours of delay would slightly increase, due to the fact that the operational and safety improvements are not adding substantial amounts of new capacity to the highly congested system, and any additional capacity is quickly filled by excessive demand.

- For **vehicles (autos)**, all projects and strategies involving separate dedicated facilities result in reduced hours of delay.
    - The most reduction in hours of delay for vehicles would occur when dedicated truck lanes are constructed from downtown Los Angeles to the Kern County border, due to the high volume of vehicles utilizing this route and the reduced delay due to the separation of trucks onto dedicated facilities.
    - With only the construction of the operational and safety improvements (Bundle 1), vehicle hours of delay would increase, due to the fact that the operational and safety improvements are not adding substantial amounts of new capacity to the highly congested system, and any additional capacity is quickly filled by excessive demand.

In an effort to evaluate the impact of the development of an advanced technology corridor, using an innovative technology such as Maglev, Freight Shuttle or a shuttle train service, a likely scenario was developed. The deployment of such a technology would require a fixed guideway linking staging areas at the SPB port terminals and an inland staging area, the latter functioning much like a conventional rail intermodal yard. Under this evaluation, goods would be transported between the ports and the inland staging yard generally located at the intersection of I-10 and I-15 in the Inland Empire region. An advanced technology mode would be used to transport the goods along a fixed guideway, as opposed to a separated truck lane corridor. An operational target of 1.35 million annual container lifts was set as a reasonable first order of development, and compares with the volumes currently experienced at the Hobart rail intermodal facility, the largest currently operated by a railroad in the study area. The Hobart facility is a good proxy for an operational target as it represents how an inland facility would function in serving a proposed alternative high technology corridor. The operational target represents approximately 5,400 trucks per day, which would in effect be removed from the highways currently linking the ports and the Inland Empire region. To test the benefits of such a corridor, an equivalent amount of trucks were removed from two origin/destination zones in the travel demand model, one representing the ports and the other representing the inland staging yard. The model was then run to determine potential changes to vehicle and truck volumes. The results of the model analysis are shown below.

Figure 19
Comparison of Year 2030 Truck and Vehicle Volumes along the Bundle 2 Network (Compares Baseline Volumes with the Operational and the Advanced Technology Improvements from the SPB Ports to Victorville)

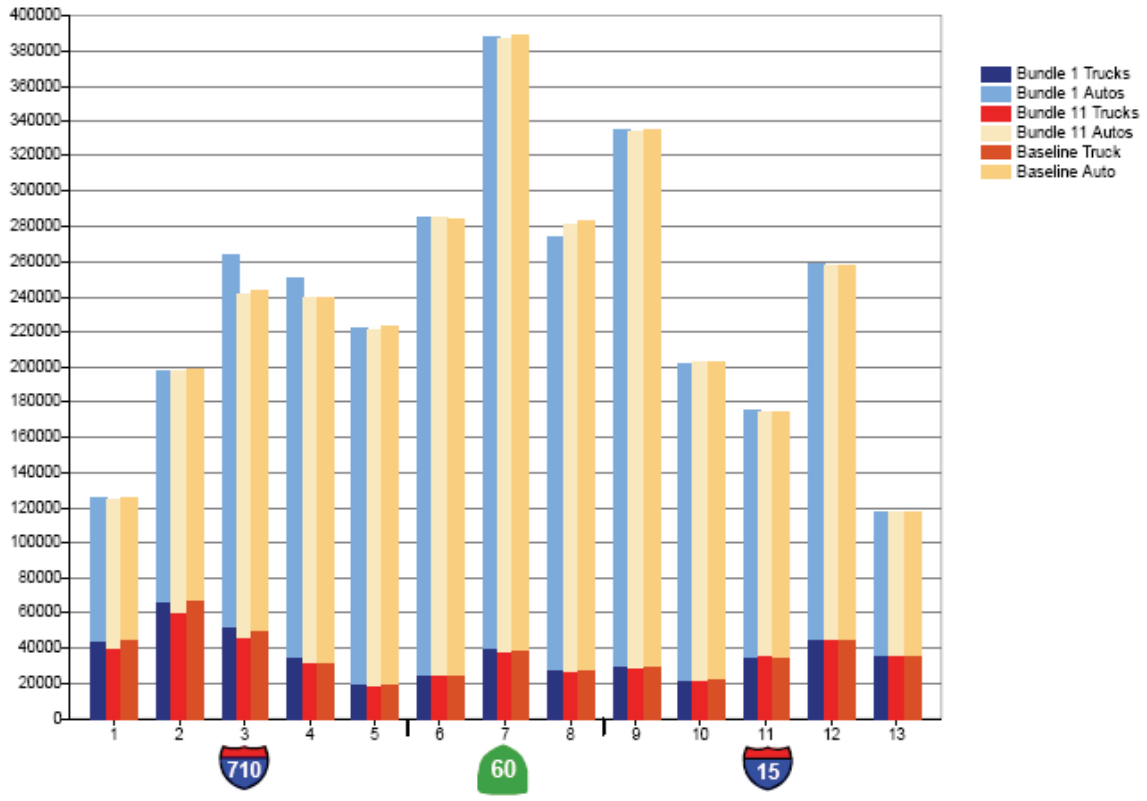
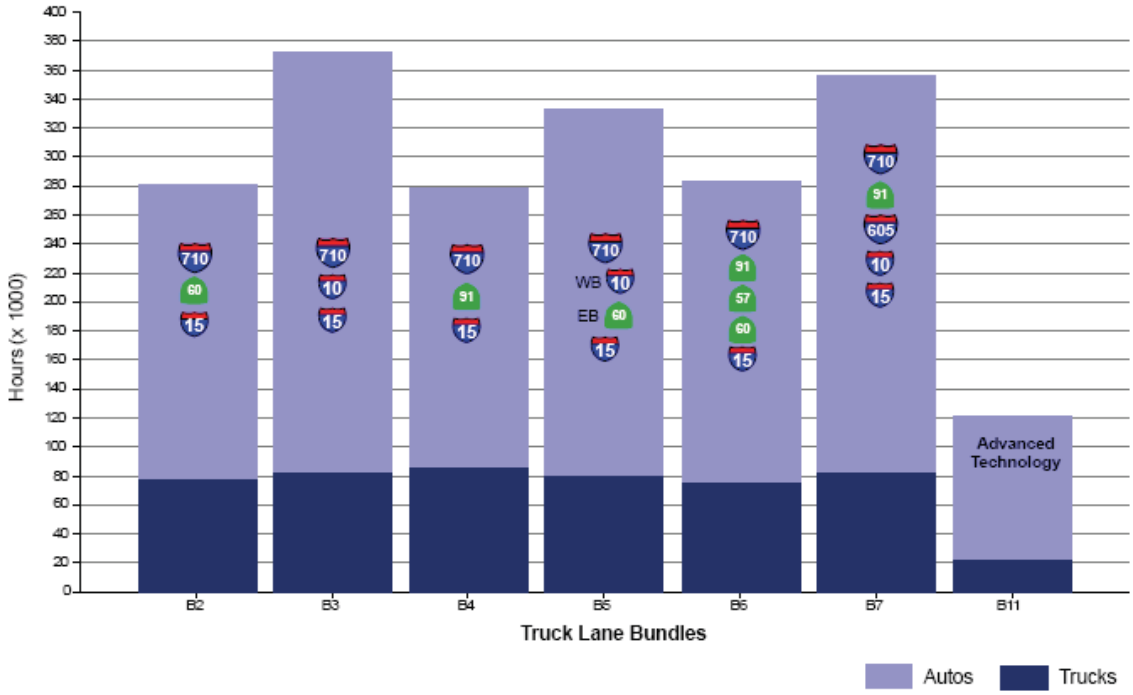


Table 3
Summary of Year 2030 Truck and Vehicle Volumes along Bundle 2 Network (Compares Baseline Volumes with the Operational and the Advanced Technology Improvements from the SPB Ports to Victorville)

Route	Segment	Vehicles (Daily, Both Directions, by Segment)			Trucks (Daily, Both Directions, by Segment)		
		Baseline	Bundle 1	Bundle 11	Baseline	Bundle 1	Bundle 11
I-710	END to I-405	125,606	125,377	124,429	44,716	44,501	40,135
I-710	I-405 to SR- 91	198,345	197,766	197,671	67,177	66,767	60,732
I-710	SR-91 to I-105	243,111	264,310	241,190	49,601	52,767	46,537
I-710	I-105 to I-5	239,787	250,344	239,346	32,552	35,647	32,274
I-710	I-5 to SR-60	223,555	222,314	221,162	19,590	19,523	18,650
SR-60	I-710 to I-605	283,895	284,845	285,108	25,212	25,267	24,676
SR-60	I-605 to SR-57	275,634	388,350	387,006	25,901	40,075	37,890
SR-60	SR-57 to I-15	282,737	273,511	280,667	27,671	27,518	27,012
I-15	SR-60 to I-10	226,077	334,922	333,129	19,817	29,625	29,368
I-15	I-10 to I-210	203,101	201,657	202,161	22,583	22,395	22,492
I-15	I-210 to I-215	174,401	175,230	174,369	35,681	35,610	35,782
I-15	I-215 to SR-138	258,082	258,891	257,722	45,249	45,147	45,193
I-15	SR-138 to I-40	118,073	118,092	118,107	36,212	36,261	36,235

Figure 20
Reduction in Hours of Delay for Vehicles and Trucks
(Year 2030 Baseline vs. Bundles containing Truck Lanes and Advanced Technology Corridor Alternative from the SPB Ports to Victorville)



The following conclusions can be drawn from Figures 18, 19, and 20 and Table 3:

- The truck lane bundles produce substantially larger benefits than the advanced technology bundle, both in terms of the ability to reduce delays for trucks and cars and in terms of shifting trucks away from other highway facilities to the dedicated facility.
  - From a **volume** standpoint, the **truck lane bundles carry a substantially larger truck volume** than the advanced technology bundle, and therefore are able to **have greater system-wide impact**.
  - From a **delay** standpoint, the advanced technology bundle provides the greatest delay benefits on the highways closest to the ports, specifically the segments of I-710 from the ports to the intersection with I-105. **From a regional standpoint, the reduction in hours of delay resulting from the alternative technology bundle is significantly less than any of the truck lane bundles** (for both trucks and autos). The least delay benefits occur along the highways closest to the inland region. The reason for this is that the concentration of non-port traffic generators are greater the furthest from the port, in the inland areas. In other words, along the segments furthest from the ports, there are more non-port related trips that consume all of the capacity generated from the removal of port generated trucks, than near the ports. These results are similar to the analysis of the impacts of the Pier-Pass program on the I-710 and other regional highways conducted by the Alameda Corridor

Transportation Authority (ACTA). The impact of the program was greatest on the highways nearest to the ports.

- The advanced technology bundle is more viable if land use policies are strengthened to shift the concentration of warehouse activities around the proposed location of the inland staging facility. This will result in a greater volume of trips to use the dedicated corridor. Land use analyses (described further in Chapter 3) show a concentration of port-related truck trips to and from the San Pedro Bay Ports centered around the SR-60 corridor and focused near the intersection of SR-60 and I-15. **The current distribution of warehouse activities throughout the region limits the successful implementation of an advanced technology corridor.** Strengthened land use guidelines that concentrate warehouse locations around the inland staging area will also improve the delay impact for the highway facilities around the inland staging area, much like the current model results show for the highways around the ports.
    - Without strengthening of land use policies around the location of the proposed inland staging facility, cargo at the staging facility will require transport (likely by truck) to warehouse facilities. This would reduce the benefit of the use of alternative technologies to replace port-to-yard truck trips, as the truck trips would simply be relocated to the areas around the proposed inland staging facility.
- **This finding supports a more comprehensive approach towards corridor development that combines 1) the concept of a fixed guideway, 2) the use of advanced technologies and 3) strengthened land use guidelines.**

Land Use Analysis

The evaluation of land use by project bundle provides additional answers to the following question: What may be the differential effects of the construction of truck lanes on different sub-regions (i.e. the specific types of benefits and impacts that may occur to different sub-regions, depending on facility location)?

Based on data presented in Tech Memo 5b, a strong link between proximity of schools and residences to transportation corridors and public health has been documented. Therefore, the bundles were evaluated to identify the number of schools and amount residential land use adjacent to bundle routes. In addition, connectivity to regional centers of goods movement activity (e.g., ports, warehouses, and distribution centers) is an important factor when considering the development of a regional goods movement system. Therefore, the bundles were also evaluated to identify the amount of warehouse/distribution land use adjacent to bundle routes.

The land use analysis was performed using GIS tools based on existing land use data for the MCGMAP region compiled by SCAG. The land use analysis focused specifically on:

- Proximity to schools and residential land uses.
    - Number of schools within 1/3rd mile (radial) of the bundle route.
    - Acreage of residential land use within ½ mile (radial) of the bundle route.

        - These distances are based on recent studies showing increased risk of health effects due to residents and schools adjacent to goods movement corridors (Described in more detail in Tech Memo 5b).
- Connectivity to warehouse/distribution land uses
    - Acreage of warehouse/distribution land use within one mile (radial) of the bundle route.
        - For the purposes of this analysis, one mile was selected as a reasonable distance for developing direct or limited access routes to the proposed facilities.

Table 4 shows the proximity of schools and residential land uses by bundle.

Table 4
Schools and Residential Land Uses by Bundle within the SCAG Region

Bundle	Description	Schools	Residential (Acres)
2	I-710 to SR-60 to I-15	35	9,933
3	I-710 to I-10 to I-15	60	11,329
4	I-710 to SR-91 to I-15	48	8,684
5	I-710 to I-10 (WB) / SR-60 (EB) to I-15	77	16,702
6	I-710 to SR-91 to SR-57 to SR-60 to I-15	41	10,533
7	I-710 to SR-91 to I-605 to I-10 to I-15	57	11,177
8	I-5 (I-710 to Kern County)	31	4,979
9	I-5 (U.S./Mexico Border to Kern County)	78	12,806
10	I-710 to SR-60 to I-15	35	9,933
12	I-15 (U.S./Mexico Border to Victorville)	23	5,500

As a point of comparison, if I-210 was used as an east-west connection between I-710 (future planned connection) and I-15, a total of 62 schools and approximately 12,200 acres of residential land use would be affected. Along I-210 there are 39 schools and approximately 6,700 acres of residential land between I-710 (future planned connection) and I-15.

The following conclusions can be drawn from Table 4 above:

- The **most schools** would be located along a truck lane system on I-5 extending from the U.S./Mexico Border to the Kern County line (Note: This information excludes San Diego County); a truck lane system that includes both SR-60 (in the eastbound direction) and I-10 (in the westbound direction) as an east-west connection between I-710 and I-15 would affect nearly as many schools.
- The **least schools** would be located along a truck lane system on I-15 extending from the U.S./Mexico Border to Victorville (Note: This information excludes

San Diego County); a truck lane system on I-5 extending from I-710 (near downtown Los Angeles) to the Kern County line and a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15 would affect nearly as few schools.

  - For the routes extending from the San Pedro Bay Ports to Victorville, the **most schools** would be located along a truck lane system that includes both SR-60 (in the eastbound direction) and I-10 (in the westbound direction) as an east-west connection between I-710 and I-15; a truck lane system that includes I-10 as an east-west connection between I-710 and I-15 would affect nearly as many schools.
  - For the routes extending from the San Pedro Bay Ports to Victorville, the **least schools** would be located along a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15.

- The **most residential land use** would be located along a truck lane system that includes I-10 as an east-west connection between I-710 and I-15.
- The **least residential land use** would be located along a truck lane system on I-5 extending from I-710 (near downtown Los Angeles) to the Kern County line; a truck lane system on I-15 extending from the U.S./Mexico Border to Victorville (Note: This information excludes San Diego County) would affect nearly as little residential land use.
  - For the routes extending from the San Pedro Bay Ports to Victorville, the **most residential land use** would be located along a truck lane system that includes I-10 as an east-west connection between I-710 and I-15.
  - For the routes extending from the San Pedro Bay Ports to Victorville, the **least residential land use** would be located along a truck lane system that includes SR-91 as an east-west connection between I-710 and I-15; a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15 would affect nearly as little residential land use.

