M e m o r a n d u m

To: CHAIR AND COMMISSIONERS

CTC Meeting: October 26-27, 2011

Reference No.: 4.16
Action

From: BIMLA G. RHINEHART
Executive Director

Subject: **METROPOLITAN TRANSPORTATION COMMISSION ASSEMBLY BILL 1467 (AB 1467) HOT LANES APPLICATION – DETERMINATION OF ELIGIBILITY RESOLUTION G-11-10**

ISSUE:
Should the Commission find the Metropolitan Transportation Commission's (MTC) Application for the *Bay Area Express Lanes* eligible in accordance with the requirements of AB 1467 (Chapter 32, Statutes of 2006) and the Commission's Public Partnership HOT Lanes Guidelines?

RECOMMENDATION:
Commission staff recommends that the Commission find MTC's Application for the *Bay Area Express Lanes eligible* in accordance with the requirements of AB 1467 (Chapter 32, Statutes of 2006) and the Commission's Public Partnership HOT Lanes Guidelines. Staff also recommends that the Commission direct staff to hold public hearings, one in Northern California and one in Southern California, as required by AB 1467.

BACKGROUND:
AB 1467, approved by the Governor on May 19, 2006, authorizes that, until January 1, 2012, regional transportation agencies, in cooperation with the Department of Transportation (Department), may apply to the Commission to develop and operate high-occupancy toll lanes, including the administration and operation of a value pricing program and exclusive or preferential lane facilities for public transit, as specified. The number of projects that may be approved is limited to four, two in Northern California and two in Southern California.

The Commission's role in implementing this legislation is limited to establishing eligibility criteria, determining whether each HOT lane application is eligible, and holding public hearings in Northern and Southern California for each eligible application. Actual approval of an eligible application was originally the purview of the Legislature, through enactment of a statute. However, AB 798 (Chapter 474, Statutes of 2009), eliminated the need for the Legislature to approve the HOT lanes applications.

On October 27, 2007, the Commission adopted the Public Partnership High Occupancy Toll (HOT) Lane Guidelines and Application to implement the requirements of AB 1467.

On September 28, 2011, MTC submitted their Application for the *Bay Area Express Lanes* to the Commission. The Bay Area Express Lanes encompass five freeway routes: Interstate 80 in Alameda, contra Costa, and Solano counties, Interstate 880 in Alameda County, Interstate 680 in Solano and Contra Costa counties, State Route 84 in Alameda County, and State Route 92 in Alameda County. The implementation of the Bay Area Express Lanes includes the conversion of 149 lane miles from normal high-occupancy vehicle (HOV) to HOT operations and the construction 116 new HOT lane miles. MTC intends to operate the Bay Area Express Lanes as a "value pricing program" in order to enhance the connectivity, efficiency, and reliability of the transportation system in the Bay Area. Solo drivers and ultimately HOVs with two passengers will be required to pay a toll to use the HOT lanes.

Commission staff evaluated the Application for compliance with the Public Partnership HOT Lane Guidelines (Guidelines) adopted by the Commission and AB 1467. Eligibility objectives included obtaining evidence to determine whether the project is consistent with the Streets & Highways Code Sections 149-149.7; whether there is cooperation with the Department of Transportation (Department) and consistency with state highway system requirements; whether the project is technically and financially feasible; whether the project is consistent with the Regional Transportation Plan; and whether there are performance measures established for project monitoring and tracking.

To address the issues of cooperation with the Department, compliance with the Streets & Highways Code Sections 149-149.7, consistency with the state highway system requirements, consistency with the Regional Transportation Plan, and technical feasibility, the Department reviewed the Application. Based on this review, the Department submitted a letter to the Commission stating that the Application is consistent with state highway system requirements, is consistent with regional priorities, is technically feasible, and was submitted in cooperation with the Department.

To assist Commission staff in the review of the Application, the Commission retained a financial consultant. The consultant provided Commission staff with an independent review and opinion on the reasonableness of the financial data included in the MTC Application and whether the Application met the financial eligibility requirements stated in the Commission's HOT Lane Guidelines and AB 1467. Specifically, the consultant reviewed the Application to determine whether MTC submitted adequate evidence that the project is financially feasible; that the Application includes a reasonable financial plan demonstrating financial guarantees; that the Application includes a documented commitment to provide sufficient equity; that the Application documents reasonable funding for project development and operations; and that the projected rate of return and life cycle cost estimates are reasonable. The consultant determined that the *Bay Area Express Lanes* is financially feasible.

Attached for your information are the following documents:

- The Executive Summary submitted by MTC as part of the *Bay Area Express Lanes* Public Partnership Application for High Occupancy Toll Lanes.
- The Department's Letter in support of the Application.
- The consultant's financial feasibility report, "Financial Analysis of the Bay Area Express Lanes Public Partnership Application for High Occupancy Toll (HOT) Lanes".
- The MTC Application in its entirely is posted on the Commission's website, www.catc.ca.gov.

CALIFORNIA TRANSPORTATION COMMISSION

Metropolitan Transportation Commission
Public Partnership
High Occupancy Toll Lanes Application
Determination of Eligibility

RESOLUTION G-11-10

1.1 WHEREAS Assembly Bill 1467, Nunez, added Section 149.7 to the Streets and Highways Code to allow a Regional Transportation Agency, as defined in Section 143, in cooperation with the Department of Transportation, to apply to the Commission to develop and operate high-occupancy toll lanes, including the administration and operation of a value pricing program and exclusive or preferential lane facilities for public transit, consistent with the established standards, requirements, and limitations that apply to those facilities in Sections 149, 149.1, 149.3, 149.4, 149.5, and 149.6, and

1.2 WHEREAS Assembly Bill 1467 requires that the Commission shall review each application for the development and operation of the facilities described in subdivision (a) of Section 149.7 according to eligibility criteria established by the Commission, and

1.3 WHEREAS Assembly Bill 1467 requires that for each eligible application, the Commission shall conduct at least one public hearing in Northern California and one in Southern California, and

1.4 WHEREAS Assembly Bill 1467 requires that following the public hearings, the Commission shall submit an eligible application and any public comments made during the hearings to the Legislature for approval or rejection. Approval shall be achieved by enactment of a statute, and

1.5 WHEREAS Assembly Bill 798 (Chapter 474, Statutes of 2009) eliminated the requirement for the Legislature to approve applications deemed eligible by the Commission, and

1.6 WHEREAS Assembly Bill 1467 requires that the number of facilities approved under this section shall not exceed four, two in Northern California and two in Southern California, and

1.7 WHEREAS Assembly Bill 1467 requires that a Regional Transportation Agency that develops or operates a facility, or facilities, described in the subdivision (a) of Section 149.7 shall provide any information or data requested by the Commission or the Legislative Analyst, and

1.8 WHEREAS Assembly Bill 1467 requires that the Commission, in cooperation with the Legislative Analyst, shall annually prepare a report on the progress of the development and operation of a facility authorized under Section 149.7. The Commission may submit this report as a section in its annual report to the Legislature required pursuant to Section 14535 of the Government Code, and

1.9 WHEREAS Assembly Bill 1467 requires that no applications may be approved under this section on or after January 1, 2012, and

1.10 WHEREAS the Commission determined that in order to ensure that the Public Partnership Transportation High Occupancy Toll (HOT) Lane Projects selected promote California's transportation goals and advance the public interest, the Commission adopted the *Guidelines for the Determination of Eligible Public Partnership Transportation Projects – High Occupancy Toll Lanes* (Guidelines) at its October 24, 2007 meeting to set forth the eligibility criteria and procedures for the Commission to evaluate Public Partnership transportation project eligibility, and

1.11 WHEREAS the Metropolitan Transportation Commission (MTC) on September 28, 2011 submitted the *Bay Area Express Lanes Application* to the Commission for determination of eligibility of the project described in the application in accordance with the requirements of Assembly Bill 1467 and the Guidelines, and

1.12 WHEREAS Commission staff reviewed the *Bay Area Express Lanes Application* for compliance with the requirements of Assembly Bill 1467 and the Guidelines, and

1.13 WHEREAS this review included a technical analysis by the Department and a financial feasibility analysis prepared by an independent financial consultant retained by the Commission, and

1.14 WHEREAS based on this review, the Commission staff recommended that the Commission find the project described in the *Bay Area Express Lanes Application* eligible in accordance with the requirements of Assembly Bill 1467 and the Guidelines,

2.1 NOW THEREFORE BE IT RESOLVED that the Commission finds the project described in the *Bay Area Express Lanes Application* eligible in accordance with the requirements of Assembly Bill 1467 and the Guidelines, and

2.2 BE IT FURTHER RESOLVED that the Commission directs staff to hold public hearings, one in Northern California and one in Southern California, as required by Assembly Bill 1467.

Executive Summary

With this application the Metropolitan Transportation Commission ("MTC") seeks authority from the California Transportation Commission ("CTC") as a "regional transportation agency" to develop and implement a high-occupancy toll ("HOT") lane facility (called hereinafter "Express Lane Facility" or "Facility"). Express lanes allow vehicles that do not qualify as a high-occupancy vehicle ("HOV") to use HOV lanes for a fee and maintain free use of the lanes by qualifying carpools and buses. The Facility is comprised of five freeway routes: Interstate 80 ("I-80") in Alameda, Contra Costa and Solano counties, Interstate 880 ("I-880")in Alameda County, Interstate 680 ("I-680") in Solano and Contra Costa counties, State Route 84 ("SR-84") in Alameda County and State Route 92 ("SR-92") in Alameda County. These corridors are shown in green in Figure 1.

This application is consistent with the region's adopted long-range transportation plan, *Transportation 2035*, which envisions a seamless, regionally managed network of express lanes in the Bay Area. The following benefits are demonstrated throughout this application:

- **Connectivity**: Express lane toll revenue, at a time of constrained federal and state budgets, can help close gaps in the existing HOV lane system to increase travel time savings for carpools and buses.
- **Efficiency**: Express lanes will optimize throughput on freeway corridors to better meet current and future traffic demands, using excess capacity in the existing HOV system to improve mobility.
- **Reliability**: Express lanes provide a reliable, congestion-free transportation option, building upon the current solid foundation of existing HOV lanes.

The Express Lane Facility described in this application, along with two value pricing high-occupancy vehicle express lane programs authorized by Streets and Highways Code ("S&H") Section 149.5 (called hereinafter "Legacy Programs") will constitute a regional express lane network (called hereinafter "Express Lane Network" or "Network"). The Legacy Programs are on I-680 and I-580. The Network is shown outlined in yellow in Figure 1. MTC intends to operate the Network, including both the Express Lane Facility and the Legacy Programs, as a "value pricing program", as authorized by S&H Code § 149.7, subject to agreements to be developed and entered into by MTC, Alameda County Transportation Commission ("ACTC") and Sunol Smart Carpool Lane Joint Powers Authority ("Sunol JPA"). The financial analysis includes the two corridors in the Legacy Programs, reflecting ACTC's and Sunol JPA's expressed interest in entering into an agreement with MTC to include the Legacy Programs in the Network.

A third agency, Santa Clara Valley Transportation Authority ("VTA") is also authorized to conduct, administer and operate two value pricing high-occupancy vehicle express lane programs on State Route 237 and U.S. 101/State Route 85. VTA has indicated that it intends for its programs to remain financially independent. However, MTC and all of the agencies authorized to develop and operate express lanes in the region are committed to seamless operation of the region's express lanes as a single system.

Hereinafter, "Express Lane System" or "System" refers to the combination of the Express Lane Network and the authorized express lanes in Santa Clara and San Mateo counties.

MTC will develop and operate the Express Lane Network in collaboration with a number of entities. MTC may enter into agreement with the Bay Area Infrastructure Financing Authority ("BAIFA") to exercise certain responsibilities outlined under this application. BAIFA is a joint exercise of powers agency formed by the Metropolitan Transportation Commission ("MTC") and the Bay Area Toll Authority ("BATA") to plan, develop, operate and finance transportation and related projects, including high-occupancy toll lanes. In addition, MTC must, according to statute, enter into agreements with Bay Area Toll Authority ("BATA") to operate and manage the toll collection system, with Caltrans for other aspects of design, construction, maintenance and operations, and with the California Highway Patrol for enforcement. Finally, as noted above, MTC may enter into agreements with one or more county congestion management agencies (CMAs) with regard to the Legacy Programs or for certain project development or delivery responsibilities.

This application includes a Project Study Report ("PSR") and a Letter of Finding from the California Department of Transportation ("Department") certifying that the application is consistent with the state highway system requirements. The PSR establishes engineering feasibility and a cost range and demonstrates operational benefits associated with express lanes, including benefits to transit from closing gaps in the region's existing HOV lane system. Individual projects will undergo required project development and environmental documentation processes.

The facility for which this application is requesting authority would ultimately add 285 directional miles of express lanes to the Bay Area freeway system, with complete implementation taking 20 or more years. As such, the financial plan developed as part of this application demonstrates the Network's feasibility under a range of circumstances. The Network's feasibility is further enhanced by the flexibility to calibrate its implementation based on factors such as actual performance, costs, revenue, and available resources and financing instruments in the future. To illustrate this flexibility — and to address potential questions regarding the impacts of adverse assumptions on future build-out – this application presents both a baseline financial plan (the "Base Case"), representing the set of assumptions supported by current projections and estimates, as well as a downside sensitivity showing the impacts of greatly reduced revenue (the "Conservative Case") resulting from adjusted tolling policies. These two cases represent the "bookends" of the analysis.

The performance of the Network, both financially and operationally, and the pace at which it would be implemented, are significantly affected by tolling policies. The different tolling policies assumed in the range of financial cases recognize that many of the existing HOV lanes will already reach their capacity with eligible carpools at some point in the future. Consequently, the minimum occupancy requirement for HOVs will need to be raised at some point in time in order to maintain the operational advantage of the lanes. In addition, as more of the Network changes to a higher HOV definition to maintain operational benefits, establishing network-wide consistency will become more important. The Base Case assumes that all express lanes would switch from a HOV2+ to a HOV3+ minimum HOV occupancy in 2020 (or upon opening if they begin operation after 2020). The Conservative Case assumes that all

express lanes would increase to a HOV3+ policy no later than 2035, and those lanes in which HOV demand reaches capacity (i.e., Level of Service C is no longer assured) earlier would increase HOV occupancy accordingly.

The Base Case also assumes an expansion of the period of operation beyond the current "peak period only" operation of HOV lanes in the Bay Area. In the Base Case the express lanes would be operated in the daytime hours (6 AM-7 PM) on weekdays and partial daytime hours (12-7 PM) on weekends. The Conservative Case assumes more limited hours of tolling operation (6-10 AM and 3-7 PM on weekdays, consistent with current HOV lane hours of operation, and 12-7 PM on weekends). Policies related to HOV occupancy requirements and hours of operation are within the purview of the responsible agencies and the Department and therefore can be modified as needed. These policies will be established in consultation with the Department, congestion management agencies, the California Highway Patrol and other stakeholders.