Table 5 shows the proximity of warehouse/distribution land uses by bundle.

Table 5
Warehouse/Distribution Land Uses by Bundle within the SCAG Region

Bundle	Description	Warehouse (Acres)
2	I-710 to SR-60 to I-15	6,290
3	I-710 to I-10 to I-15	3,135
4	I-710 to SR-91 to I-15	4,716
5	I-710 to I-10 (WB) / SR-60 (EB) to I-15	6,767
6	I-710 to SR-91 to SR-57 to SR-60 to I-15	5,057
7	I-710 to SR-91 to I-605 to I-10 to I-15	2,691

Table 5
Warehouse/Distribution Land Uses by Bundle within the SCAG Region

Bundle	Description	Warehouse (Acres)
8	I-5 (I-710 to Kern County)	579
9	I-5 (U.S./Mexico Border to Kern County)	3,054
10	I-710 to SR-60 to I-15	6,290
12	I-15 (U.S./Mexico Border to Victorville)	3,151

As a point of comparison, if I-210 was used as an east-west connection between I-710 (future planned connection) and I-15, a total of approximately 1,300 acres of warehouse/distribution land in proximity of the route. Along I-210 there are approximately 95 acres of warehouse/distribution land in proximity of the route between I-710 (future planned connection) and I-15.

The following conclusions can be drawn from Table 5 above:

- The **most warehouse/distribution land use** would be located along a truck lane system that includes both SR-60 (in the eastbound direction) and I-10 (in the westbound direction) as an east-west connection between I-710 and I-15; with a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15 having almost as much connectivity.
- The **least warehouse/distribution land use** would be located along a truck lane system on I-5 extending from I-710 (near downtown Los Angeles) to the Kern County line.
    - For the routes extending from the San Pedro Bay Ports to Victorville, the **most warehouse/distribution land use** would be located along a truck lane system that includes both SR-60 (in the eastbound direction) and I-10 (in the westbound direction) as an east-west connection between I-710 and I-15; with a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15 having almost as much.
    - For the routes extending from the San Pedro Bay Ports to Victorville, the **least warehouse/distribution land use** would be located along a truck lane system that includes I-10 as an east-west connection between I-710 and I-15; a truck lane system that includes SR-91 as an east-west connection between I-710 and I-15 would have nearly as little connectivity to warehouse/distribution land uses.

Conclusions Based on Travel Demand Model and Land Use Analysis

The application of the travel demand model and land use analysis of the 12 bundles provides answers to the following three questions presented at the beginning of this Tech Memo:

1. Can dedicated truck lanes offer sufficient benefits to be a preferable alternative to other ways of accommodating increased freight traffic (such as adding mixed-flow lanes, adding rail capacity, etc.)?
    a. Operational and safety improvements (including mixed-flow lanes) would not affect a change in truck travel patterns or volumes.
    b. Operational and safety improvements (including mixed-flow lanes) tend to accommodate demand rather than induce increased volumes.
    c. Therefore, truck lanes offer sufficient benefits to be a preferable alternative (in terms of system performance) to operational and safety improvements (including mixed-flow lanes).
    d. While truck lanes offer a better alternative to an advanced technology corridor under the current land use distribution, concentration of warehouse activities around an inland staging area would improve the prospect of an advanced technology corridor.
2. What may be the differential effects of the construction of truck lanes on different sub-regions (i.e. the specific types of benefits and impacts that may occur to different sub-regions, depending on facility location)?
    a. The truck lane concepts that include an east-west connection between I-710 and I-15 are the most varied in terms of potential affects to different subregions.
        i. When examined in terms of truck volumes, vehicle volumes, proximity to schools and residential land uses, and connectivity to warehouse/distribution land uses, SR-60 as an east-west connection between I-710 and I-15:
            1. Would carry the highest truck volumes.
            2. Would carry very high vehicle volumes (compared to other options).
            3. Would affect the least number of schools.
            4. Would affect the least amount of residential land uses.
            5. Would provide the most connectivity to warehouse/distribution land uses.
                a. As stated previously, all truck lane bundles show comparable reductions in hours of delay for trucks, therefore,, changes to congested hours of delay for trucks is not referenced.
3. To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? In other words, would they be a cost-effective investment?

a. Similar to the response to the first question above, truck lanes offer sufficient benefits to be a preferable alternative (in terms of system performance) to operational and safety improvements (including mixed-flow lanes).
b. The costs of truck lane alternatives are evaluated in Chapter 3.
c. More detailed information and analyses would be required in order to accurately respond to the question, particularly in the area of air quality improvements and associated costs.

Chapter 3 – Potential Revenue Generation and Cost Estimate

Evaluation of Potential Revenue Generation

An evaluation of tolling and potential revenue generation begins to answer the following question: What portion of dedicated truck lane costs could be offset by user financing, and what additional revenues or funding sources would be needed to support dedicated truck lanes?

An analysis of revenue generation potential of a truck lane system that includes an east-west connection between I-710 and I-15 under tolling scenarios was performed. The results are summarized in Table 6 below. The tolling analyses were carried out using travel demand model output data received from SCAG. As described in Chapter 2 and as defined by the Modeling Working Group, SCAG ran the travel demand model for each bundle. The model output was provided to the project team for further analysis. All tolling analyses were performed external to SCAG's travel demand model. Therefore, the tolling analysis was not able to evaluate changes in vehicle volumes and trip characteristics (e.g., the output of the tolling analysis could not be input into SCAG's travel demand model and then reevaluated under SCAG's model).

In general, it was found that the greatest revenue generation potential occurs when a toll rate of $0.20, $0.40, and $0.60 per mile is applied to light- (LHDT), medium- (MHDT), and heavy-duty trucks (HHDT), respectively.

Table 6
Potential Toll Revenue Generation Year 2030
for a Truck Lane System that Includes an East-West Connection between I-710 and I-15

Toll Rate ($LHDT / $MHDT / $HHDT)	Annual Revenue ($millions)					
	Bundle 2	Bundle 3	Bundle 4	Bundle 5	Bundle 6	Bundle 7
.10/.20/.30	199.5	197.8	177.0	199.7	177.9	185.0
.15/.30/.45	240.4	239.4	215.3	241.3	213.6	224.1
.20/.40/.60	255.0	254.3	231.1	256.5	226.5	239.4
.25/.50/.75	253.1	250.5	230.1	253.5	222.3	236.5
.30/.60/.90	245.1	242.6	223.9	242.7	213.5	225.3

The toll revenue generation estimates presented above are primarily based on estimated vehicle miles of travel (VMT) along specified routes. Table 7 summarizes VMT estimates by bundle and toll rate.

Table 7
Projected Vehicle Miles of Travel (VMT) Year 2030
for a Truck Lane System that Includes an East-West Connection between I-710 and I-15

Toll Rate ($LHDT / $MHDT / $HHDT)	Annual VMT					
	Bundle 2	Bundle 3	Bundle 4	Bundle 5	Bundle 6	Bundle 7
.10/.20/.30	736,395	725,509	651,808	734,829	653,441	677,672
.15/.30/.45	599,428	592,726	534,872	599,596	529,583	553,704
.20/.40/.60	484,268	479,133	436,544	485,262	427,364	449,749
.25/.50/.75	391,094	383,603	353,326	390,053	341,301	361,083
.30/.60/.90	321,108	314,645	290,926	316,501	277,686	291,480

Table 8 below shows the share of total trucks using the toll lanes along specified routes by project bundle. Due to the methodology for evaluation of the truck toll lanes developed by the MCGMAP project team, the truck toll lanes are assumed to have a number of access points at key locations along each bundle route. Therefore, the truck toll lanes will be most effective on capturing the more diffuse truck trips within the region (e.g., truck trips that are not tied to a specific route or origin-destination pair). This is highlighted by the percent share of trucks shown on Table 8. The highest market share of trucks is occurring along those routes that serve multiple destinations and multiple truck travel purposes (e.g., local distribution, port drayage, regional distribution).

Table 8
Percent Trucks Using Toll Lanes for Each Bundle - Year 2030

Bundle	Description	Toll Market Share for Specific Segments
2	I-710 to SR-60 to I-15	I-710 – 25% to 65%(1); SR 60 – 40%; I-15 – 18%-28%(2)
3	I-710 to I-10 to I-15	I-710 – 33% to 77%(1); I-10 – 50%; I-15 – 14%-30%(2)
4	I-710 to SR-91 to I-15	I-710 – 29% to 35%; SR 91 – 27%-30%; I-15 – 16%-43%(2)
5	I-710 to I-10 (WB) / SR-60 (EB) to I-15	I-710 – 30% to 50%(1); SR 60/I-10 – 30%; I-15 – 14%-30%(2)
6	I-710 to SR-91 to SR-57 to SR-60 to I-15	I-710 – 30% to 33%; SR 91 – 30%; SR 60 – 25%-43%; I-15 – 16%-43%(2)
7	I-710 to SR-91 to I-605 to I-10 to I-15	I-710 – 30%; I-605 - 25%; I-10 – 28%-35%; I-15 – 14%-28%(2)

(1) Highest share towards northern end of I-710.
(2) Lowest share towards northern end of I-15.

Based on Tables 6, 7 and 8 above, the following conclusions can be made regarding potential toll revenue generating potential:

- The **greatest toll revenue generation potential** would result from a truck lane system that includes both SR-60 (in the eastbound direction) and I-10 (in the

westbound direction) as an east-west connection between I-710 and I-15; truck lane systems that include SR-60 or I-10 as an east-west connection between I-710 and I-15 provide nearly an equal amount of revenue generating potential.

- The **least toll revenue generation potential** would result from a truck lane system that includes SR-91, SR-57, and SR-60 as an east-west connection between I-710 and I-15; truck lane systems that include SR-91 as an east-west connection between I-710 and I-15 provide the least amount of revenue generating potential.

Evaluation of Longer Combination Vehicles

An evaluation of the use of longer combination vehicles (LCV) begins to answer the following question: What policy changes would facilitate or enhance truck lane feasibility (e.g., LCV's, mandatory use, etc.)?

An evaluation of the use of longer combination vehicles (LCV) was also conducted as a subset of the toll revenue analysis. Whereas the toll revenue analysis to this point focused on the tolling of standard trucks on dedicated facilities, the purpose of the LCV evaluation is to determine whether toll revenue can be enhanced through productivity gains by allowing LCV's on dedicated facilities to offset the cost of a toll. The FHWA defines two particular types of LCV configurations: A "Triple Short" and a "Double Long" that could carry 50% and 100% more tonnage, respectively, than standard truck units. A Triple Short LCV combination consists of a tractor and three trailers in tow, typically three 28 to 28.5 foot trailers. The Double Short (also known as the Turnpike Double) consists of a truck-tractor towing two long trailers of equal length, typically two 48 or 53 foot trailers. A total of 14 States currently have provisions for LCV use and are included in this study: Alaska, Arizona, Colorado, Idaho, Montana, Nebraska, Nevada, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, Wyoming[1]. LCV's are not permitted anywhere in California. Furthermore, there is significant local opposition to the use of LCV's on local roadways in the study area[2]. This opposition creates barriers for the integration of LCVs on the State highway system, as staging areas would be required to avoid local roads if local opposition or resolutions forbade the use of LCVs on local roadways. Therefore, a potential LCV system would likely require direct, dedicated access to staging areas where trucks could be converted to and from LCV configurations.

Two different methods were used to evaluate this potential market. The first approach, which is similar to the approach utilized for the *I-15 Comprehensive Corridor Study* prepared for SCAG, SANBAG and Caltrans (December, 2005), evaluates commodity-specific information to determine the potential LCV market on the premise that only specific commodities would benefit from a longer vehicle combination. The commodity-specific approach is used to identify trips of more than 100 miles, to and from the study area, and primarily trips defined as domestic, as well as secondary trips in and out of the region. The second approach evaluates the international container market through the ports of Long Beach and Los Angeles, and focuses specifically on the portion of trips that stay within the region, specifically first order trips between the port and staging areas.

Evaluation of the Long-Haul LCV Market Potential

Commodity flow data from Caltrans' Intermodal Transportation Management System (ITMS) was used along with the payload data from SCAG's Heavy Duty Truck (HDT) model for calculating the truck volumes. The ITMS data base provided estimates of 2030 Commodity Flow within/entering/exiting the region. Only trips longer than 100 miles are considered to be eligible. Considering the complexities of cross-border commerce and infrastructure differences of different countries, goods to/from Canada and Mexico were excluded in the analysis. Finally, due to the potential lack of continued provision of LCV facilities in the central parts of the United States, goods to/from northeastern and southeastern States were also taken out of the LCV data set.

The SCAG Regional LCV eligible goods were converted to standard truck units using the SCAG HDT model payload parameters. The LCV Triple Short and Double Long truckloads were then calculated by applying 1.5 and 2.0 factors to the standard truckloads. Assuming LCV facilities are available in year 2030 for either Triple Short or Double Long within the SCAG region and are required for use by long haul (over 100 miles) LCVs, an average LCV trip length of 74 miles was used to calculate the LCV VMT (representing the VMT of LCVs within the SCAG region). Note that the average trip length of 74 accounts for the distances from the geo-center point of the SCAG Region (the region covered by the modeling data utilized) to the peripheral of the SCAG Region along major highways. Based on this evaluation, and estimated 22.7 million annual standard truck loads are considered as convertible to LCV, representing a 14% share of the total study area truck market based on the SCAG model for 2030 (approximately 162 million annual standard truck loads). This market share estimate is conservative compared to studies by the Transportation Research Board (TRB) and the Bureau of Transportation Statistics (BTS). The table below shows the potential LCV convertible market for low density goods and high density goods based on these studies.

Table 9
LCV Market Conversion Rates Based on National Studies

	TRB*	BTS**
Low Density Goods	11-21%	31-51%
High Density Goods	33%	23-36%

*Source: The Productivity Effects of Truck Size and Weight Policies; Bureau of Transportation Statistics, U.S. Department of Transportation, November 1994.
** Source: Special Report 227; Transportation Research Board, 1990.

Given that the likely scenario for LCV corridor development would initially be isolated to the corridor between the ports and Victorville, further analysis was conducted to determine the share of the potential convertible LCV market that would use the corridor. Based on an evaluation of the overall truck market for the study area, it was determined that this corridor handles approximately 10% of the region's truck volumes, based on annual truck trips. Applying this factor to the overall LCV market yields an estimate of 2.3 million annual standard truck loads convertible to LCV along this corridor, reducing the effective market share to 1.4% of the entire study area truck market. The following table summarizes the SCAG region LCV market as well

as for the corridor between the ports and Victorville. This served as the basis for revenue estimates performed for LCVs.

Table 10
2030 SCAG Region LCV Volume & VMT from Long-Haul Truck Market

	Annual Standard Truckloads	Annual LCV Truckloads		Annual LCV VMT*	
		Triple Short	Double Long	Triple Short	Double Long
SCAG Total	162,240,100	N/A	N/A	N/A	N/A
SCAG Region (Eligible for LCV conversion)	22,713,618	15,142,423	11,356,821	1,120,539,302	840,404,754
Bundle 2 Corridor	2,271,362	1,514,255	1,135,693	148,396,990	111,297,914

Note: * Assume Average trip length of 74 miles within the SCAG region and 98 miles for the Corridor.

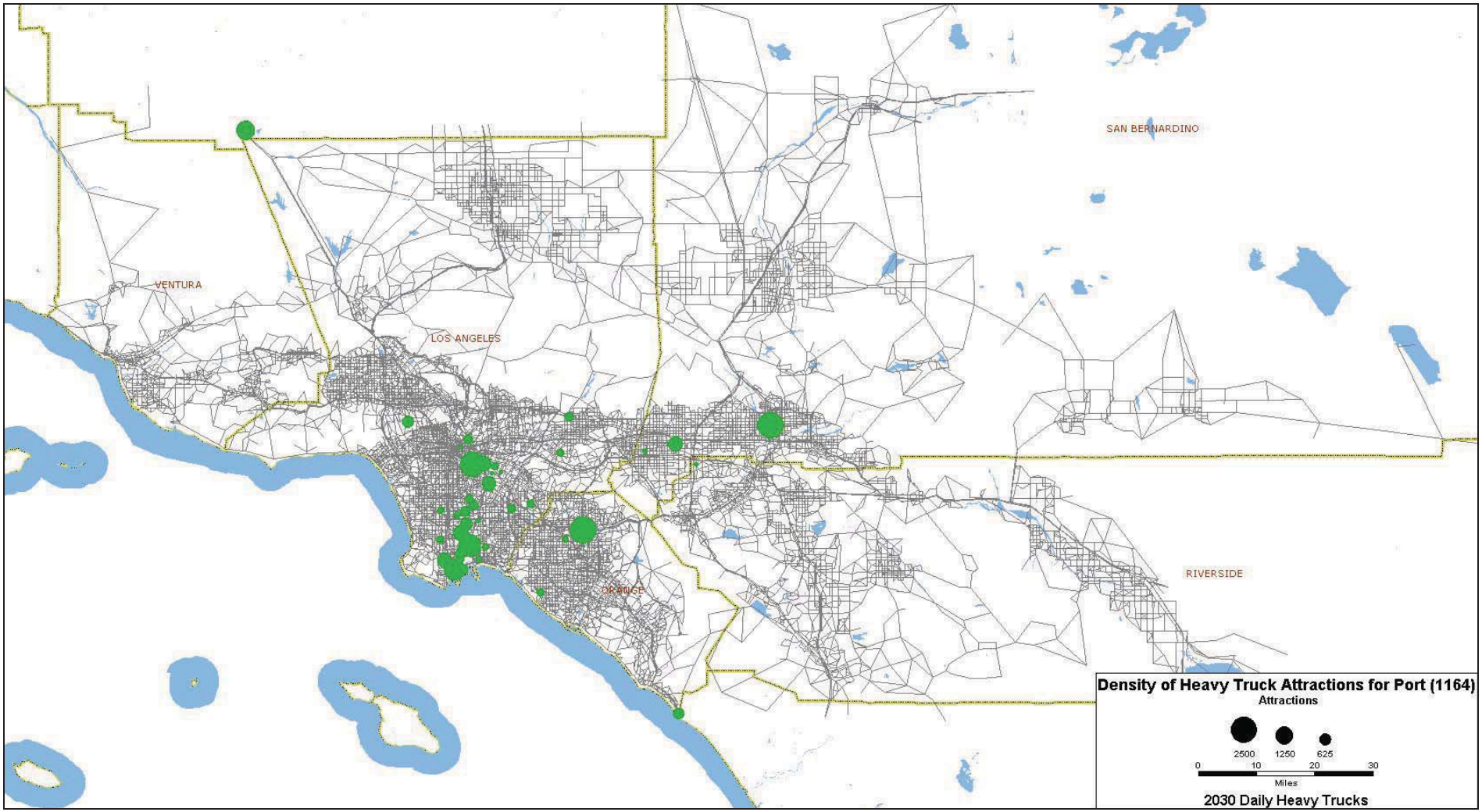
In the *I-15 Comprehensive Corridor Study*, potential LCV revenue estimates were based on the savings achieved by comparing the cost of using a semi-trailer versus a Triple Short, and a double short vs. a Double Long. A third of the savings by using LCV is assumed to be applied to tolls as toll revenue, while the other two thirds were split between shippers and truckers. The report provided a per-mile toll rate of $0.37 for the Triple Short LCV configuration and $0.89 for the Double Long LCV configuration (in year 2000 dollars).

By applying the Consumer Price Index (CPI) based inflation adjustment to the above toll rates, the year 2006 LCV per-mile toll rates come to $0.43 (Triple Short) and $1.04 (Double Long). **Therefore, the 2030 LCV revenue for the corridor from the Ports to Victorville is estimated to be $64 million if only the Triple Short configuration is used, or $116 million if only the Double Long configuration is used.** This revenue generation potential assumes LCVs would be allowed along one of the identified truck lane systems (specifically bundle 2 in this evaluation).

Evaluation of the Intra-Regional LCV Market Potential

Although currently not in practice, and not withstanding the technological and institutional hurdles to implementing double chassis for container trucks, an evaluation of the potential market for port container trucks as an LCV (by assuming trucks are configured to carry double container chassis) was conducted. The evaluation was conducted based on the unique nature of this market segment. Unlike the attractors and generators of domestic truck traffic which are scattered throughout the region, the attractors and generators of port related truck traffic are somewhat more concentrated, as is shown in the map in Figure 21. Therefore, the truck volumes for this market tend to utilize a limited number of facilities, specifically the corridor from the ports to Victorville. And although the volumes do drop significantly further from the port, there are specific locations along this corridor that represent major

Figure 21
Attraction Density of Heavy Trucks (Daily 2030) from Port (TAZ 1164)



concentrations of volumes. Based on the evaluation of the port truck trip data, these locations include the area around the Hobart intermodal facility east of Los Angeles, the concentrated warehouse and distribution facilities between downtown Los Angeles and Ontario, the intersection of I-10 and I-15, and the area around Victorville. These areas were identified as the inland nodes in evaluating the potential VMT and associated revenue generating potential of LCVs to and from the San Pedro Bay Ports and inland destinations.

Given that trucks would use the LCV facility only for a portion of their trip, based on variety of factors such as destination as well as congestion levels on competing facilities, truck trip distances on the separated truck facility, and the associated revenue, were based on the shortest "skimmed" path during congested peak times. Trips with a "skimmed" distance on the actual facility of less than 10 miles were eliminated. Based on the analysis, approximately 26% of the port container market in 2030 is potentially convertible to LCVs, which equates to approximately 32,227 trips per day. Note that this market share estimate is conservative when compared to the earlier mentioned TRB and BTS studies. The following table shows the estimated port container LCV market in 2030, shown as daily truck trips.

Table 11
Port Container LCV Market – Daily Truck Trips (2030)

	From Ports	To Ports	Total
Total Daily Port Truck Trips*	63,051	60,277	123,328
Potential LCV Convertible Trips	20,528	11,699	32,227
Market Share	33%	19%	26%

* Source: SCAG Port Truck Trip Model.

The following table summarizes the estimated annual VMTs for port related LCV's along the Bundle 2 Corridor, and associated revenues, using a toll rate of $1.04 per mile for a Double configuration.

Table 12
VMT and Revenue Estimates for Container Truck LCVs

General Location of Staging Area	Daily Miles Traveled On LCV Facility (VMT)		Annual Toll Revenue ($millions)
	Standard Trucks	Double LCV	
Victorville (via I-15)	88,430	44,215	13.8
Colton/I-15 (via SR-60)	873,962	436,981	136.3
Covina (via SR-60)	87,892	43,946	13.7
Hobart/East LA (via I-710 & SR-60)	180,757	90,379	28.2
TOTAL	1,231,042	615,521	192.0

Combined LCV Market Potential

It is likely that the port container LCV trips to/from Victorville are external to the region and may potentially be included in the long haul LCV market estimates. Therefore the adjusted LCV market in 2030 is estimated at 38,896 standard trucks daily (7,571 for the long-haul market and 32,227 for the port container market), an adjusted market share of seven percent of the entire truck market in the region in 2030. Total potential annual revenue is estimated at $308 million ($116 million from the long-haul market and $192 million from the port container market).

It is important to note that the LCV toll facilities would also be open to standard trucks willing to pay the conventional truck toll rate. The LCV market revenue estimates do not include the potential revenue from standard trucks using the LCV toll facilities. Therefore, the current estimate under the LCV market scenario is conservative. By including standard trucks, the potential revenue will increase by some portion of $255 million, but not by the full amount, for several reasons, including:

- Some share of the standard trucks willing to pay a toll under the conventional toll scenarios are candidates for the LCV market, and are therefore included in the LCV revenue estimates.
- Under the LCV scenarios, the congestion levels on the general purpose lanes would improve, thereby reducing the incentive for some of the standard trucks that were willing to pay the toll.

Attracting 25% of the conventionally tolled trucks into the LCV lanes would generate an additional $63.75 million, for a total of $371.75 million; a 50% capture rate would generate an additional $127.50 million (total of $435.50 million) and a 75% capture rate would generate an additional $191.25 million (total of $499.25 million).

Evaluation of Container Fees

The project team also investigated the revenue generation potential of container fees. For the purposes of the study, two scenarios for potential bonding capacity were evaluated, each based on container fees per Forty-foot Equivalent Unit (FEU). The two scenarios evaluated were:

1. Revenue bonding capacity based on container fees levied for all container movement through the San Pedro Bay ports.
2. Bonding capacity based on container fees levied for only those containers that would travel on a separate facility using an alternative technology.

For the first scenario, the three forecasts (Low or 12.25 million FEUs, Medium or 16.65 million FEUs, and High or 21.25 million FEUs) of container cargo through the San Pedro Bay ports (as described under the discussion of Scenarios in Chapter 1) were used along with a series of container fee levels (per FEU) to calculate potential revenue bonding capacity. Container fees of $10, $20, $30, $40, $50, $100, and $200 per FEU were used.

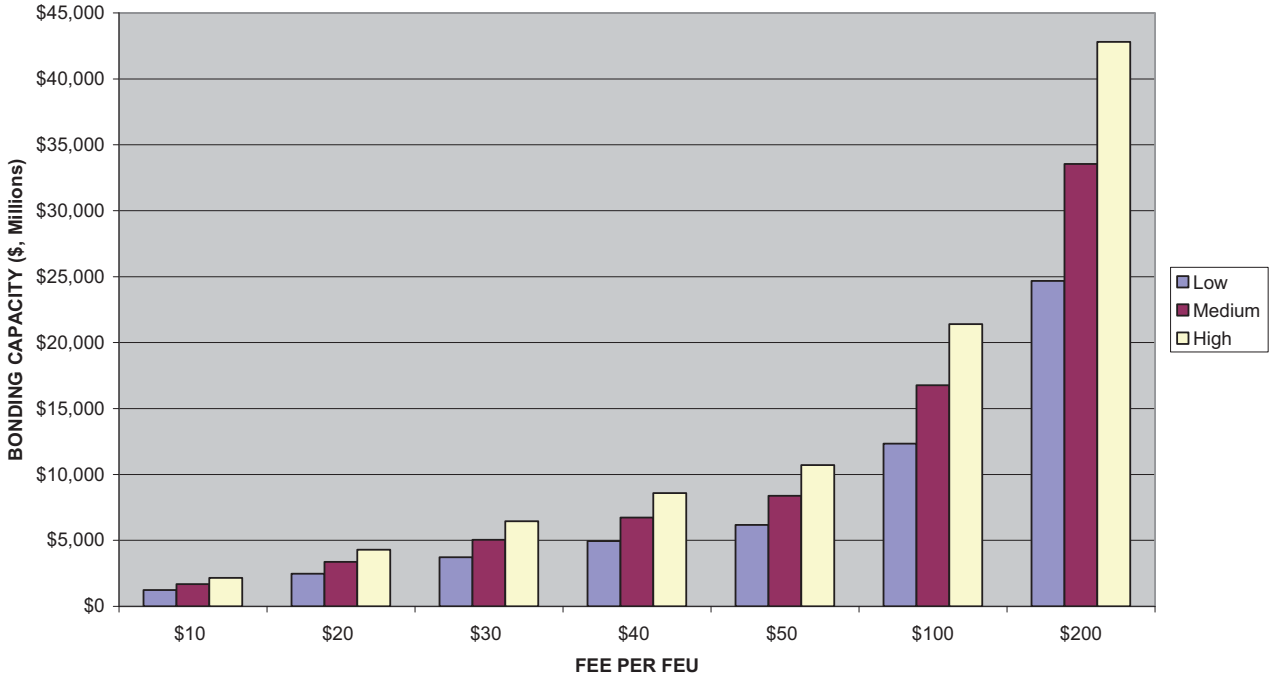
Key assumptions in the estimates of container fees and associated revenue bonding capacity were:

- A debt coverage rate of 1.4 was assumed for all projects.
- Bonds would be issued at an interest rate of 5.75 percent with a 30 year repayment schedule.
- No transaction fees, debt service costs, or debt service reserves have been included at this time, but would be included in future financial strategy development.
- As a rough estimate, the level of bond proceeds that could be issued under the truck toll projects was estimated to be roughly equal to 14 times the net revenue available for payment of debt service, assuming a 1.4 coverage ratio.
- In the absence of a real cost or schedule, the analysis was done in constant dollars. Any future financial strategy development would be based on refined project cost estimates and a proposed project implementation schedule and would be based on year of expenditure dollars.

Using the highest container cargo forecast (42.5 million TEUs, or 21.25 million FEUs) and the highest container fee ($200 per FEU), a bonding capacity of $42.8 billion was estimated. Using the lowest container cargo forecast (24.5 million TEUs, or 12.25 million FEUs) and the lowest container fee ($10 per FEU), a bonding capacity of $1.2 billion was estimated. Figure 22 below presents a summary of potential revenue bonding levels and container fees.

Figure 22

POTENTIAL BONDING CAPACITY FROM CONTAINER FEES
RANGE OF CONTAINER (FEU) FEE: $10 - $200 PER FEU
2030 PROJECTION OF FEU'S: LOW, MEDIUM, AND HIGH
(in Millions)

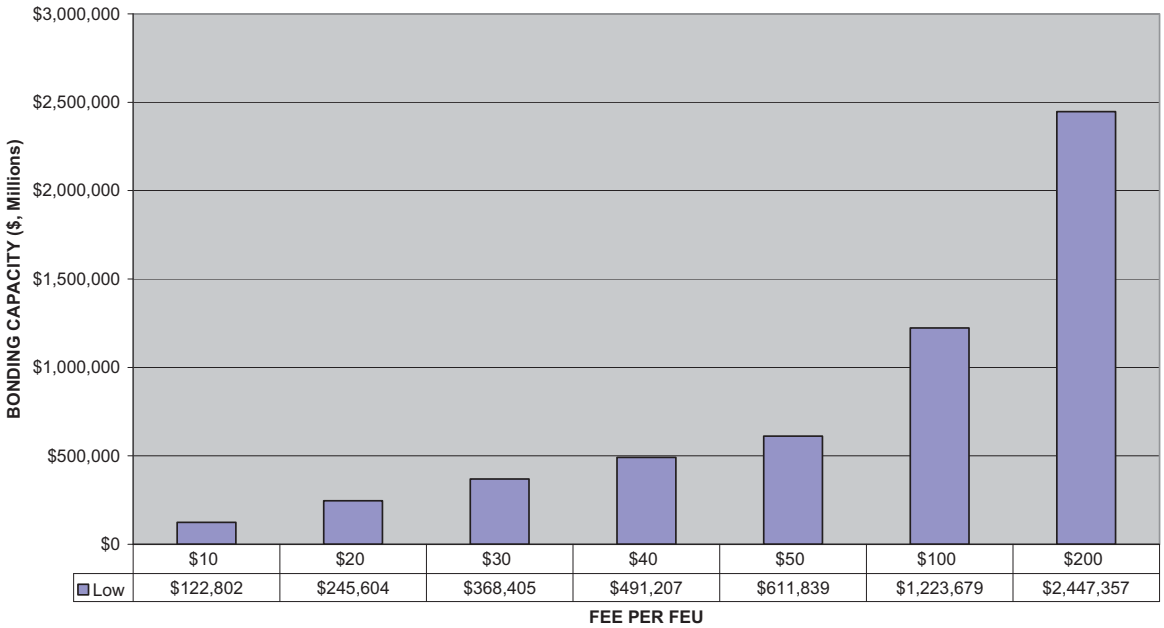


Source: Sharon Greene Associates, 2007

For the second scenario, an alternative technology system connecting the San Pedro Bay ports and an inland staging yard, as described under the modeling of Bundle 11 in Chapter 2, was used to calculate potential bonding capacity. It was assumed that the alternative technology system would accommodate approximately 1,215,000 FEUs per year (equivalent to the existing Hobart yard). Container fees of $10, $20, $30, $40, $50, $100, and $200 per FEU were used. The analysis showed a potential bonding capacity between $122 million and $2.45 billion, depending on the container fee. Figure 23 below presents a summary of bonding capacities and container fees.