The financial plan shows the Network generates revenues that facilitate HOV lanes being added to the freeway system much faster than would otherwise be feasible. In this analysis, the Network can be completed by 2030 under the Base Case or by 2035 under the Conservative Case. The financial plan contemplates multiple issuances of toll revenue bonds and TIFIA loans over 20 years (or 25 under the Conservative Case) in conjunction with local funding already committed, pay-as-go-you funds mainly generated from toll revenues, and capital grants assumed to be contributed over this period. Table 1 shows how capital costs are financed under the two analysis cases. Table 2 summarizes operating Network cash-flows for each case through year 2040. Both cases show a requirement for supplemental capital grant funding to complete construction but also show modest amounts of net excess revenue accruing after the Network's construction is fully complete.

Table 1: Uses and Sources of Funds for Network Capital Expenses through Completion

	BASE CASE		CONSERVATIVE CASE	
Amounts in millions of year-of-expenditure dollars	through Network completion (2030)		through Network completion (2035)	
	Amount	%	Amount	%
Sources				
Total Debt	2,100	*60%*	2,377	*56%*
Local Funding for Projects	96	*3%*	96	*2%*
Grant Funding	384	*11%*	796	*19%*
Pay-As-You-Go Funds*	902	*26%*	1,011	*24%*
Total	**3,482**	*100%*	**4,280**	*100%*
Uses				
Capital Costs	2,980	*86%*	3,594	*84%*
Financial Fees and Funding of Reserves	131	*4%*	221	*5%*
Interest during Construction	370	*11%*	464	*11%*
Total	**3,482**	*100%*	**4,280**	*100%*

*Includes reinvestment from operating network cashflow (generated by express lane toll revenue) and interest income on escrowed balances

Table 2: Operating Network Summary Cash-flow through Year 2040

	BASE CASE	CONSERVATIVE CASE
Amounts in millions of year-of-expenditure dollars		
Partial Operations	***15 years (2015-30)***	***20 years (2015-35)***
Full Operations	***10 years (2030-40)***	***5 years (2035-40)***
Express Lane Toll Revenue	6,490	4,396
Operations and Maintenance Expenses	(1,270)	(1,024)
Rehabilitation Costs	(270)	(232)
Debt Service (Principal and Interest)	(2,989)	(1,845)
Other*	132	84
Net Operating Network Cashflow	**2,093**	**1,380**
Reinvested as Construction Funding	(750)	(769)
Potential Net Revenue**	**1,343**	**611**

* Operating period financing fees, reserves releases, & interest income on debt service reserves

** These at-risk surpluses emerge after completion of the Network (2030 under the Base Case, 2035 under the Conservative Case)

In addition to the Conservative Case downside sensitivity, various other sensitivity tests have been performed to analyze whether the Network is still financially feasible under a variety of adverse circumstances. Cooperative agreements for funding contributions for pavement rehabilitation costs will be developed as the projects are implemented. Neither Caltrans or CTC has the authority to approve any contribution to pavement rehabilitation, which is subject to legislative action. While the financial plan assumes pavement rehabilitation costs would be shared with 20 percent borne by the Network and 80 percent borne by the State, a financial sensitivity analysis demonstrates the Network remains feasible if the Network bears 100 percent of the pavement rehabilitation costs. Other sensitivity tests included: the unavailability of TIFIA loans; and not including Alameda County Legacy Program in the Network. It was determined that the Network remains financially feasible under each of these circumstances, though, in some cases, the phasing of implementation would look more similar to the Conservative Case than the Base Case.

Table 3 provides a definition of the uppercase terms defined above and used throughout this application. The directional mileage associated with each of these definitions is also shown. Directional miles are used throughout this application when describing the length of express lanes. A directional mile refers to one lane-mile in one direction. As shown in Table 3, the Facility is made up of approximately 55 percent conversion of existing HOV lanes and 45 percent construction of new express lanes. The conversions, which will be operational by approximately 2020 in the Base Case and 2025 in the Conservative Case, represent approximately 8% of the total capital cost, while the new lanes represent 92% of the capital costs.

Table 3: Glossary of Terms and Mileage

	Existing Express Lanes	Conversions	New Lanes	Operational Gap Closure*	Total
Facility: I-80, I-880, I-680, SR-84 and SR-92	0	149	116	20	285
Legacy Programs: Authorized lanes in Alameda County on I-580 and I-680	14	24	54	0	91
Network: Facility plus Legacy Programs	14	173	170	20	376

* Tolling is not proposed on this segment of I-880 from the San Francisco/Oakland Bay Bridge to Hegenberger as part of this application; operational strategies could include enhanced ramp metering, increased incident management capabilities, and improvements to major parallel arterials.