Figure 23

POTENTIAL BONDING CAPACITY FROM CONTAINER FEES
RANGE OF FEE PER FEU: $10 - $200 PER FEU
PROJECTED FEU'S: 1,215,000
($, 000)



	$10	$20	$30	$40	$50	$100	$200
Low	$122,802	$245,604	$368,405	$491,207	$611,839	$1,223,679	$2,447,357

Source: Sharon Greene Associates, 2007

Note that the current fee program being proposed by the ports of Los Angeles and Long Beach involves a "pay-as-you-go" program without the need for borrowing. The advantage of this approach is two-fold. First, the project owner/sponsor can avoid substantial borrowing costs such as interest and other financing fees. Second, the term of the fee is reduced, reducing the burden on the project owner/sponsor and on the fee contributors. This approach is especially possible in this specific port area because of the high volumes of container traffic.

Conclusions Based on Potential Revenue Generation

Truck Toll Revenue

Based on the evaluation of potential revenue generation by truck lane bundles, the following conclusions are made:

- The **greatest toll revenue generation potential** (in terms of truck tolls) would result from a truck lane system that includes both SR-60 (in the eastbound direction) and I-10 (in the westbound direction) as an east-west connection between I-710 and I-15 (approximately $257 million annual toll revenue) allowing for a potential bonding capacity of approximately $3.5 billion; truck lane systems that include SR-60 or I-10 as an east-west connection between I-710 and I-15 provide nearly an equal amount of revenue generating potential (approximately $255 million annual toll revenue) allowing for a potential bonding capacity of approximately $3.5 billion.
- The use of LCVs on dedicated facilities could increase annual revenue generation to $308 million, allowing for a potential bonding capacity of more than $4 billion. Moreover, allowing standard trucks to use the LCV facility will further increase revenues to as much as $500 million. (Note that the modeling methodology used to calculate LCV toll revenue potential did not allow for an accurate analysis of additional revenue potential from non-LCVs using the dedicated facilities.) Developing the LCV facilities from the port to as far as Victorville will maximize its revenue potential by optimally targeting three market segments:
    - The long haul LCV market.
    - The port container LCV market.
    - The remaining standard truck market willing to pay tolls.

Container Fees

- Container fees levied on all containers through the San Pedro Bay ports could allow for a bonding capacity between $1.2 billion and $42.8 billion, depending on the volume of containers and the amount of fee.
- An alternative technology system could impose container fees for those containers using the facility and generate between $122 million and $2.45 billion, depending on the amount of fee.

Truck Lane Cost Estimates

The cost of truck lane systems is required in order to complete the answer to the following question: What portion of dedicated truck lane costs could be offset by user financing, and what additional revenues or funding sources would be needed to support dedicated truck lanes?

Based on previous studies, a per lane mile cost for new facility construction is estimated to be between $6.43 million and $32.44 million, as summarized below. These costs assume new construction, preliminary studies, and right-of-way acquisition:

- An evaluation of planned truck lane projects (excluding preliminary cost estimates for truck lanes on I-710), an average cost of $6.43 million per lane-mile is determined.
- An evaluation of all project costs (including truck lanes and mainline additions) shows an average cost of $32.44 million per lane-mile.
- Based on the cost data presented in the *Briefing Paper - User-Supported Regional Truckways in Southern California* (SCAG, 2004), an average cost of $28.45 million per lane mile was calculated for the regional truck lane system evaluated along I-710, SR-60, and I-15 (from the San Pedro Bay Ports to Barstow).
- It is assumed that given current right-of-way acquisition costs in the urban areas of Southern California, costs of $40 million to $50 million per lane-mile of new facility would not be unreasonable; therefore, a cost of $45 million per lane-mile is taken as a "theoretical maximum" for truck lane construction.

Note that the cost estimates are prepared at a regional level for comparison purposes only. Detailed engineering cost estimates of specific facilities could show great variation, particularly in terms of right-of-way acquisition costs between urban and suburban/rural areas. In addition, utility relocation costs or other location-specific costs (e.g., environmental or cultural resource impacts) could substantially impact facility costs.

Therefore, the following range of costs is identified for the identified project bundles that include a truck lane system:

Table 13
Cost Estimates for Truck Lane Systems

					Lowest		SCAG-Based		Average		Highest		Theoretical Maximum	
Bundle	Description	Distance (mi)	Lanes	Lane-mi	Cost / lane-mi ($Mil)	Cost ($Mil)	Cost / lane-mi ($Mil)	Cost ($Mil)	Cost / lane-mi ($Mil)	Cost ($Mil)	Cost / lane-mi ($Mil)	Cost ($Mil)	Cost / lane-mi ($Mil)	Cost ($Mil)
2	I-710 to SR-60 to I-15	101.5	4	406.0	$6.43	$2,611.69	$28.45	$11,549.56	$26.70	$10,839.14	$32.44	$13,170.06	$45.00	$18,268.20
3	I-710 to I-10 to I-15	98.7	4	394.8	$6.43	$2,539.90	$28.45	$11,232.06	$26.70	$10,541.17	$32.44	$12,808.01	$45.00	$17,766.00
4	I-710 to SR-91 to I-15	87.5	4	349.9	$6.43	$2,250.91	$28.45	$9,954.09	$26.70	$9,341.81	$32.44	$11,350.73	$45.00	$15,744.60
5	I-710 to I-10 (WB) / SR-60 (EB) to I-15	100.1	4	400.4	$6.43	$2,575.79	$28.45	$11,390.81	$26.70	$10,690.16	$32.44	$12,989.04	$45.00	$18,017.10
6	I-710 to SR-91 to SR-57 to SR-60 to I-15	110.0	4	439.8	$6.43	$2,829.65	$28.45	$12,513.45	$26.70	$11,743.74	$32.44	$14,269.19	$45.00	$19,792.80
7	I-710 to SR-91 to I-605 to I-10 to I-15	96.1	4	384.3	$6.43	$2,472.22	$28.45	$10,932.77	$26.70	$10,260.29	$32.44	$12,466.73	$45.00	$17,292.60
8	I-5 (I-710 to Kern County)	74.6	4	298.4	$6.43	$1,919.46	$28.45	$8,488.34	$26.70	$7,966.22	$32.44	$9,679.33	$45.00	$13,426.20
9	I-5 (U.S./Mexico Border to Kern County)	204.6	4	818.4	$6.43	$5,264.82	$28.45	$23,282.34	$26.70	$21,850.24	$32.44	$26,549.05	$45.00	$36,826.20
12	I-15 (U.S./Mexico Border to Victorville)	161.7	4	646.8	$6.43	$4,160.85	$28.45	$18,400.32	$26.70	$17,268.51	$32.44	$20,982.04	$45.00	$29,104.20

Conclusions Based on Cost Estimates

Based on the cost estimates for truck lane systems, the following conclusions are made:

- The **least costly** truck lane system would be on I-5 extending from I-710 (near downtown Los Angeles) to the Kern County line.
- The **most costly** truck lane system would be on I-5 extending from the U.S./Mexico Border to the Kern County line.
    - For the routes extending from the San Pedro Bay Ports to Victorville, the **least costly** would be a truck lane system that includes SR-91 as an east-west connection between I-710 and I-15.
    - For the routes extending from the San Pedro Bay Ports to Victorville, the **most costly** would be a truck lane system that includes both SR-91, SR-57, and SR-60 as east-west connections between I-710 and I-15.

The cost estimates provide additional information to respond to the question: To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? The costs for truck lane systems will be factored into the review of system performance in order to respond to this question.

Based on the earlier evaluation of system performance and land use (described in Chapter 2), it was clear that a truck lane system that includes SR-60 as an east-west connection between I-710 and I-15 offers the best performance for a dedicated truck lane system accessing warehouse and distribution land uses. Therefore, when combined with the evaluation of toll revenue generating potential and the estimate of truck system costs, an answer to the following question presented at the beginning of this Tech Memo is provided:

1. What portion of dedicated truck lane costs could be offset by user financing, and what additional revenues or funding sources would be needed to support dedicated truck lanes?
    a. The response assumes the recommendation of a truck lane system comprised of dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to SR-60), SR-60 (I-710 to I-15), and I-15 (SR-60 to Victorville).
        i. **As shown in the table below, toll revenues provide a bonding capacity of between 33% and 58% of the project cost.** Bonds leveraged from anticipated toll revenue could potentially be a component of the funding and financing proposed for the truck toll lane projects. This conclusion is preliminary and not based on a detailed financial analysis.

Table 14
Estimated Bonding Capacity from Truck Toll Lanes
($ Billion)

	Toll Revenue	Toll Revenue Bonds	% of Project Cost
Conventional Truck Toll	$255	$3,595	33%
LCV Truck Toll	$308	$4,371	40%
Combined LCV/Truck Toll	$436	$6,237	58%

Note that since cost data and traffic forecasts are only conceptual at this time, the toll revenue and bonding potential described above should only be considered as order of magnitude estimates. The following assumptions were used to generate order of magnitude toll revenue bond estimates for each of the truck lane projects:

- Costs for constructing the project is assumed to be $10.839 billion, the average of the range previously described ($2.6 billion to $18.3 billion).
- Annual O&M costs assumed to range between $6.2 Million/year at the low end and $13.6 Million/year at the high end.
- Debt Coverage Ratio of 1.4 times.
- Toll revenue for first year of operations are $255 million for the conventional truck toll, $308 million for the LCV toll and $436 for the combined toll (100% of the LCV revenue and 50% of the conventional truck toll).
- Toll revenue is assumed to grow by 110% over 30 year period.
- Bonds would be issued at an interest rate of 5.75 percent with a 30 year repayment schedule.
- Amortization over 30 years, with project starting in 2030.
- No transaction fees, debt service costs, or debt service reserves have been included at this time, but would be included in future financial strategy development.
- In the absence of a real cost or schedule, the analysis was done in constant dollars. Any future financial strategy development would be based on refined project cost estimates and a proposed project implementation schedule and would be based on year of expenditure dollars.

Using a 40 year amortization could increase the bonding capacity by a further 13%, from 33% to 38% under the conventional toll, and from 58% to 65%.

Results of Detailed Evaluation

As stated in the beginning of this Tech Memo, the purpose of the detailed evaluation is to answer specific questions. The questions are listed below with the answers following:

- To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? In other words, would they be a cost-effective investment?
  - In terms of economic benefits, it is clear that additional investment in the transportation system beyond current levels will be required in order to accommodate the forecast growth in container cargo volumes through the San Pedro Bay Ports; otherwise, the system will be constrained and will perform at less than optimal levels. The forecast growth in container cargo will result in increased truck traffic on the MCGMAP Region's highway system. Therefore, not accommodating the additional truck traffic could lead to less than expected growth in container cargo, which could lead to the reduced job creation forecasts discussed above and a related economic impact; conversely, accommodating truck traffic will lead to economic benefits.
  - Truck lanes offer sufficient benefits to be a preferable alternative (in terms of system performance) to operational and safety improvements (including mixed-flow lanes).
  - More detailed information and analyses would be required in order to accurately respond to the question, particularly in the area of air quality improvements and associated costs.
    - **Therefore, dedicated truck lanes could offer sufficient economic and efficiency (system performance) benefits, however, subject to demonstration of cost-effectiveness and financial feasibility.**

- What portion of dedicated truck lane costs could be offset by user financing, and what additional revenues or funding sources would be needed to support dedicated truck lanes?
  - The response assumes the recommendation of a truck lane system comprised of dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to SR-60), SR-60 (I-710 to I-15), and I-15 (SR-60 to Victorville).
    - **Approximately 33% to 58% of the project cost could be offset by user financing. Container fees could serve as an additional revenue source.**

- What policy changes would facilitate or enhance truck lane feasibility? (e.g., LCV's, mandatory use, etc.)?
  - LCV provisions would increase revenue generation potential and would enhance truck lane feasibility; however, a number of concerns regarding safety, legality, etc. would need to be addressed:
    - The state of California does not allow LCV's on its highways.
    - There is local community resistance to the use of LCV's.
    - A separate truck highway facility will need to be constructed with requisite staging areas to allow trucks to build and breakdown the configurations in order to comply with standards on the general purpose system.
    - The port container LCV market will need further innovation to improve the operations of standard container chassis to operate safely as LCV's.

- Can dedicated truck lanes offer sufficient benefits to be a preferable alternative to other ways of accommodating increased freight traffic (such as adding mixed-flow lanes, adding rail capacity, etc.)?
  - Operational and safety improvements (including mixed-flow lanes) would not affect a change in truck travel patterns or volumes.
  - Operational and safety improvements (including mixed-flow lanes) tend to accommodate demand rather than induce increased volumes.
    - **Therefore, truck lanes offer sufficient benefits to be a preferable alternative to accommodating increased freight traffic, as they would affect the most substantial change on truck travel patterns and volumes on the roadways within the MCGMAP Region.**
  - An advanced technology corridor could be a viable alternative if land use guidelines and policies are strengthened to encourage warehouse clustering near inland staging areas.

- What may be the differential effects of the construction of truck lanes on different sub-regions (i.e. the specific types of benefits and impacts that may occur to different sub-regions, depending on facility location)?
  - The truck lane concepts that include an east-west connection between I-710 and I-15 are the most varied in terms of potential affects to different subregions.
  - When examined in terms of truck volumes, vehicle volumes, changes to congested hours of delay, proximity to schools and residential land uses, and connectivity to warehouse/distribution land uses, SR-60 clearly offers the best performance because of the following:

- A truck lane system includes SR-60 as an east-west connection between I-710 and I-15 would carry the highest truck volumes.
- A truck lane system includes SR-60 as an east-west connection between I-710 and I-15 would carry very high vehicle volumes (compared to other options).
- A truck lane system includes SR-60 as an east-west connection between I-710 and I-15 would affect the least number of schools.
- A truck lane system includes SR-60 as an east-west connection between I-710 and I-15 would affect the least amount of residential land uses.
- A truck lane system includes SR-60 as an east-west connection between I-710 and I-15 would provide the most connectivity to warehouse/distribution land uses.
- **Therefore, a truck lane system from the San Pedro Bay Ports to Victorville on I-710, SR-60, and I-15 would be the preferred option.**
    - **NOTE: SEE UPDATED DISCUSSION IN VOLUME 1 EXECUTIVE SUMMARY**

[1] Source: U.S. GAO Longer Combination Vehicles, Washington D.C., 1994.

[2] Resolution No. C – 28387 – A resolution of the City Council of the City of Long Beach voicing opposition to the operation of longer combination vehicles (LCV) within the jurisdiction of the City of Long Beach, June 15, 2004.

Multi-County Goods Movement Action Plan

Technical Memorandum 7: Mitigation Strategies for the Effects of Goods Movement on Local Communities & the Environment

Prepared for:

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E.0 EXECUTIVE SUMMARY
E.1 Introduction E-1
E.2 Mitigation E-2
Types of Mitigation E-2
Community/Stakeholder Input E-2
Implementing and Funding Mitigation E-2
Mitigation Strategies E-3
Emissions Reduction Strategies E-3
Land Use Strategies E-4
Institutional Policy E-4
E.3 Status of Emission Control Efforts E-4
E.4 Emissions Targets E-5
E.5 Conclusion E-6

1.0 INTRODUCTION
1.1 Purpose of Technical Memorandum 7 1-1

2.0 MITIGATION STRATEGIES
2.1 Types of Mitigation 2-1
Project Specific 2-1
Regional Conformity 2-1
Broader Regional Issues 2-3
2.2 Community/Stakeholder Input 2-4
2.3 Implementing and Funding Mitigation 2-4
2.4 Emissions Reduction Strategies 2-4
2.5 Land Use Strategies 2-7
2.6 Institutional Policy 2-9
2.7 Applied Mitigation Measures 2-11

3.0 EMISSION CONTROL EFFORTS
3.1 Status 3-1

4.0 EMISSION TARGETS

5.0 CONCLUSION

TABLES

Table 1 – Emissions Reduction Strategies 2-5
Table 2 – Land Use Strategies 2-8
Table 3 – Institutional Policy Listing 2-10
Table 4 – Preliminary Port-Related Emissions Targets (tpd) 4-2
Table 5 – 2007 AQMP Recommended Control Measures & Estimated Emissions Reductions for Sources under State and Federal Jurisdiction 4-5

E.1 Introduction

This technical memorandum presents a set of strategies that can be utilized for mitigating the effects of goods movement activities in general, as well as mitigating the potential effects of those particular goods movement strategies proposed in Technical Memorandum 6. This memorandum provides a set of "good practices" that individual jurisdictions, transportation agencies, and the private sector can apply to minimize the potential negative consequences of infrastructure projects and industrial/manufacturing development.

As stated in Tech Memo 5b, during the outreach process (conducted as a part of Task 2), stakeholders within the MCGMAP region voiced strong concern over the impacts of goods movement on the environment, their communities, and their overall quality of life. Due to the serious environmental, public health impacts and traffic congestion issues, communities and policy makers have begun to demand mitigation and to challenge proposals for infrastructure capacity enhancement. The stakeholders within the affected communities are opposing key infrastructure improvement projects that could improve current circumstances; they are calling for slower growth and mitigation of existing impacts.

The stakeholder outreach process has highlighted the critical need to address community and stakeholder concerns regarding the environmental and community impacts of goods movement while pursuing infrastructure improvements. The mitigation of direct and indirect impacts of specific goods movement projects or related activities must become a part of the process from the early stages.

One result of the stakeholder outreach was the understanding by the project partners that a new approach was necessary in order to achieve the goals of simultaneous and continuous improvements to goods movement and the environment. Although this task focused on the identification of good practices (defined as practices that have shown proven positive results), the outreach and associated discussions identified a number of "new" approaches that should be considered.

The MCGMAP was tasked with identifying a set of good practices and action steps for mitigating the impacts of goods movement on the community and the environment. While specific costs or budgets for implementation of mitigation measures (e.g., cost-benefit analyses, environmental assessments) were not a part of the project scope, a detailed discussion of the costs associated with specific environmental and community impact mitigation members can be found within the recent study conducted by the Southern California Association of Governments (SCAG) entitled *Analysis of Goods Movement Emission reduction Strategies*. In addition, the *Clean Air Action Plan* (CAAP) provides a number of measures to mitigate environmental and community impacts in and around the Ports of Los Angeles and Long Beach.

Due to an emphasis on air quality and the related community health impacts within the Multi-County Goods Movement Action Plan study area, this memorandum also summarizes the status of federal, state, and regional level legislative and regulatory emission control efforts associated with the goods movement industry. Further, this memorandum addresses goods movement emissions relating to the 2008 Air Quality Management Plan (AQMP) currently

being drafted by the South Coast Air Quality Management District (SCAQMD), with a focus on PM 2.5 and ozone precursor emissions.[1]

E.2 Mitigation

Types of Mitigation

The current mechanisms for identifying, avoiding, reducing, and mitigating environmental impacts should be improved and expanded. Most environmental impacts are identified and mitigated on a project-specific basis pursuant to state and federal regulations. This leads to a perception by stakeholders that mitigation measures are "band aids" that do not address broader regional concerns. Regional agencies and authorities try to develop plans and identify appropriate mitigation or avoidance measures; yet these measures are typically linked to projects or specific sectors. Therefore, mitigation measures for goods movement should focus on three aspects:

1. Project Specific
2. Regional Conformity
3. Broader Regional Issues

Community/Stakeholder Input

CEQA and NEPA are public disclosure tools. Each time a project is seriously considered, each regulation requires disclosure to the public. For EIRs/EISs, public scoping meetings are required, sponsored by the lead agency. Public circulation/comments periods are prescribed.

In some cases (such as the I-710 / Major Corridor Study Tier 2 Advisory Committee), stakeholder and community members are brought together to identify solutions to address environmental, community, and health impacts. This type of process can be folded into the CEQA/NEPA process to identify project-specific mitigation measures. It can also serve as a framework for addressing the broader cumulative concerns of a community or region.

Implementing and Funding Mitigation

The critical component for mitigation and avoidance measures is funding availability. Discrete projects with discrete mitigation or avoidance measures have the highest likelihood of funding (both from a public and private sector perspective). Therefore, in the development and identification of broader strategies to mitigate regional or cumulative impacts, it will be critical

[1] Ozone is not a pollutant directly emitted from mobile and non-mobile sources, but develops as a result of a combination of precursor emissions, such as nitrogen oxides (NOx) and reactive organic gases (ROG). Therefore, emissions budgets for ozone are not established by regulatory agencies.

to identify a nexus between projects or market segments and specific impacts. It will also be critical to bring all affected groups (stakeholders, community members, public agencies, private industry) together early in the process.

Mitigation Strategies

Numerous mitigation strategies are available to reduce the effects of goods movement on the community and the environment. A primary concern of community and environmental effects is air quality. Goods movement emissions, primarily mobile source emissions, are a significant source of pollution in the study area. The effects are especially egregious due to the potential health impacts resulting from pollutants. The goods movement industry is heavily dependent upon diesel fuel for mobility and operations. As discussed in Technical Memorandum 5B (TM 5b) of this action plan, diesel fuel results in the emissions of diesel particulate matter (DPM), which has been identified as a toxic air contaminant (TAC) by the state's Office of Environmental Health Hazard Assessment (OEHHA). Diesel fuel is also a significant contributor of nitrogen oxides (NOx), the primary pollutant for ozone formation. Both DPM and NOx are linked to various health issues especially in susceptible populations (the young and the elderly), including cancer, asthma, and preterm and low birth weight babies. Due to the current diesel fuel dependency within the goods movement industry, this action plan is targeting emissions reductions. In addition, this action plan addressed mitigation strategies for land use and institutional policies.

Emissions Reduction Strategies

The goods movement mobile sources targeted for emissions reduction include ships, harbor craft, rail, cargo handling equipment, and trucks. Aircraft, while a goods movement mobile source, generally have not yet been targeted for emissions reductions efforts primarily because emissions reporting do not identify aircraft as a significant source of pollutants in comparison to other mobile sources.[2]

Many emissions reduction strategies can be applied to goods movement, regardless of mode. Such strategies focus on fuel and engine technologies, as well as congestion reduction and operational approaches. Fuels and engine technologies concentrate on the reduction of particulate matter (PM), nitrogen oxides (NOx), and sulfur oxides (SOx) at the source. Congestion reduction and operational strategies can be considered to mitigate the negative effects of goods movement including corridor congestion, safety concerns from mixed-use traffic, and truck traffic diversion into neighborhoods, in addition to emissions reductions. Goods movement emissions reduction strategies are centered on various available engine technologies and alternative fuels, and are recognized as being potentially effective within the California Air Resource Board *Emission Reduction Plan for Ports and Goods Movement in California*, San Pedro Bay Ports *Clean Air Action Plan*, and South Coast Air Quality Management District

[2] The SCAQMD 2003 AQMP estimated that the 2005 annual average aircraft emissions in the SCAB contributed less than 3% NOx, 1.6% SOx, 0.6% PM2.5 of the total emissions from all sources in the Basin. For further discussion, refer to TM 5b Table 4, or the 2003 AQMP.

Draft 2007 Air Quality Management Plan. Such strategies include improved diesel fuels, shore-based electrical power for ships, hybrid technologies, and engine retrofits. A further listing of engine technologies and alternative fuels is available in the full technical memorandum.

Land Use Strategies

The effects of goods movement on local communities are largely a result of the proximity of goods movement corridors and facilities to the places where people live, work, and recreate. This result is unintended – most corridors and facilities were initially constructed in areas with sparse population. Over time, however, the dramatic growth in both population and trade has resulted in encroaching land uses that produce undesirable effects (as discussed in TM 5b.) In addition to the air quality impacts addressed in the previous section, undesirable community effects can also include noise and vibration, visual, safety, and natural resource impacts. Further, these effects can give rise to environmental justice concerns.

Potential land use strategies range from grade separations for noise/vibration and safety mitigation, buffers to improve aesthetics and reduce noise, and appropriate regulatory compliance during project planning activities to prevent the degradation of natural resources. A further listing of land use policies is available in the full technical memorandum.

Institutional Policy

Agencies that have regulatory and/or funding purview for goods movement-related activity can influence, either directly or indirectly, the environmental and community effects resulting from the goods movement industry. Many of these strategies have already been implemented or are suggested by various sources, including among others: CARB's Emission Reduction Plan, the Ports' CAAP, and SCAQMD Draft 2007 AQMP. Such institutional policies include establishing stricter emissions control regulations. Other institutional policies include enforcement, education, and monetary incentives or disincentives to enhance emissions reductions to achieve air quality goals. A further listing of institutional policies is available in the full technical memorandum.

E.3 Status of Emission Control Efforts

Several federal, state, and regional level legislative and regulatory emission control efforts associated with the goods movement industry have been initiated. As referenced in the previous section, emissions related to goods movement are primarily derived from diesel-fueled sources. The five major sources include: Ocean Going Vessels (OGVs, or ships), On-Road Heavy-Duty Vehicles (HDVs, or trucks), Cargo Handling Equipment (CHE), Harbor Craft (HC), and Railroad Locomotives (RL, or trains). The responsibility for the emissions control of the majority of these sources falls under the jurisdiction of local (South Coast Air Quality Management District, or SCAQMD), state (California Air Resource Board, or CARB), or federal (Environmental Protection Agency, or EPA) agencies.

E.4 Emissions Targets

Freight and port-related mobile sources such as ships, trucks, cargo handling equipment, harbor craft, and trains are major contributors to the emissions inventory in the South Coast Air Basin. In April 2006, CARB adopted its Emission Reduction Plan for Ports and Goods Movement in California (Emission Reduction Plan), which established the framework for actions to reduce the air quality and health impacts from the Ports and other goods movement activities in the state (as discussed in TM 5b). In June 2006, both the ports of Long Beach and Los Angeles released the San Pedro Bay Ports Clean Air Action Plan (CAAP), which set out emission reduction goals and control strategies necessary to reduce the emissions from port-related sources. Emission reductions from port-related sources are required in order to show attainment with the ambient air quality standards for new federal PM2.5 and the 8-hour ozone standards. The Draft 2007 Air Quality Management Plan (AQMP) contains port-related measures that build upon both the Emission Reduction Plan and CAAP with enhancements by the SCAQMD to reflect the reductions needed for attainment. Specifically, the Draft 2007 AQMP proposes that locomotives go beyond the Emission Reduction Plan and CAAP by requiring all locomotives operating in the SCAB to be Tier 3 equivalent by 2020. For ocean-going vessels, the Draft 2007 AQMP proposes that all ships operating within 40 nautical miles to operate on 0.2 percent sulfur fuel beginning in 2008, with another reduction to 0.1 percent sulfur beginning in 2010. In addition, the draft plan calls for ships to comply with the vessel speed reduction proposal specified in the CAAP, as well as similar retrofit penetration rates for 2014 and 2020 to what is called for in the State's Emission Reduction Plan.

The estimated emission reductions and final emissions targets needed from port-related sources to demonstrate attainment are[3]:

- NOx – reduce 48.8 tons per day (tpd) by 2014, and 32.7 tpd by 2020
- SOx – reduce 1.6 tpd by 2014, and 2.0 tpd by 2020
- PM2.5 – reduce 3.4 tpd by 2014, and 2.8 tpd by 2020

To achieve the emissions targets, SCAQMD is recommending the specific goods movement-related emissions reduction control measures for the 2007 AQMP, as summarized in Table 1.

[3] Port emissions estimated by assigning all ships, harbor craft, and port-related cargo handling equipment emissions to port inventory. Emissions from trucks and locomotives operating at the ports are based on the percentage of international goods movement compared to all goods movement (international plus domestic) emissions from CARB's Emission Reduction Plan statewide estimate for trucks and locomotives.

TABLE 1
2007 AQMP Recommended Control Measures & Estimated Emissions Reductions for Sources under State and Federal Jurisdiction

Control Measure Number	Control Measure Title	Estimated Reductions (tpd)	
		2014	2020
ONRD-07	Greater Use of Diesel Fuel Alternatives and Diesel Fuel Reformulation	NOx: 30.3 PM2.5: 2.3	NOx: 19.1 PM2.5: 1.2
ONRD-08	Accelerated Retrofits of Heavy-Duty Vehicles	NOx: 3.2 PM2.5: 0.2	NOx: 4.6 PM2.5: 0.3
ONRD-09	In-Use Emission Reductions from On-Road Heavy-Duty Vehicles	VOC: 0.3 NOx: 6.1 PM2.5: 0.1	VOC: 0.3 NOx: 5.1 PM2.5: 0.1
ONRD-10	Further Emission Reductions from Out-of-State/ International Registered Heavy-Duty Vehicles	NOx: 0.4 PM2.5: 0.03	NOx: 0.6 PM2.5: 0.03
ONRD-11	Enhanced Inspection and In-Use Emissions Tracking of Heavy-Duty Vehicles	VOC: 1.5 NOx: 16.7 PM2.5: 0.2	VOC: 1.4 NOx: 17.8 PM2.5: 0.1
ONRD-12	Further Emission Reductions from Heavy-Duty Trucks Providing Freight Drayage Services	VOC: 0.1 NOx: 2.6 PM2.5: 0.1	VOC: 0.1 NOx: 2.3 PM2.5: 0.1
OFFRD-05	Further Emission Reductions from Locomotives	NOx: 15.3 PM2.5: 0.5	NOx: 17.7 PM2.5: 0.7
OFFRD-06	Clean Marine Fuel Requirements for Ocean-Going Marine Vessels	NOx: 7.3 SOx: 45.6 PM2.5: 4.0	NOx: 9.3 SOx: 59.6 PM2.5: 5.2
OFFRD-07	Further Emission Reductions from Ocean-Going Marine Vessels and Harbor Crafts While at Berth	VOC: 0.5 NOx: 20.4 SOx: 0.6 PM2.5: 0.6	VOC: 0.7 NOx: 27.4 SOx: 0.8 PM2.5: 0.9
OFFRD-08	Further Emission Reductions from Cargo Handling Equipment	NOx: 1.0	NOx: 0.6
OFFRD-09	Vessel Speed Reduction	NOx: 17.4	NOx: 23.2
OFFRD-10	Further Emission Reductions from Ocean-Going Vessels	NOx: 13.9	NOx: 24.1

Source: SCAQMD 2007 Draft AQMP.

E.5 Conclusion

This technical memorandum provides a range of approaches to mitigate the environmental and community effects stemming from the goods movement industry. The approaches present a compendium of best practices that can be utilized by various agencies and jurisdictions. Many such approaches have been either recently adopted or is on the immediate horizon for adoption as they relate to emissions reductions.

This technical memorandum, in conjunction with the other previous technical memorandums, will be lead into the actual Action Plan itself – that is, the development of a plan that recommends goods movement improvement strategies for the study area that have positive economic impacts and which minimize the related environmental and community effects.