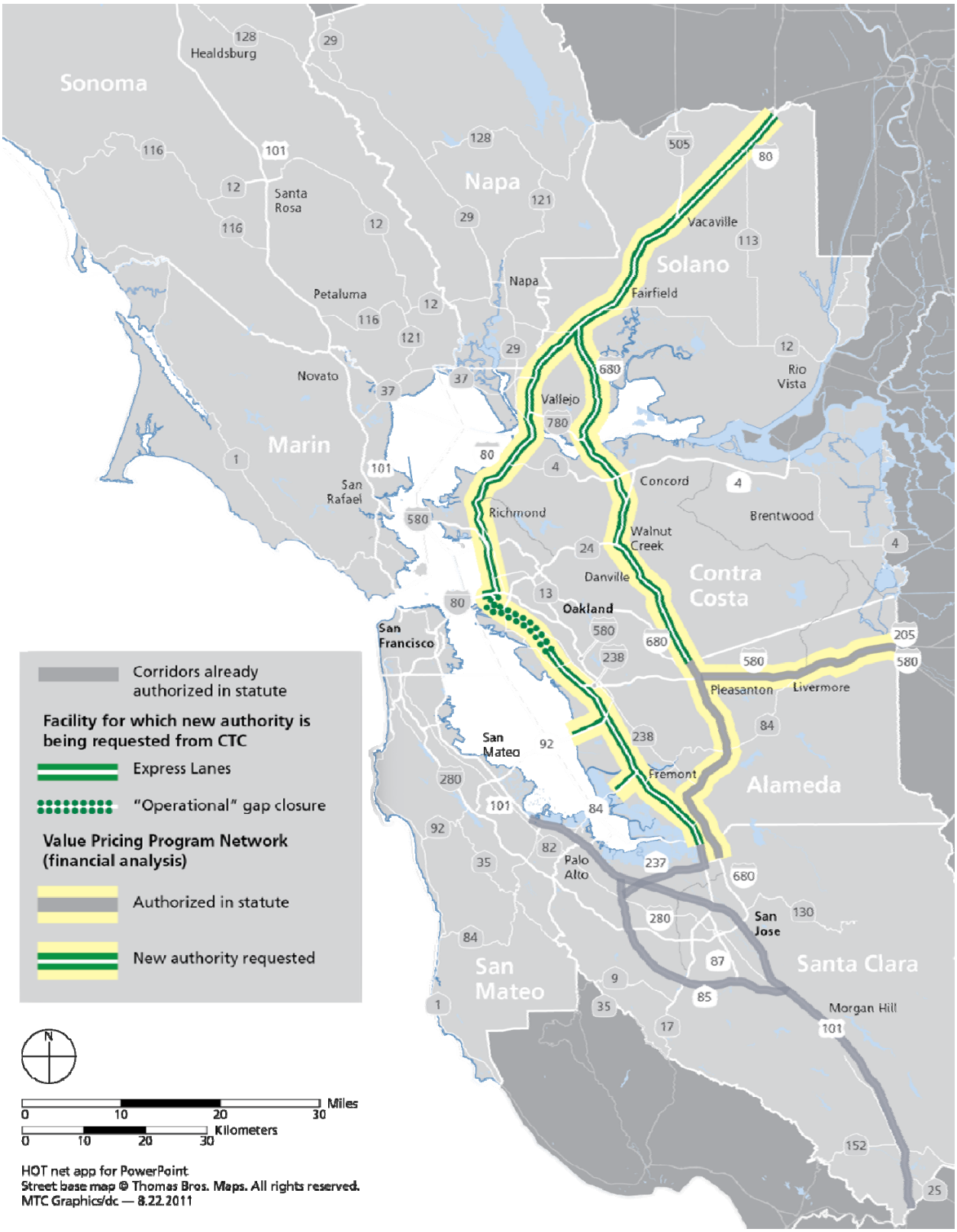


Figure 1: Bay Area Express Lanes Map

Attachment A

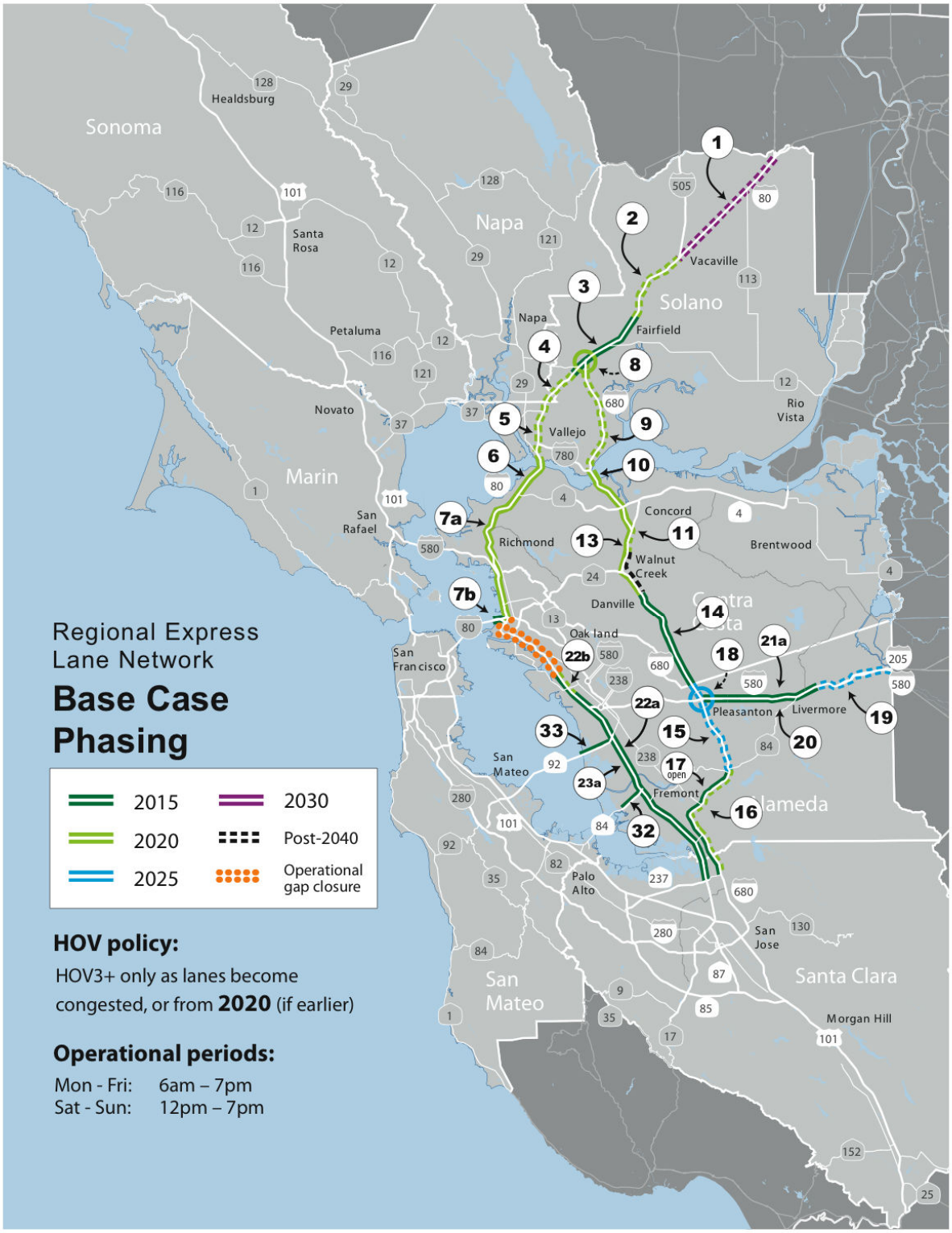
Phasing Assumptions in the Financial Analysis

Base Case: Projects by Implementation Phase[1]

Construction Project Number in PSR	Route[2]	Limits	Convert HOV or Widen for New Lanes	Capital Cost in 2010 $ (Mill.)	Capital Cost in Escalated $ (Mill.)
Phase I Projects: Open in 2015					
3	I-80	Airbase Pkwy to Red Top Rd	Convert	17.1	18.9
7B	I-80 WB	Bay Bridge HOV bypass lane	Convert	0	0
14	I-680	Livorna Rd to Alcosta Blvd	Convert	21.6	23.9
20*	I-580 EB	Hacienda Dr to Greenville Rd	Convert (44%) New lane[3] (56%)	28.7	31.8
21A*	I-580 WB	San Ramon Rd to Greenville Rd	Convert	13.6	15.1
22A	I-880 NB	Lewelling Blvd to SR-237 Direct Connector	Convert	27.9	30.9
23A	I-880 SB	Hegenberger Rd to SR-237 Direct Connector	Convert	24.6	27.3
32	SR-84	Dumbarton Bridge Toll Plaza to I-880	Convert	3.5	3.9
33	SR-92	San Mateo Bridge Toll Plaza to Hesperian Blvd	Convert	3.4	3.7
			TOTAL Phase I	**140.3**	**155.4**
Phase II Projects: Open in 2020					
2	I-80	I-505 to Airbase Pkwy	New lanes	100.7	127.7
4	I-80	Red Top Rd to SR-37	New lanes	116.2	147.2
5	I-80	SR-37 to Carquinez Bridge Toll Plaza	New lanes	145.2	184.1
6	I-80	Carquinez Bridge Toll Plaza to SR-4	Convert	7.0	9.1
7A	I-80	SR-4 to Bay Bridge HOV bypass lane	Convert	40.6	52.6
8	I-80/I-680	I-80/I-680 Direct Connectors (I-80WB to I-680SB and I-680NB to I-80EB)	New lanes	92.9	117.8
9	I-680	I-80 to I-780	New lanes	222.9	282.6
10	I-680 NB	Benicia-Martinez Bridge and HOV bypass	Convert	0	0
11	I-680 NB	Marina Vista to N. Main St	Convert (16%) New lane (84%)	67.8	85.9
13	I-680 SB	Marina Vista to Livorna Rd	Convert (5%) New lane (95%)	161.6	204.9
16*	I-680 NB	SR-84 to SR-237	New lane	121.5	157.6
22B	I-880 NB	Hegenberger Rd to Lewelling Blvd	New lane	137.9	173.6
			TOTAL Phase II	**1,214.3**	**1,543.1**
Phase III Projects: Open in 2025					
15*	I-680	Alcosta Blvd to SR-84	New lanes	200.1	296.9
18*	I-680/ I-580	I-580/I-680 Direct Connectors (I-580 WB to I-680 SB and I-680 NB to I-580 EB)	New lanes	176.3	261.6
19*	I-580	Greenville Rd to ALA/SJQ County Line	New lanes	222.2	329.8
			TOTAL Phase III	**598.6**	**888.4**
Phase IV Projects: Open in 2030					
1	I-80	SOL/YOLO County Line to I-505	New lanes	226.3	393.2
			TOTAL Phase IV	**226.3**	**393.2**
Post 2040					
N/A[4]	I-680 NB	N. Main St. to Livorna Rd	New lane	200	>485