1.1 Purpose of Technical Memorandum 7

This technical memorandum presents a set of strategies that can be utilized for mitigating the effects of goods movement activities in general, as well as mitigating the potential effects of those particular goods movement strategies proposed in Technical Memorandum 6. This memorandum is not intended as a California Environmental Quality Act (CEQA)-type analysis of mitigating strategies nor will it identify specific obligations of individual member agencies. Rather, it is intended to delineate a range of approaches for addressing the community impacts of goods movement, which were summarized in Technical Memorandum 5b (TM 5b). This memorandum provides a set of "good practices" that individual jurisdictions, transportation agencies, and the private sector can apply to minimize the potential negative consequences of infrastructure projects and industrial/manufacturing development.

As stated in Tech Memo 5b, during the outreach process (conducted as a part of Task 2), stakeholders within the MCGMAP region voiced strong concern over the impacts of goods movement on the environment, their communities, and their overall quality of life. Due to the serious environmental, public health impacts and traffic congestion issues, communities and policy makers have begun to demand mitigation and to challenge proposals for infrastructure capacity enhancement. The stakeholders within the affected communities are opposing key infrastructure improvement projects that could improve current circumstances; they are calling for slower growth and mitigation of existing impacts.

The stakeholder outreach process has highlighted the critical need to address community and stakeholder concerns regarding the environmental and community impacts of goods movement while pursuing infrastructure improvements. The mitigation of direct and indirect impacts of specific goods movement projects or related activities must become a part of the process from the early stages.

One result of the stakeholder outreach was the understanding by the project partners that a new approach was necessary in order to achieve the goals of simultaneous and continuous improvements to goods movement and the environment. Although this task focused on the identification of good practices (defined as practices that have shown proven positive results), the outreach and associated discussions identified a number of "new" approaches that should be considered.

The MCGMAP was tasked with identifying a set of good practices and action steps for mitigating the impacts of goods movement on the community and the environment. While specific costs or budgets for implementation of mitigation measures (e.g., cost-benefit analyses, environmental assessments) were not a part of the project scope, a detailed discussion of the costs associated with specific environmental and community impact mitigation members can be found within the recent study conducted by the Southern California Association of Governments (SCAG) entitled *Analysis of Goods Movement Emission reduction Strategies*. In addition, the *Clean Air Action Plan* (CAAP) provides a number of measures to mitigate environmental and community impacts in and around the Ports of Los Angeles and Long Beach.

Due to an emphasis on air quality and the related community health impacts within the Multi-County Goods Movement Action Plan study area, this memorandum also summarizes the status of federal, state, and regional level legislative and regulatory emission control efforts associated with the goods movement industry. As always, such information is dynamic and time-sensitive; therefore, it is the intent of this memorandum to capture a "snap-shot" of such policy activities that are targeting the emissions of the goods movement industry. Further, this memorandum will address goods movement emissions relating to the 2008 Air Quality Management Plan (AQMP) currently being drafted by the South Coast Air Quality Management District (SCAQMD), with a focus on PM 2.5 and ozone precursor emissions.[1]

Numerous mitigation strategies are available to reduce the effects of goods movement on the community and the environment. As presented in TM 5b, the effects are intertwined – that is, effects on the environment are also effects on the local community's quality of life, and to separate the two when developing an action plan is moot.

A primary concern of community and environmental effects is that of air quality. Goods movement emissions, primarily mobile source, are a significant source of pollution in the study area. The effects are especially egregious due to the potential direct health impacts resulting from pollutants. The goods movement industry is heavily dependent upon diesel fuel for mobility and operations. As discussed in TM 5b, diesel fuel results in the emissions of diesel particulate matter (DPM), which has been identified as a toxic air contaminant (TAC) by the state's Office of Environmental Health Hazard Assessment (OEHHA). Diesel fuel is also a significant contributor of nitrogen oxides (NOx), the primary pollutant for ozone formation. Both DPM and NOx are linked to various health issues especially in susceptible populations (the young and the elderly), including cancer, asthma, and preterm and low birth weight babies. Due to the current dependency of the goods movement industry on diesel fuel, the spotlight of this action plan, as with any such action plan, is emissions reduction.

[1] Ozone is not a pollutant directly emitted from mobile and non-mobile sources, but develops as a result of a combination of precursor emissions, such as nitrogen oxides (NOx) and reactive organic gases (ROG). Therefore, emissions budgets for ozone are not established by regulatory agencies.

2.1 Types of Mitigation

The current mechanisms for identifying, avoiding, reducing, and mitigating environmental impacts should be improved and expanded. Most environmental impacts are identified and mitigated on a project-specific basis pursuant to state and federal regulations. This leads to a perception by stakeholders that mitigation measures are "band aids" that do not address broader regional concerns. Regional agencies and authorities try to develop plans and identify appropriate mitigation or avoidance measures; yet these measures are typically linked to projects or specific sectors. Therefore, mitigation measures for goods movement should focus on three aspects:

1. Project Specific
2. Regional Conformity
3. Broader Regional Issues

Project Specific

For project specific mitigation, the California Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA) regulations force the project analysis and identification of mitigation. The project lead agency (for example, Caltrans for a highway project, ACE for the Alameda Corridor, the Port of Los Angeles for a port project, etc.) is required to identify mitigation measures as part of the environmental document (EA, EIR, EIS, etc.) If they don't identify mitigation measures that are deemed appropriate by a myriad of responsible agencies, trustee agencies, and other public agencies that have jurisdiction by law with respect to the project (reviewing agencies), then the lead agency will (a) not get there needed permits to do the project, and/or (b) face litigation. Once the lead agency adopts/certifies the environmental document and mitigation measures are identified, they must also, under CEQA, adopt a Mitigation Monitoring & Report Program (MMRP). Legally they are required to fulfill their duty and implement those measures at their own cost as part of the project. If they don't, they can face litigation. The state CEQA and federal NEPA processes/documents are legally binding. Also, the public can sue if (a) the process was not correctly adhered to, or (b) the project proceeds differently than outlined in the environmental document (including failure to implement mitigation measures.) Sometimes a project does not require any mitigation at all if there are no significant impacts identified in consultation with the experts (the environmental consultant and/or appropriate agencies).

Regional Conformity

From the California ARB[2]:

> State and federal law require regional planning officials to prepare both a transportation plan to benefit public mobility and an air quality plan to benefit public health. Under the federal Clean Air Act, transportation activities that receive federal funding or approval must be found to be

[2] http://www.arb.ca.gov/planning/tsaq/conformity/nutshell.doc

fully consistent with the plan developed to meet federal clean air standards, known as the State Implementation Plan, or SIP.

The requirement that federal activities--especially transportation plans and projects--be shown to help communities attain federal air quality standards is known as conformity.

Conformity applies to federal transportation decisions in all areas that are designated "nonattainment" for specific pollutants (ozone, carbon monoxide, particulate matter) by the U.S. Environmental Protection Agency (U.S. EPA). These are areas that have recorded violations of the National Ambient Air Quality Standards. "Attainment" areas that have adopted air quality maintenance plans are also subject to conformity.

Areas that have exceeded the more stringent State of California air quality standards but are within national standards are not subject to conformity. The California Environmental Quality Act applies to plans and projects in these areas, however.

Adoption by a metropolitan planning organization (MPO) of a 20-year regional transportation plan (RTP), or a short-term federal transportation improvement program (TIP), must include a conformity analysis prepared by the MPO. In addition, sponsors of transportation projects that require a federal approval are responsible for assessing project conformity. Final determinations of conformity for RTPs, TIPs and projects are made by the Federal Highway Administration and the Federal Transit Administration.

Conformity assessments are part of a broader regional transportation planning process carried out by the MPO, or by another transportation agency in less urbanized areas. Because joint transportation and air quality planning assists both conformity assessments and air pollution reduction efforts, local air districts and transportation planning agencies regularly consult with each other and with involved state and federal agencies. Local transportation and air quality planning processes are also open to interested organizations and members of the public.

Project conformity is first tied to regional conformity. Generally the project must be part of the metropolitan planning organization's conforming RTP and TIP. Outside of metropolitan planning areas, projects need to be included in a regional emissions analysis performed by a neighboring MPO or the California Department of Transportation (Caltrans).

All "regionally significant" projects, regardless of funding source, should be accounted for in the regional emissions analysis. City and county public works agencies have responsibility for assuring that significant arterial projects are included in the analysis.

In carbon monoxide (CO) nonattainment and maintenance areas, project sponsors also need to demonstrate that their projects will not result in a localized violation of CO standards, or increase the frequency or severity of existing violations. UC Davis researchers have developed a carbon monoxide analysis protocol for making this assessment.

Caltrans has responsibility for assessing the conformity of state highway projects, and the actual conformity determination is made by the Federal Highway Administration. Transit

project conformity findings are made by the Federal Transit Administration.

Finally, some safety and rehabilitation projects, as well as certain projects with neutral or beneficial effects on air quality, are exempt from conformity. These project types are listed in the federal conformity regulation.

Federal funds cannot be spent for transportation plans, programs and projects that do not conform to the SIP. Federal funds for transit and highway improvements can be delayed, diverted, or even lost, as only SIP TCMs and a limited set of exempt projects and programs can be funded.

Because conformity failures have great implications for both mobility and air quality improvement, involved agencies work hard to correct them.

Successful conformity findings benefit from a dynamic, interactive regional planning process that considers both air pollution reduction and transportation needs. For this reason, affected regions are required to develop and include in the SIP specific procedures for consultation on conformity findings and transportation-air quality planning. With continual input from each other and from concerned members of the public, decision-makers can make informed choices that improve air quality and mobility at the same time.

Broader Regional Issues

Innovative strategies for avoiding / mitigating environmental impacts can include:

1. Mitigation banking
2. Creating land use buffers
3. Research grants

These strategies can be identified through activities such as the Southern California National Freight Gateway Framework Strategy effort currently being undertaken by Metro. This effort involves bringing a group of principal convenors together to develop preliminary scoping for topics including[3]:

- Processes and approaches for the coordination of environmental reviews and, more specifically, the addressing of cumulative and systemic environmental and community impacts and effects (e.g., those related to environmental justice) under NEPA and CEQA.
- Funding principles and alternatives (including fees and tolls; and, possible institution(s) to hold, disburse and monitor combined funds).

[3] Lindell Marsh, January 31, 2007; "Results of Next Steps Meeting Convened on Monday, January 29, 2007"

2.2 Community/Stakeholder Input

CEQA and NEPA are public disclosure tools. Each time a project is seriously considered, each regulation requires disclosure to the public. For EIRs/EISs, public scoping meetings are required, sponsored by the lead agency. Public circulation/comments periods are prescribed.

In some cases (such as the I-710 / Major Corridor Study Tier 2 Advisory Committee), stakeholder and community members are brought together to identify solutions to address environmental, community, and health impacts. This type of process can be folded into the CEQA/NEPA process to identify project-specific mitigation measures. It can also serve as a framework for addressing the broader cumulative concerns of a community or region.

2.3 Implementing and Funding Mitigation

The critical component for mitigation and avoidance measures is funding availability. Discrete projects with discrete mitigation or avoidance measures have the highest likelihood of funding (both from a public and private sector perspective). Therefore, in the development and identification of broader strategies to mitigate regional or cumulative impacts, it will be critical to identify a nexus between projects or market segments and specific impacts. It will also be critical to bring all affected groups (stakeholders, community members, public agencies, private industry) together early in the process.

2.4 Emissions Reduction Strategies

The goods movement mobile sources targeted for emissions reduction include ships, harbor craft, rail, cargo handling equipment, and trucks. Aircraft, while a goods movement mobile source, generally have not yet been targeted for emissions reductions efforts primarily because emissions reporting do not identify aircraft as a significant source of pollutants in comparison to other mobile sources.[4]

Many emissions reduction strategies can be applied to goods movement, regardless of mode. Such strategies focus on fuel and engine technologies, as well as congestion reduction and operational approaches. Fuels and engine technologies concentrate on the reduction of particulate matter (PM), nitrogen oxides (NOx), and sulfur oxides (SOx) at the source. Congestion reduction and operational strategies can be considered to mitigate the negative effects of goods movement such as corridor congestion, safety concerns from mixed-use traffic, and truck traffic diversion into neighborhoods, in addition to emissions reductions. Table 1 presents various emissions reduction strategies that have been aggregated from multiple sources, including among others: California Air Resource Board *Emission Reduction Plan for Ports and Goods Movement in California*, San Pedro Bay

[4] The SCAQMD 2003 AQMP estimated that the 2005 annual average aircraft emissions in the SCAB contributed less than 3% NOx, 1.6% SOx, 0.6% PM2.5 of the total emissions from all sources in the Basin. For further discussion, refer to TM 5b Table 4, or the 2003 AQMP.

Ports *Clean Air Action Plan*, and South Coast Air Quality Management District *Draft 2007 Air Quality Management Plan*.

TABLE 1
Emissions Reduction Strategies

FUELS & ENGINE TECHNOLOGIES
Ships
Low-Sulfur Diesel Fuels
Emulsified Diesel
Shore-based Electrical Power (Cold Ironing)
Dedication of Cleanest Fuels to California Service
Diesel oxidation catalyst retrofit
Diesel particulate filter (DPF) retrofit
Improved Original Equipment Manufacturer (OEM) Engines – main & auxiliary
Speed Reduction
Harbor Craft
Cleaner Engines
Biodiesel Fuel
Liquefied Natural Gas (LNG)
Liquefied Petroleum Gas (LPG)
Ethanol
Diesel oxidation catalyst retrofit
Diesel particulate filter (DPF) retrofit
Selective catalytic reduction (SCR) systems
Shore-based Electrical Power (Cold Ironing)
Cargo Handling Equipment
Fleet modernization with improved OEM Engines
Biodiesel Fuel
Liquefied Natural Gas (LNG)
Liquefied Petroleum Gas (LPG)
Fuel-cell
Electrification
Fischer-Tropsch fuel
Emulsified diesel

TABLE 1
Emissions Reduction Strategies

Diesel-electric
Diesel oxidation catalyst retrofit
Diesel particulate filter (DPF) retrofit
Rail
Biodiesel Fuel
Liquefied Natural Gas (LNG)
Compressed Natural Gas (CNG)
Fuel-cell
Electrification
Fischer-Tropsch fuel
Emulsified diesel
Diesel-electric hybrid (e.g., Green Goat)
Fleet modernization with improved OEM Engines
On-board engine diagnostics
Trucks
Fleet modernization with improved OEM Engines
Biodiesel Fuel
Liquefied Natural Gas (LNG)
Compressed Natural Gas (CNG)
Emulsified diesel
Propane fuel
Diesel-electric hybrid
Transport Refrigeration Unit (TRU) engine improvements
CONGESTION REDUCTION/OPERATIONS
Electronic cargo manifest
Grade separations at highway-rail crossings
Dedicated lanes, including possibility for automobile and truck tolls
Rail capacity expansion
Extended port and/or distribution gate hours (e.g., PierPass)
Shift operations to other ports
Modal shift from truck to rail
Shuttle trains in lieu of trucks between ports and warehouses (short-haul)
Virtual container yard

TABLE 1
Emissions Reduction Strategies

Increased on-dock rail
Creation of near-dock rail terminal
Engine idling restrictions for rail and trucks
Maglev technology
Efficiency through facility planning and design
Near-dock rail
Traffic Management Plan (TMP) – during project construction

Source: Jones & Stokes. 2006.

2.5 Land Use Strategies

The effects of goods movement on local communities are largely a result of the proximity of goods movement corridors and facilities to the places where people live, work, and recreate. This result is unintended – most corridors and facilities were initially constructed in areas with sparse population. Over time, however, the dramatic growth in both population and trade has resulted in encroaching land uses that produce undesirable effects (as discussed in TM 5b.) In addition to the air quality impacts addressed in the previous section, undesirable community effects include noise and vibration, visual, safety, and natural resource impacts. Table 2 identifies various strategies relating to land use that may be considered for mitigating the effects of goods movement. These land use strategies derive from various public agency studies and guidelines including the Federal Highway Administration, Federal Railroad Administration, and US Department of Transportation. Industry best practices and resource agency mandates are sources, as well.

TABLE 2
Land Use Strategies

LAND USE STRATEGIES
Noise & Vibration
Railroad Quiet Zones
Grade Separations – reduce noise from train horns & tire/rail interaction
Noise barriers (e.g., sound walls, berms)
Rubberized asphalt on highways
Exhaust mufflers on trucks
Tunneling of corridors
Building and window insulation
Prohibition of truck Jake brake usage
Siting/orientation of amplification systems
Noise control policy implementation during construction activities
Aesthetics
Landscaping – avoid non-native or invasive vegetation.
Barriers – landscaped berms; walls with possible artistic elements
Below-grade facilities – prevent visual perception of rail or truck corridors
Matte or diffuse building materials in locations of external lighting to prevent glare
Property acquisition land use buffering
Façade illumination from fixed downlight sources
Shielding & aiming of light fixtures
Low-level wattage lighting for landscaping and plazas
Low-height pedestrian poles, bollards, and steplights
Lighting design for minimum necessary illumination generation
Safety
Grade separation
Pedestrian crossing improvements
Natural Resources
New, replaced, or replanted vegetation removed shall be native vegetation appropriate to the setting.
On a project-specific basis, develop a Stormwater Pollution Prevention Plan (SWPPP) if required.

TABLE 2
Land Use Strategies

Comply with Section 404 of the Clean Water Act concerning activities that result in discharge of dredged, fill, or excavated material in waters of the US.
Comply with Section 402 of the Clean Water Act and National Pollutant Discharge Elimination System (NPDES) standards during and following construction to ensure that dirt, construction materials, pollutants, or other human-associated materials are not discharged from the project area.
Comply with California Department of Fish & Game Section 1600 et seq.
Comply with the Migratory Bird Treaty Act.
Comply with any locally adopted tree protection ordinances as required
Comply with Federal and State Endangered Species Acts
Comply with Federal and State Clean Water Acts
Comply with Coastal Zone Management Act
Comply with Natural Community Conservation Planning (NCCP) Act by coordinating with NCCP/Habitat Conservation Plan (HCP) organizations where applicable.
Recycled water usage for project construction activities and irrigation
Design facility elements to accommodate the natural filtration/attenuation of runoff to the maximum extent possible in order to prevent erosion and to preserve more stable soil conditions.
Cultural Resources
Verify the presence of existing or eligible historic resources. Any historic materials removed shall be replaced with materials that are consistent with the original historic design.
A certified archaeologist shall monitor project-related ground disturbing activities in areas of archeological sensitivity.
Excavation shall be monitored by a qualified paleontologic monitor in areas identified as likely to contain paleontologic resources.

Source: Jones & Stokes, 2006

2.6 Institutional Policy

Agencies that have regulatory and/or funding purview for goods movement-related activity can influence, either directly or indirectly, the environmental and community effects resulting from the goods movement industry. To achieve this end, Table 3 provides a listing of institutional policies that may be considered for mitigating the effects of goods movement. Many of these strategies have already been implemented or are suggested by various sources, including among others: CARB's Emission Reduction Plan, the Ports' CAAP, and SCAQMD Draft 2007 AQMP.

TABLE 3
Institutional Policy Listing

POLICY
Dedication of Cleanest Fuels to California Service
Implement Sulfur Emission Control Area (SECA)
Monetary incentives/disincentives for vehicle replacements, engine upgrades, and other technology retrofits
Regulatory engine idling reduction
Mandatory engine performance standards
Mandatory emission controls
Anti-idling training & awareness programs
Zoning and land use regulations for land use compatibility
Community reporting of engine idling violators
Enforcement of emissions control requirements
Environmental justice considerations & public outreach requirements
Establish public-private partnerships for practical and innovative strategies

Source: Jones & Stokes, 2006.

2.7 Applied Mitigation Measures

The following are a list of environmental and community mitigation measures that may be applied to projects and strategies discussed in Technical Memorandums 6a and 6b. These mitigation measures are suggested as a starting point and are not intended to constitute an exhaustive or prescriptive list. MCGMAP agencies and community members can jointly consider these and other mitigation measures to match the particular characteristics of specific goods movement projects. Therefore, a holistic approach to projects – one that maximizes the benefits and minimizes the impacts – can be realized.

Expansion of On-Dock Rail at Ports

- On-dock rail vehicles and support equipment to use alternative fuels, such as electrification, diesel-electric hybrid, or compressed natural gas, to achieve reductions in emissions-related pollutants, including PM, NO2, and SO2.
- Implementation of on-board engine diagnostics on rail vehicles to adjust and optimize engine operations that minimize pollutant emissions.
- On-site maintenance of rail cars and support equipment to be located away from open bodies of water and storm drains. Outfit storm drains within the vicinity with secondary pollution prevention measures.
- Implement and enforce idling restrictions for rail, cargo trucks, and support equipment.
- Permit only trucks meeting certain engine and fuel technology standards to access on-dock facilities.
- Design on-dock expansion to facilitate and maximize efficient vehicle throughput to minimize dwelling time of rail, truck, and support vehicles. Reevaluate existing design to optimize site and avoid piece-meal expansion approaches for a fully integrated, smart design.

Additional Intermodal Facilities/Freight Yards

- Vehicles and support equipment to use alternative fuels, such as electrification, diesel-electric hybrid, or compressed natural gas, to achieve reductions in emissions-related pollutants, including PM, NO2, and SO2.
- On-site maintenance of freight vehicles and support equipment to be located away from open bodies of water and storm drains. Outfit storm drains within the vicinity with secondary pollution prevention measures.
- Design intermodal facilities/freight yards to facilitate and maximize efficient vehicle throughput to minimize dwelling time of rail, truck, and support vehicles.
- Orient facility lighting and amplification systems to avoid/minimize spillover to surrounding land uses.
- Use non-invasive plant species to create visual, landscaped buffer between the facility and nearby properties.
- Construct physical barriers with artistic elements around the facility for aesthetic and noise benefits.

- Site freight facility in non-residential areas. Design facility access that avoids or minimizes use of roadway facilities heavily utilized by local traffic.

Addition of Mainline Rail Capacity

- Implement Federal Railroad Administration-approved Quiet Zones.
- Rail engines to use on-board engine diagnostics and alternative fuels to minimize emissions pollutants.

Modification of Port Operation/Delivery Hours

- If port hours are extended, create truck routes on arterials and prohibit truck diversion onto residential streets.

Construction of Exclusive Truck Lanes

- Permit only trucks meeting certain engine and fuel technology standards to access exclusive truck lanes.

Allow Use of LCVs on Dedicated Facilities

- Construct noise barriers on LCV dedicated facilities in areas near residences, schools, and community facilities.

Additional Rail Grade Separations

- Adopt and implement Traffic Management Plan (TMP) to effectively address traffic issues during construction of the grade separation. Coordinate and consult with local Department of Transportation, school board, and fire and police departments to identify alternative routes for vehicles, emergency vehicles, school buses, and pedestrians in advance of grade separation construction.

Implement Institutional Changes to Improve Feasibility of Large Scale/Mega Projects

- Obtain state legislative authority to apply Carl Moyer program funds to retrofit private-owner truck fleet.

Additional Freeway Lanes/Capacity

- Construct noise barriers in areas near residences, schools, and community facilities.
- Where possible, avoid right-of-way (ROW) acquisitions by expanding freeway facilities toward the inside shoulders and median instead of expanding towards the outside shoulders and abutting properties.
- Use rubberized asphalt on freeway lanes to reduce traffic noise.
- Construct "greenbelt" between freeway expansion and neighboring properties to provide a spatial and aesthetic buffer.

Increase Port/Rail Yard Freight Capacity

- Permit "clean" ships only to access new docks and terminals.

3.1 Status

Several federal, state, and regional level legislative and regulatory emission control efforts associated with the goods movement industry have been initiated. As referenced in the previous section, emissions related to goods movement are primarily derived from diesel-fueled sources. The five major sources include: Ocean Going Vessels (OGVs, or ships), On-Road Heavy-Duty Vehicles (HDVs, or trucks), Cargo Handling Equipment (CHE), Harbor Craft (HC), and Railroad Locomotives (RL). The responsibility for the emissions control of the majority of these sources falls under the jurisdiction of local (South Coast Air Quality Management District, or SCAQMD), state (California Air Resource Board, or CARB), or federal (Environmental Protection Agency, or EPA) agencies. Below is a list of recently adopted regulatory measures that will reduce emissions from the goods movement industry.

Ocean Going Vessels (Ships)

- *Emissions Standard for Marine Propulsion Engines*
  The International Maritime Organization (IMO) established limits for NOx in Annex VI to the International Convention for the Prevention of Pollution from Ships in 1997. IMO limits apply to marine vessel engines over 130 kilowatts (kW) installed on vessels built on or after 2000. Depending upon the engine speed in revolutions per minute (rpm), the NOx standards vary between 17.0 g/kW-hr (for < 130 rpm) to 9.8 g/kW-hr (for ≥2000 rpm). While a majority of countries have ratified the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI, it has yet to be fully ratified by the United States. It has been approved by the U.S. Senate (7 April 2006), an important step toward ratification. Despite the formal status of Annex VI, it is believed that engines manufactured after 2000 will meet the standard due to the retroactive nature of the regulation (i.e., once fully in effect engines must comply, and the simplest way for that to occur is for them to be manufactured to comply).

- *Vessel Speed Reduction (VSR) Program*
  In May of 2001, a Memorandum of Understanding (MOU) between the Port of Los Angeles (POLA), Port of Long Beach (POLB), EPA, CARB, SCAQMD, the Pacific Merchant Shipping Association (PMSA), and the Marine Exchange of Southern California was signed. This MOU calls for OGVs to voluntarily reduce speed to 12 knots at a distance of 20 nautical miles (nm) from Point Fermin. Reduction in speed demands less power on the main engine, which in turn reduces NOx emissions and fuel usage. The positive affects of this program are expected to not only benefit the San Pedro Bay Ports area, but will also extend to other coastal areas such as Ventura and San Diego counties.

- *Low Sulfur Fuel for Marine Auxiliary Engines*
  In December of 2005, CARB adopted low sulfur fuel requirements for marine auxiliary engines within 24 nm of the California coastline. Starting in January of 2007, it requires use of marine diesel oil (MDO) or marine gas oil (MGO) with sulfur content of equal or less than 0.5 percent sulfur by weight, followed by use of marine gas oil with sulfur content of equal or less than 0.1 percent sulfur in 2010. The use of low sulfur fuel will reduce emissions of NOx, DPM, and SOx.

On-Road Heavy-Duty Vehicles (Trucks)

- *Emission Standards for New 2007+ On-Road Heavy-Duty Vehicles*
  In 2001, CARB adopted EPA's stringent emission standards for 2007+ HDV, which will ultimately result in 90 percent reductions in emissions of oxides of nitrogen (NOx) and particulate matter (PM). Per this regulation, HDV engine manufacturers will be meeting a PM standard of 0.01 g/bhp-hr starting in 2007, which is 90 percent lower than the 2004 PM standard of 0.1 g/bhp-hr. The NOx standard requires a phase-in of the 0.2 g/bhp-hr NOx standards between 2007 and 2010. By 2010, all engines have to meet the 0.2 g/bhp-hr NOx standard, which is over 90 percent lower than the 2004 NOx standard of 2.4 g/bhp-hr. It is expected that between 2007 and 2010, on average, manufacturers will be producing HDV engines meeting the PM standard of 0.01 g/bhp-hr and a NOx standard of 1.2 g/bhp-hr. This latter standard is referred to as the 2007 interim standard.

- *Heavy-Duty Vehicle On-Board Diagnostics (OBD) Requirement*
  In 2005, CARB adopted a comprehensive HDV OBD regulation, which ensures that the increasingly stringent HDV emissions standards being phased in are maintained during each vehicle's useful life. The OBD regulation requires manufacturers to install a system in HDVs to monitor virtually every emissions related component of the vehicle.

- *Ultra-Low Sulfur Diesel (ULSD) Fuel Requirement*
  In 2003, CARB adopted a regulation requiring that diesel fuel produced or offered for sale in California for use in any on-road or non-road vehicular diesel engine (with the exception of locomotive and marine diesel engines) contain no more than 15 parts per million (ppm) of sulfur by weight, beginning June 2006 statewide. This ULSD fuel is needed in order for retrofit technologies, such as diesel particulate filters, to work successfully.

Cargo Handling Equipment

- *Emissions Standards for Non-Road Diesel Powered Equipment*
  The EPA's and CARB's Tier 1, Tier 2, Tier 3, and Tier 4 (interim Tier 4 and final) emissions standards for non-road diesel engines require compliance with progressively more stringent standards for hydrocarbon, carbon monoxide (CO), DPM, and NOx. Tier 4 standards for non-road diesel powered equipment complement the latest 2007+ on-road heavy-duty engine standards requiring a 90 percent reduction in DPM and NOx when compared against the current level. To meet these standards, engine manufacturers will produce new engines with advanced emissions control technologies similar to those already expected for on-road heavy-duty diesel vehicles. These standards for new engines will be phased in starting with smaller engines in 2008 until all but the very largest diesel engines meet NOx and PM standards in 2015. Currently, the interim Tier 4 standard includes 90 percent reduction for PM and a 60 percent reduction in NOx.

- *Cargo Handling Equipment (CHE) Regulation*
  In December of 2005 CARB adopted a regulation to reduce emissions from CHE such as yard tractors and forklifts starting in 2007. The regulation calls for the replacement or retrofit of existing engines with engines that use Best Available Control Technology (BACT). Beginning

January 1, 2007 the regulation will require that newly purchased, leased, or rented CHE be equipped with either a 2007 or later on-road engine, a Tier 4 off-road engine or the cleanest verified diesel PM emissions control system, which reduces DPM by 90 percent and NOx by at least 70 percent for yard tractors. For non-yard tractors cargo handling equipment currently verified technologies reduces PM by 85 percent.

Harbor Craft

- *Emission Standards for Harbor Craft Engines*
  The EPA has established new engine standards for new "category 1 & 2" diesel engines – engines rated over 50 horsepower (hp) used for propulsion in most harbor craft. These standards are to be phased in between 2004 and 2007 and limit NOx, hydrocarbon, CO, and DPM, but the emissions reductions achieved are modest in next five years. EPA expects a 24 percent reduction in NOx and 12 percent reduction in DPM in 2030 when the harbor craft engine fleet is fully turned over to new these new engines.

- *Low Sulfur Fuel Requirement for Harbor Craft*
  In 2004, CARB adopted a low sulfur fuel requirement for harbor craft. Starting January 1, 2006 (in South Coast Air Basin, or SCAB) harbor craft are required to use on-road diesel fuel (i.e., ULSD), which has sulfur content limit of 15 ppm sulfur and lower aromatic content. Use of lower sulfur and aromatic fuel will result in NOx and DPM reduction benefits. In addition, use of low sulfur fuel will facilitate retrofitting of harbor craft with emissions control devices such as diesel particulate filters (DPFs) that have the potential to reduce PM by 85 percent.

Railroad Locomotives

- *Emissions Standards for New and Remanufactured Locomotives and Locomotive Engines*
  In 1998, EPA adopted Tier 0 (1973-2001), Tier 1 (2002-2004), and Tier 2 (2005+) emissions standards applicable to newly manufactured and remanufactured railroad locomotives and locomotive engines. These standards require compliance with progressively more stringent standards for emissions of hydrocarbon, CO, NOx, and DPM. Although the most stringent standard, Tier 2, results in over a 40 percent reduction in NOx and 60 percent reduction in DPM compared to Tier 0, full potential of these reductions will not be realized in the next five years because of the long life of diesel locomotive engines.