* Already authorized under existing law
1 Does not include the operational gap closure on I-880 between the San Francisco Bay Bridge and Hegenberger
2 Both directions unless otherwise specified
3 This segment is proposed to convert existing HOV lane and to add a second express lane from Tassajara Rd to Vasco Rd
4 Long-term express lane construction project; not included fully in financial plan. Not included in totals shown below.

	Capital Cost in 2010 $ (Mill.)	Capital Cost in Escalated $ (Mill.)
TOTAL Phases I through IV	2,179	2,980
Conversions	192 (9%)	225 (8%)
New lanes	1,988 (91%)	2,755 (92%)


Regional Express Lane Network
Base Case Phasing
2015
2020
2025
2030
Post-2040
Operational gap closure
HOV policy:
HOV3+ only as lanes become congested, or from 2020 (if earlier)
Operational periods:
Mon - Fri: 6am – 7pm
Sat - Sun: 12pm – 7pm
Sonoma
Napa
Solano
Marin
Contra Costa
Alameda
San Mateo
Santa Clara
Healdsburg
Santa Rosa
Petaluma
Novato
San Rafael
Vacaville
Fairfield
Napa
Vallejo
Rio Vista
Concord
Brentwood
Richmond
Walnut Creek
Danville
Oakland
San Francisco
Pleasanton
Livermore
San Mateo
Fremont
Palo Alto
San Jose
Morgan Hill
1
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3
4
5
6
7a
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13
14
15
16
17 open
18
19
20
21a
22a
22b
23a
32
33

Conservative Case: Projects by Implementation Phase[1]

Construction Project Number in PSR	Route[2]	Limits	Convert HOV or Widen for New Lanes	Capital Cost in 2010 $ (Mill.)	Capital Cost in Escalated $ (Mill.)
Phase I Projects: Open in 2015					
7B	I-80 WB	Bay Bridge HOV bypass lane	Convert	0	0
14	I-680	Livorna Rd to Alcosta Blvd	Convert	21.6	23.9
20*	I-580 EB	Hacienda Dr to Greenville Rd	Convert (44%) New lane[3] (56%)	28.7	31.8
21A*	I-580 WB	San Ramon Rd to Greenville Rd	Convert	13.6	15.1
22A	I-880 NB	Lewelling Blvd to SR-237 Direct Connector	Convert	27.9	30.9
23A	I-880 SB	Hegenberger Rd to SR-237 Direct Connector	Convert	24.6	27.3
32	SR-84	Dumbarton Bridge Toll Plaza to I-880	Convert	3.5	3.9
33	SR-92	San Mateo Bridge Toll Plaza to Hesperian Blvd	Convert	3.4	3.7
			TOTAL Phase I	**123.2**	**136.5**
Phase II Projects: Open in 2020					
3	I-80	Airbase Pkwy to Red Top Rd	Convert	17.1	22.1
5	I-80	SR-37 to Carquinez Bridge Toll Plaza	New lanes	145.2	184.1
6	I-80	Carquinez Bridge Toll Plaza to SR-4	Convert	7.0	9.1
7A	I-80	SR-4 to Bay Bridge HOV bypass lane	Convert	40.6	52.6
16*	I-680 NB	SR-84 to SR-237	New lane	121.5	157.6
			TOTAL Phase II	**331.4**	**425.5**
Phase III Projects: Open in 2025					
2	I-80	I-505 to Airbase Pkwy	New lanes	100.7	149.5
4	I-80	Red Top Rd to SR-37	New lanes	116.2	172.3
10	I-680 NB	Benicia-Martinez Bridge and HOV bypass	Convert	0	0
11	I-680 NB	Marina Vista to N. Main St	Convert (16%) New lane (84%)	67.8	100.6
13	I-680 SB	Marina Vista to Livorna Rd	Convert (5%) New lane (95%)	161.6	239.8
22B	I-880 NB	Hegenberger Rd to Lewelling Blvd	New lane	137.9	203.3
			TOTAL Phase III	**584.3**	**865.5**
Phase IV Projects: Open in 2030					
8	I-80/I-680	I-80/I-680 Direct Connectors (I-80WB to I-680SB and I-680NB to I-80EB)	New lanes	92.9	161.4
9	I-680	I-80 to I-780	New lanes	222.9	387.2
15*	I-680	Alcosta Blvd to SR-84	New lanes	200.1	347.6
			TOTAL Phase IV	**515.8**	**896.2**
Phase V Projects: Open in 2035					
1	I-80	SOL/YOLO County Line to I-505	New lanes	226.3	460.3
18*	I-680/ I-580	I-580/I-680 Direct Connectors (I-580 WB to I-680 SB and I-680 NB to I-580 EB)	New lanes	176.3	358.5
19*	I-580	Greenville Rd to ALA/SJQ County Line	New lanes	222.2	451.9
			TOTAL Phase V	**624.8**	**1270.7**
Post 2040					
N/A[4]	I-680 NB	N. Main St. to Livorna Rd	New lane	200	>485

* Already authorized under existing law
1 Does not include the operational gap closure on I-880 between the San Francisco Bay Bridge and Hegenberger
2 Both directions unless otherwise specified
3 This segment is proposed to convert existing HOV lane and to add a second express lane from Tassajara Rd to Vasco Rd
4 Long-term express lane construction project; not included fully in financial plan. Not included in totals shown below.