- *Low Sulfur Fuel Requirement for Intrastate Locomotives*
  In 2004, CARB adopted a low sulfur fuel requirement for intrastate locomotives. Intrastate locomotives are defined as those locomotives that operate at least 90 percent of the time within borders of the state, based on hours of operation, miles traveled, or fuel consumption. Mostly applicable to switchers, starting 1 January 2006, statewide, intrastate locomotives are required to use CARB off-road diesel fuel that has a sulfur content limit of 15 ppm sulfur and lower aromatic content. Use of fuel with lower sulfur and lower aromatics will result in NOx and DPM reductions. In addition, use of low sulfur fuel will facilitate retrofitting of locomotives with emissions control devices such as DPFs that have potential to reduce DPM by 85 percent.

- *Statewide 2005 Memorandum of Understanding*

In order to accelerate the implementation of Tier 2 engines in the South Coast Air Basin, CARB and EPA entered into an enforceable memorandum of understanding (MOU) in 1998 with two major freight railroads [Union Pacific (UP) and Burlington Northern Santa Fe (BNSF)] in California. This MOU requires UP and BNSF to concentrate introduction of the Tier 2 locomotives in the SCAB, which will achieve a 65 percent reduction in NOx by 2010.

In 2005, CARB entered into another MOU with UP and BNSF whereby these two railroads have agreed to phase out non-essential idling and install idling reduction devices, identify and expeditiously repair locomotives that smoke excessively, and maximize the use of 15 ppm sulfur fuel.

In addition to these regulations, CARB is pursuing additional regulations that would reduce port- and goods movement-related emissions. These regulations would affect equipment in the following categories:

- Port trucks (through a fleet rule and incentive program)
- Harbor craft
- Ship main engines (through fuel and engine emissions requirements)
- Ship auxiliary engines at dock (through cold ironing, engine controls, or other effective technologies)

CARB anticipates completing these rulemaking actions by the end of 2007. The recently adopted CARB regulations, anticipated CARB rulemakings, and the measures in the San Pedro Bay Ports Clean Air Action Plan (discussed in TM 5b) will provide a vital and complimentary combination to the overall effort to meet both State and San Pedro Bay Ports air quality improvement goals.

One non-regulatory program that is also helping to significantly reduce emissions from sources including those associated with ports, is the Carl Moyer Program. This program is a CARB administered grant program implemented in partnership with local air districts to fund the replacement of older, dirtier engines or to cover the incremental cost of purchasing cleaner than-required engines and vehicles. Under this program, owners/operators of mobile emissions sources can apply for incremental funding to reduce emissions. The program is also being expanded to include a fleet modernization component. Emissions source categories at the ports that have been successful in obtaining Carl Moyer funding include: heavy-duty vehicles, cargo-handling equipment, harbor craft, and rail locomotives.

4.1 Emissions Targets

Freight and port-related mobile sources such as ships, trucks, cargo handling equipment, harbor craft, and locomotives are major contributors to the emissions inventory in the South Coast Air Basin. In April 2006, CARB adopted its Emission Reduction Plan for Ports and Goods Movement in California (Emission Reduction Plan), which established the framework for actions to reduce the air quality and health impacts from the Ports and other goods movement activities in the state (as discussed in TM 5b). In June 2006, both the ports of Long Beach and Los Angeles released the San Pedro Bay Ports Clean Air Action Plan (CAAP), which set out emission reduction goals and control strategies necessary to reduce the emissions from port-related sources. Emission reductions from port-related sources are required in order to show attainment with the ambient air quality standards for PM2.5 and the 8-hour ozone standard. The Draft 2007 Air Quality Management Plan (AQMP) contains port-related measures that build upon both the Emission Reduction Plan and CAAP with enhancements by the SCAQMD to reflect the reductions needed for attainment. Specifically, the Draft 2007 AQMP proposes that locomotives go beyond the Emission Reduction Plan and CAAP by requiring all locomotives operating in the SCAB to be Tier 3 equivalent by 2020. For ocean-going vessels, the Draft 2007 AQMP proposes that all ships operating within 40 nautical miles to operate on 0.2 percent sulfur fuel beginning in 2008, with another reduction to 0.1 percent sulfur beginning in 2010. In addition, the draft plan calls for ships to comply with the vessel speed reduction proposal specified in the CAAP, as well as similar retrofit penetration rates for 2014 and 2020 to what is called for in the State's Emission Reduction Plan. The estimated emission reductions and final emissions targets needed from port-related sources to demonstrate attainment are shown in Table 4.

TABLE 4
Preliminary Port-Related Emissions Targets (tpd)[1]

Pollutant	Estimated Year/Emissions Target[2]	
	2014	2020
NOx		
Baseline Inventory	119.9	128.7
Emission Reductions	71.1	96.0
NOx Port Emissions Target	**48.8**	**32.7**
SOx		
Baseline Inventory	47.8	62.4
Emission Reductions	46.2	60.4
SOx Port Emissions Target	**1.6**	**2.0**
PM2.5		
Baseline Inventory	7.9	9.3
Emission Reductions	4.5	6.5
PM2.5 Port Emissions Target	**3.4**	**2.8**

[1] tpd = tons per day
[2] Port emissions estimated by assigning all ships, harbor craft, and port-related cargo handling equipment emissions to port inventory. Emissions from trucks and locomotives operating at the ports are based on the percentage of international goods movement compared to all goods movement (international plus domestic) emissions from CARB's Emission Reduction Plan statewide estimate for trucks and locomotives.

Source: SCAQMD Draft 2007 AQMP.

To achieve the emissions targets in Table 4 above, SCAQMD is recommending the following goods movement-related emissions reduction control measures for the 2007 AQMP. The estimated emissions reduction of each control measure is summarized in Table 5:

- ONRD-07 – GREATER USE OF DIESEL FUEL ALTERNATIVES AND DIESEL FUEL REFORMULATION: This measure calls for a two-phase approach to achieve additional emission benefits from engines powered by diesel fuel. The first phase would have CARB adopt by mid-2007, enhanced diesel fuel specifications. The proposal reflects the achievement of tighter in-use aromatic controls being feasible and the improvements in sulfur control technology now allowing for diesel fuel to be refined down to the detection limit of sulfur. Additionally, recent test data indicates that higher cetane levels are associated with lower emissions of volatile organic compounds (VOC) and NOx. The proposed reformulation will also reflect the application of the latest refining technology to

reduce polycyclic aromatic hydrocarbons, which have been associated with higher levels of mutagenicity and toxic impacts relative to other diesel components, such as paraffinic compounds.

The second phase of the control measure calls for greater use of alternatives to diesel fuel including gas-to-liquid fuels, dimethyl ether, alternative fuels, or other emulsified diesel fuel that provide additional oxides of nitrogen or particulate matter reductions. User or supplier incentives would be established to ensure that at least 50 percent of current volume of conventional diesel fuel – approximately 1.5 billion gallons statewide annually – would be displaced with diesel alternatives.

- ONRD-08 – ACCELERATED RETROFITS OF HEAVY-DUTY VEHICLES: This measure calls for accelerated retrofit programs for heavy-duty vehicles operating primarily in the South Coast jurisdictional boundaries. This measure covers all heavy-duty vocations except for Class 8 over-the-road trucks that provide freight drayage services. This measure would target approximately 20,000 heavy-duty diesel vehicles, between 1988 through 2009 model-year for retrofitting by 2014. In addition, for calendar year 2020, an additional 20,000 heavy-duty diesel vehicles will be targeted for retrofitting. The retrofit requirement would include a 30 percent reduction in oxides of nitrogen and either a 25 percent or 85 percent reduction in particulate matter, depending on the model year of the vehicle.

- ONRD-09 – IN-USE EMISSION REDUCTIONS FROM ON-ROAD HEAVYDUTY VEHICLES: This measure would call for accelerated replacement of on-road heavy-duty vehicles with vehicles meeting the 2010 on-road heavy-duty exhaust emissions standards, beginning in 2010. The proposal calls for resources to be directed at replacing the older "captive" fleet used for short to medium distance hauling. About 12,000 heavy-heavy-duty diesel and medium-heavy-duty diesel vehicles would be targeted for replacement in the jurisdictional boundaries of the SCAQMD over a 10-year period. It is envisioned that half the truck replacement would be diesel powered and the remaining half would be alternative fuel powered.

- ONRD-10 – FURTHER EMISSION REDUCTIONS FROM OUT-OFSTATE/ INTERNATIONAL REGISTERED HEAVY-DUTY VEHICLES: This measure calls for the development of a federal incentives program similar to the state's Carl Moyer Program for heavy-duty vehicles registered outside of California. The federal program would provide funding assistance to either retrofit or replace older over-the-road trucks with commercially available control technologies. There are a number of retrofit technologies that are commercially available that could be used to potentially support this program.

- ONRD-11 – ENHANCED INSPECTION AND IN-USE EMISSIONS TRACKING OF HEAVY-DUTY VEHICLES: This measure would have CARB develop an expanded inspection and maintenance program for heavy-duty-diesel vehicles. The current tools that CARB has available include the current smoke inspection program which the proposal calls for expansion of, to include the following: 1) a visual under-the-hood inspection of

the emission control devices, 2) an electronic check of the truck's onboard computer, and 3) use of remote sensing technology to assess in-use heavy-duty diesel trucks emissions. An added component to this measure is to incorporate a not-to-exceed limit for 1998 and older trucks to ensure in-use emissions are kept to a minimum.

- ONRD-12 – FURTHER EMISSIONS REDUCTIONS FROM HEAVY-DUTY TRUCKS PROVIDING FREIGHT DRAYAGE SERVICES: This measure calls for the retrofit or replacement of existing over-the-road trucks providing drayage services at marine ports, intermodal facilities, or warehouse distribution centers. This measure contains elements of ONRD-08 and ONRD-09. A similar program is proposed in the [Draft] San Pedro Bay Ports Clean Air Action Plan. The state is currently developing a regulation on trucks operating at marine ports. The proposed control measure would complement statewide actions.

- OFFRD-05 – FURTHER EMISSION REDUCTIONS FROM LOCOMOTIVES: This measure calls for all locomotives operating in the Basin to meet Tier 3 equivalent emissions by 2014. In addition, the measure proposes that all locomotives moving in and out of the twin ports in the Southern California region be equipped with Tier 3-equivalent controls by 2011. Existing technologies can reduce oxides of nitrogen and particulate matter emissions by over 90 percent.

- OFFRD-06 – CLEAN MARINE FUEL REQUIREMENTS FOR OCEAN-GOING MARINE VESSELS: This measure would require all ocean-going vessels to use 0.2 percent sulfur content marine distillate fuels beginning in 2008. Ocean-going vessels would be required to switch to the cleaner fuel when traveling within 40 nautical miles of Point Fermin.

- OFFRD-07 – FURTHER EMISSION REDUCTIONS FROM OCEAN-GOING MARINE VESSELS AND HARBOR CRAFT WHILE AT BERTH: This control measure would require ocean-going vessels and harbor craft to use shore-side power or other equivalently clean alternative technology while at berth. It is envisioned that a specific number of berths can be equipped with shore-side power by 2014 and a majority of the berths will provide shore-side power by 2020.

- OFFRD-08 – FURTHER EMISSION REDUCTIONS FROM CARGO HANDLING EQUIPMENT: This control measure seeks additional emission reductions from cargo handling equipment beyond the state regulation. This measure would implement the proposed San Pedro Bay Ports Clean Air Action Plan beyond the five-year horizon of the Clean Air Action Plan. The Plan calls for accelerated turnover of existing equipment with engines that meet 2007 or 2010 on-road emissions standards or Tier 4 off-road emissions standards.

- OFFRD-09 – VESSEL SPEED REDUCTION: This measure would implement a 12 knot speed limit to ocean-going vessels traveling within 40 nautical miles of Point Fermin. A majority of ocean-going vessels are currently complying with a 12-knot speed limit

within 24 nautical miles on a voluntary basis. Implementation of the proposed measure would further reduce oxides of nitrogen emissions.

- OFFRD-10 – FURTHER EMISSION REDUCTIONS FROM OCEAN-GOING MARINE VESSELS: This measure seeks further emission reductions of oxides of nitrogen or particulate matter from ocean-going vessels and harbor craft. Current technologies such as advanced slide valve designs can provide immediate emissions benefits on the order of 30 percent. Combining this technology with other control technologies such as water injection can lead to a greater than 50 percent reduction in oxides of nitrogen emissions.

TABLE 5
2007 AQMP Recommended Control Measures & Estimated Emissions Reductions for Sources Under State and Federal Jurisdiction

Control Measure Number	Control Measure Title	Estimated Reductions (tpd)	
		2014	2020
ONRD-07	Greater Use of Diesel Fuel Alternatives and Diesel Fuel Reformulation	NOx: 30.3 PM2.5: 2.3	NOx: 19.1 PM2.5: 1.2
ONRD-08	Accelerated Retrofits of Heavy-Duty Vehicles	NOx: 3.2 PM2.5: 0.2	NOx: 4.6 PM2.5: 0.3
ONRD-09	In-Use Emission Reductions from On-Road Heavy-Duty Vehicles	VOC: 0.3 NOx: 6.1 PM2.5: 0.1	VOC: 0.3 NOx: 5.1 PM2.5: 0.1
ONRD-10	Further Emission Reductions from Out-of-State/ International Registered Heavy-Duty Vehicles	NOx: 0.4 PM2.5: 0.03	NOx: 0.6 PM2.5: 0.03
ONRD-11	Enhanced Inspection and In-Use Emissions Tracking of Heavy-Duty Vehicles	VOC: 1.5 NOx: 16.7 PM2.5: 0.2	VOC: 1.4 NOx: 17.8 PM2.5: 0.1
ONRD-12	Further Emission Reductions from Heavy-Duty Trucks Providing Freight Drayage Services	VOC: 0.1 NOx: 2.6 PM2.5: 0.1	VOC: 0.1 NOx: 2.3 PM2.5: 0.1
OFFRD-05	Further Emission Reductions from Locomotives	NOx: 15.3 PM2.5: 0.5	NOx: 17.7 PM2.5: 0.7
OFFRD-06	Clean Marine Fuel Requirements for Ocean-Going Marine Vessels	NOx: 7.3 SOx: 45.6 PM2.5: 4.0	NOx: 9.3 SOx: 59.6 PM2.5: 5.2
OFFRD-07	Further Emission Reductions from Ocean-Going Marine Vessels and Harbor Crafts While at Berth	VOC: 0.5 NOx: 20.4 SOx: 0.6 PM2.5: 0.6	VOC: 0.7 NOx: 27.4 SOx: 0.8 PM2.5: 0.9
OFFRD-08	Further Emission Reductions from Cargo Handling Equipment	NOx: 1.0	NOx: 0.6

TABLE 5
2007 AQMP Recommended Control Measures & Estimated Emissions Reductions for Sources Under State and Federal Jurisdiction

Control Measure Number	Control Measure Title	Estimated Reductions (tpd)	
		2014	2020
OFFRD-09	Vessel Speed Reduction	NOx: 17.4	NOx: 23.2
OFFRD-10	Further Emission Reductions from Ocean-Going Vessels	NOx: 13.9	NOx: 24.1

Source: SCAQMD 2007 Draft AQMP.

5.1 CONCLUSION

This technical memorandum provides a range of approaches to mitigate the environmental and community effects stemming from the goods movement industry. The approaches present a compendium of best practices that can be utilized by various agencies and jurisdictions, many of which have been either recently adopted or is on the immediate horizon for adoption as they relate to emissions reductions.

This technical memorandum, in conjunction with the other previous technical memorandums, will be lead into the actual Action Plan itself – that is, the development of a plan that recommends goods movement improvement strategies for the study area that have positive economic impacts and which minimize the related environmental and community effects.