	Capital Cost in 2010 $ (Mill.)	Capital Cost in Escalated $ (Mill.)
TOTAL Phases I through V	2,179	3,594
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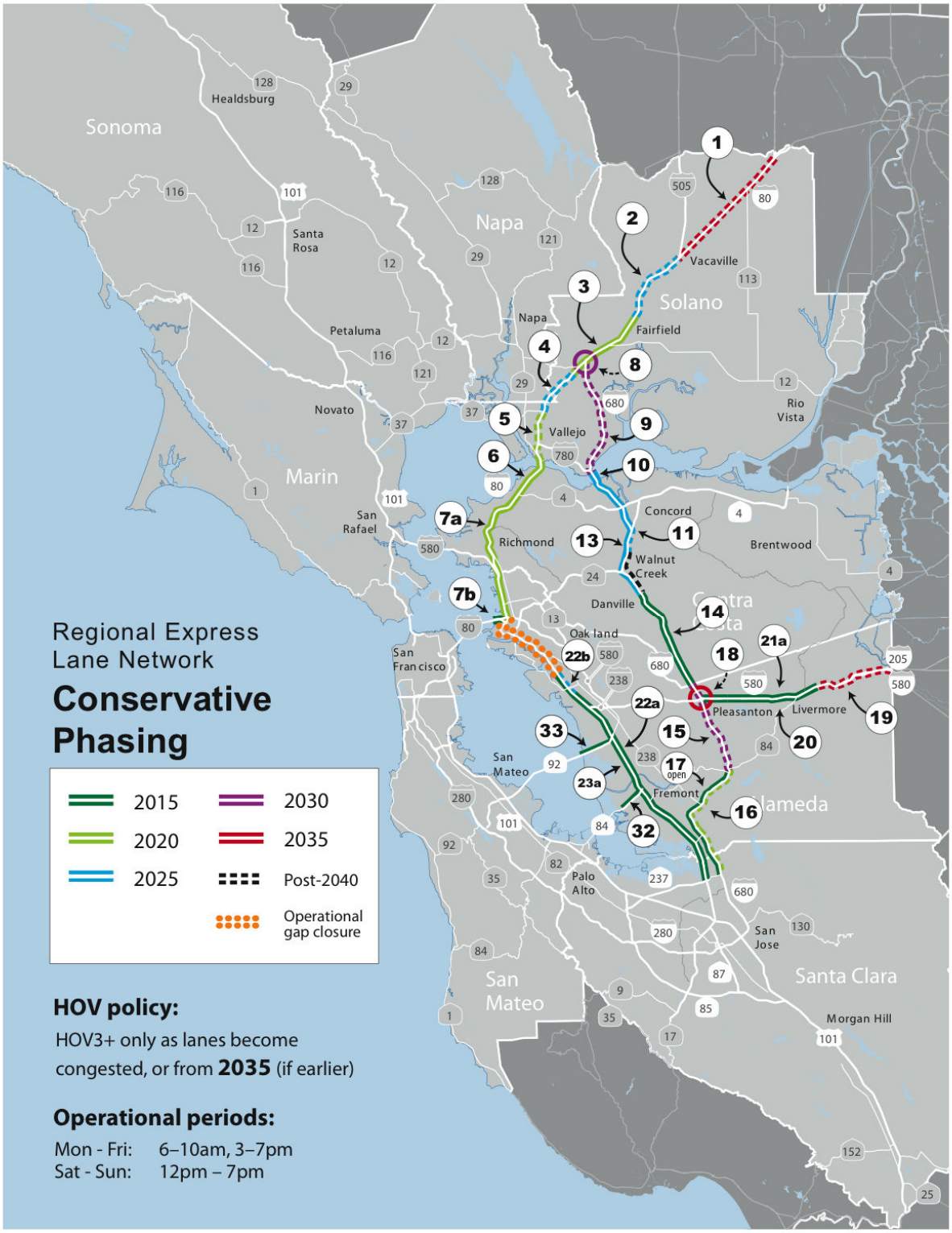
Regional Express Lane Network
Conservative Phasing
2015
2020
2025
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2035
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Operational gap closure
HOV policy:
HOV3+ only as lanes become congested, or from 2035 (if earlier)
Operational periods:
Mon - Fri: 6–10am, 3–7pm
Sat - Sun: 12pm – 7pm
Sonoma
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Solano
Marin
Contra Costa
Alameda
San Mateo
Santa Clara
Healdsburg
Santa Rosa
Petaluma
Novato
San Rafael
Vacaville
Fairfield
Napa
Vallejo
Rio Vista
Concord
Brentwood
Richmond
Walnut Creek
Danville
Oakland
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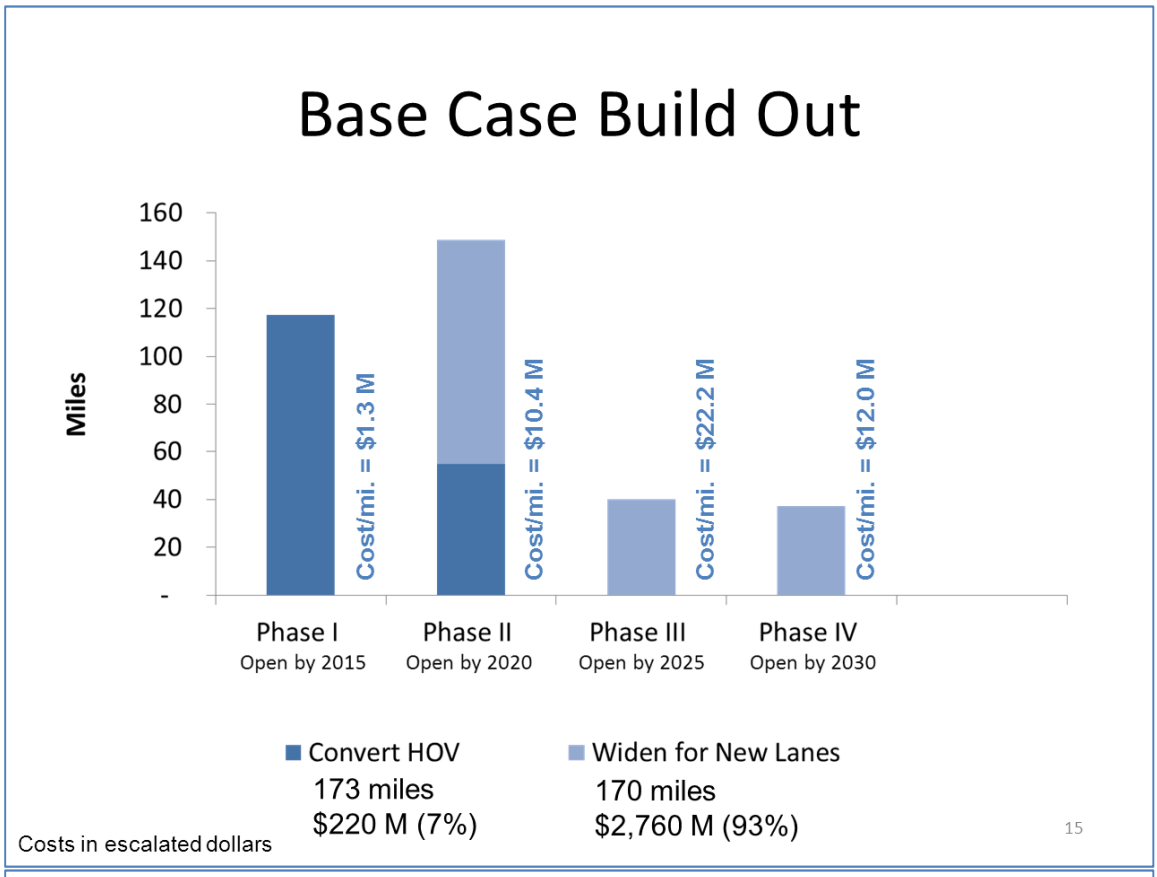
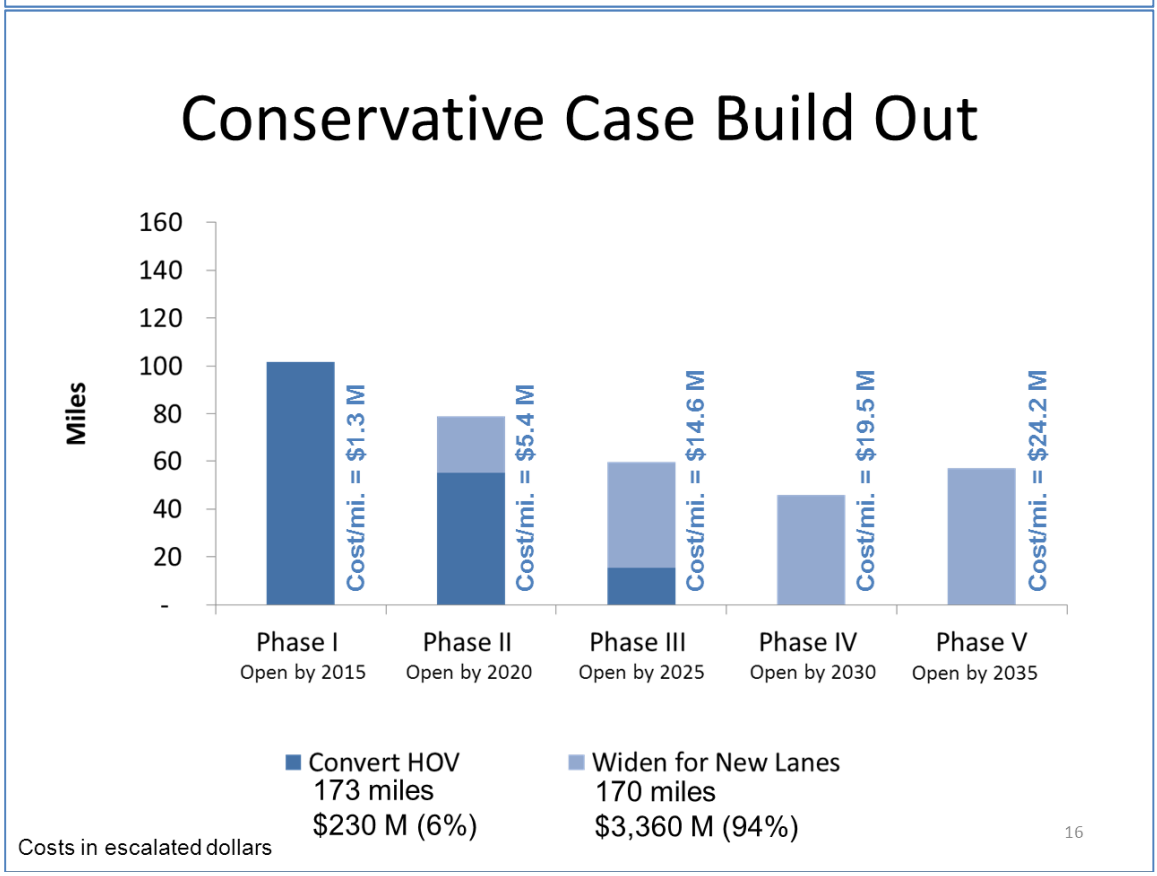
Summary of Phased Build Out in Base and Conservative Cases





DEPARTMENT OF TRANSPORTATION
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5900
FAX (510) 286-5903
TTY 711

Flex your power!
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September 2, 2011

Bimla Rhinehart
Executive Director
California Transportation Commission
1120 N Street
Room 221 (MS-52)
Sacramento, CA 95814

Dear Ms. Rhinehart:

The California Department of Transportation (Department) supports the Bay Area Infrastructure Financing Authority's (BAIFA) application to the California Transportation Commission (CTC) for the Bay Area Express Lanes Public Partnership Application For High Occupancy Toll Lanes. BAIFA is a joint exercise of powers agency formed by the Metropolitan Transportation Commission (MTC) and the Bay Area Toll Authority seeking authority as a regional transportation agency, by the consent of MTC, to develop and implement a high occupancy toll facility.

The application was developed by the MTC in cooperation with the Department for BAIFA to request the determination of eligibility, pursuant to the Section 149 of the Streets and Highway Code, for an Express Lanes Facility. The proposed Express Lanes Facility would consist of about 265 directional miles of express lanes, including 149 miles of existing HOV lanes to be converted to express lanes, and 116 miles of new express lanes. The Express Lanes Facility is comprised of five freeway routes: I-80 in Alameda, Contra Costa and Solano Counties, I-680 in Contra Costa and Solano Counties, I-880 in Alameda County, SR-84 in Alameda County and SR-92 in Alameda County. The proposal also includes a 19.9 directional mile gap on I-880 for which tolling is not anticipated in the near future. Operational strategies will be employed to enhance mobility on this segment instead. The Express Lanes Facility, when combined with other corridors that already have statutory authority for express lanes, would constitute an Express Lane "Network".

The primary goal of the proposed Express Lanes Facility is to help optimize the freeway system management and traffic operations by making use of the available unused capacity in the HOV lanes. Additionally, the Express Lanes Facility would aid in expediting completion of the region's entire HOV lane network, encompassing other currently authorized corridors in the region, to alleviate congestion for all freeway users.

Caltrans District 4 has approved a Project Study Report (PSR) for a "backbone" set of freeway corridors for which express lanes were considered. The Express Lanes Facility submitted in this application is a subset of the "backbone" network. The PSR is programmatic and precedes development of individual project initiation documents and the Project Approval and Environmental Document phase for individual corridors of the proposed network.

In parallel with development of the programmatic PSR, the Department completed a qualitative assessment of the traffic operational benefits of the proposed "backbone" network, including the Express Lane Facility. As you will notice in the attached, the Department has determined that:

- In spite of their effectiveness in providing significant travel time savings, portions of the existing 420 miles of HOV lanes in the San Francisco Bay Area are not being fully utilized. Additionally, the 800 mile HOV network historically envisioned for the Bay Area includes 113 miles of programmed and 267 miles of unfunded HOV lanes which will remain discontinuous due to right-of-way and funding challenges, and thus, not optimized to allow the lanes to reach their full capacity.

- Some existing HOV lanes are near capacity. Once these lanes reach their capacity, their effectiveness in terms of providing travel time savings to users will diminish. In order to ensure continued travel time saving for transit users and carpoolers, either additional capacity, if deemed feasible, will need to be added or the vehicle occupancy requirement will need to be increased. It is expected that a change in the minimum carpool eligibility requirements would result in increased traffic volumes in the adjacent general purpose lanes and would accompany additional congestion, at least initially while the intended increase in usage of transit and ridesharing take effect. Tolling and Express lane operations can help reduce this impact by allowing solo drivers access to the carpool lane, not only reducing demand and congestion in the adjacent lanes but also helping attain optimum efficiency and full capacity of the system. Such changes are expected to be applied incrementally over time and on a corridor by corridor basis upon detailed analyses of needs, and as needed to maintain the integrity of carpool operations starting from 2020.

- The proposed Express Lanes Facility operations will serve as a complementary and an effective tool for real-time multimodal system management operations, adding benefits due to connectivity afforded by extending and closing existing gaps in the HOV network as well as increased efficiency due to full utilization of the unused capacity in the HOV lanes. Given the qualitative assessment and the programmatic approach, the exact benefits cannot be quantified at this time; however, the resultant mobility benefits are expected to be significant.

- The proposed Express Lanes Facility will be consistent with the established standards, requirements, and limitations that apply to those facilities in Sections 149, 149.1, 149.3, 149.4, 149.5, 149.6 and 149.7 of the Streets and Highways Code. The network will be integrated with and complement the previously authorized Express Lanes in Alameda and Santa Clara Counties, on Interstates 580 and 680, U.S. 101, and State Routes 237 and 85.

- Full effectiveness of the proposed Express Lanes Facility will be realized via inclusion of certain design considerations and operational criteria. These include careful selection of access, operational hours, carpool eligibility, dynamic pricing, and network consistency, in addition to uniform tolling and customer service, integration with toll collection and metering operations at Bay Area toll bridges and re-investment of revenues. It is expected that these criteria will be met through appropriate cooperative agreements and memoranda of understanding among appropriate stakeholders, including the Department, MTC, the California Highway Patrol, and other stakeholders.

In closing, the proposed Bay Area Express Lanes Facility is consistent with State Highway System requirements and with the established standards, requirements, and limitations that apply to those facilities in Sections 149, 149.1, 149.3, 149.4, 149.5, 149.6, and 149.7 of the Streets and Highways Code. It is also consistent with the Department's Traffic Operations Program goals, including preserving safety, enhancing mobility, real-time multimodal transportation system management, and providing choice and control for travelers. In addition, the Express lanes network also allows the Department to engage in innovative solutions, potentially involving public-private sector partnerships, in addressing transportation needs and challenges.

Sincerely,

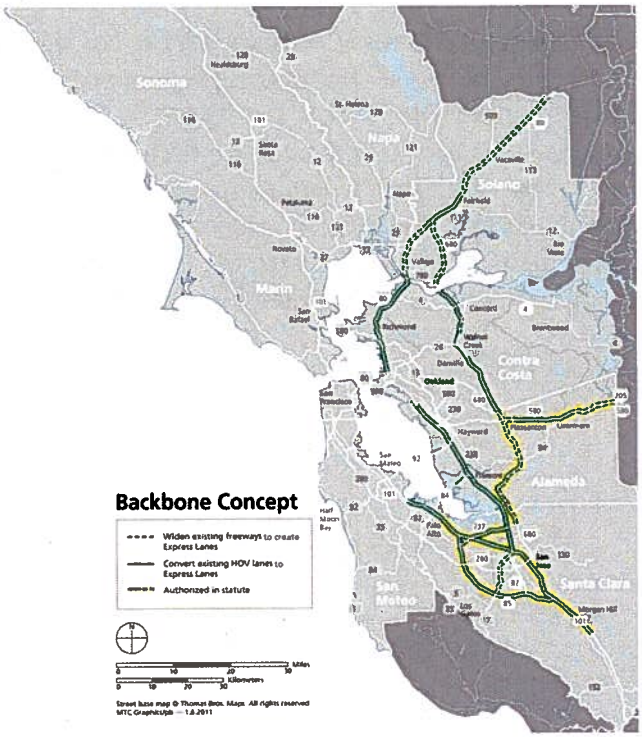
BIJAN SARTIPI
District Director

Attachment: Traffic Operational Assessment, San Francisco Bay Area Express Lanes Network dated August 31, 2011

Cc: Steve Heminger – Executive Director, MTC

Traffic Operational Assessment

SAN FRANCISCO BAY AREA BACKBONE EXPRESS LANES NETWORK



August 31, 2011

California Department of Transportation
District 4 – Office of Highway Operations

SAN FRANCISCO BAY AREA BACKBONE EXPRESS LANES NETWORK

I. INTRODUCTION

This evaluation focuses on the potential traffic operational benefits, i.e., congestion reduction and mobility to convert existing and programmed High Occupancy Vehicle (HOV) lanes in the San Francisco Bay Area to a backbone (High Occupancy Toll or) Express Lanes Network. The need for this evaluation has arisen as part of a current proposal by the Metropolitan Transportation Commission (MTC) and the Bay Area Infrastructure Financing Authority is to get authorization for conversion of HOV to Express lanes on five below corridors hereinafter referred to as the "Facility":

- Interstate 80 in Alameda, Contra Costa, and Solano Counties
- Interstate 680 in Contra Costa and Solano Counties
- Interstate 880 in Alameda County
- SR 84 in Alameda County
- SR 92 in Alameda County

A programmatic Project Study Report for the backbone Network that includes this Facility has been completed by the MTC and approved by Caltrans. Future implementation of all individual elements of the Express Lane Network will be subject to detailed analyses and approval on appropriate corridor level bases, assuring further safety and operational evaluations before actual implementation. Also, while mindful of other influencing factors, such as market and consumer acceptance, pricing, or revenue generation, this evaluation purposely does not intend to assess the financial feasibility of the Express Lanes.

II. BACKGROUND

Existing HOV Lanes Network:

The San Francisco Bay Area has a population of over seven million people and consists of nine counties: San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Marin, Napa, Sonoma, and Solano. The region's highway network has consistently been ranked as one of the most congested in the nation, and peak period congestion is expected to grow in the future. An extensive network of HOV lanes is currently in place to reduce solo commuting by encouraging ridesharing and transit use.

Currently, there are about 420 lane-miles of HOV lanes in the San Francisco Bay Area. The first HOV lanes in the Bay Area were constructed in 1970's. However, the major expansion of the system started in early 1980's when Santa Clara County residents approved a tax measure to build HOV lanes on all major freeways in the South Bay.

Since then, HOV lanes in the other counties of the Bay Area have been constructed in accordance with the HOV Lane Master Plan that envisions an 800 lane-miles network in the Bay Area.

HOV lanes in the Bay Area have design and operational characteristics that differ from HOV facilities in Southern California. HOV lanes in this region are operated contiguous with general purpose lanes and have continuous unlimited access into and out of the lane, with no buffer (neither physical nor striped) separating them from the adjacent lanes. The lane restrictions are in effect only during weekday commute periods (e.g. 5-9 a.m. and 3-7 p.m.). During off-peak periods and on weekends, the lanes are open to all traffic. Because HOV lanes in this region have historically been operated in this manner, these factors will be considered in the operational and design approach to a Bay Area Express Lane network.

Bay Area HOV lanes continue to be well-utilized and offer time savings. The average peak hour speed in the HOV lane is about 61 mph, compared to average speed of general purpose lanes of about 43 mph. The effective capacity of the HOV lane is about 1650 - 1700 vehicles per hour (vph). According to the HOV lane report for calendar year 2009 (http://www.dot.ca.gov/dist4/highwayops/docs/hov_report_2009.pdf), the majority of the HOV lanes in the Bay Area have surplus unused capacity, even during the highest hour of the commute. Because HOV usage is less in the shoulder hours of the peak period, more unused capacity is available at hours immediately preceding or succeeding the peak.

In spite of their effectiveness in providing significant travel time savings, on average, the existing HOV lanes are not being fully utilized in capacity, and the network remains discontinuous due to right-of-way and funding challenges.

Proposed Backbone Express Lanes Network:

Prior legislation allows implementation of Express lanes in four corridors in the Bay Area, consisting of two in Alameda County (Interstates 580 and 680) and two in Santa Clara County (State Route 85/ U.S. 101 and State Route 237). HOV lanes are already in operation in those corridors except for northbound I-680. An Express lane has been in operation on southbound I-680 from Route 237 to Route 84 in Alameda and Santa Clara Counties since September 2010.

The proposed backbone Express Lanes Network would consist of about 533 miles of Express lanes, including 345 miles of existing and under development HOV lanes to be converted to Express lanes, and 188 miles of new Express lanes. The primary goal of the proposed network is to help optimize the freeway system management and traffic operations. By making use of the available unused capacity in the HOV lanes, and

expediting completion of the entire network, congestion for all freeway users could be reduced.

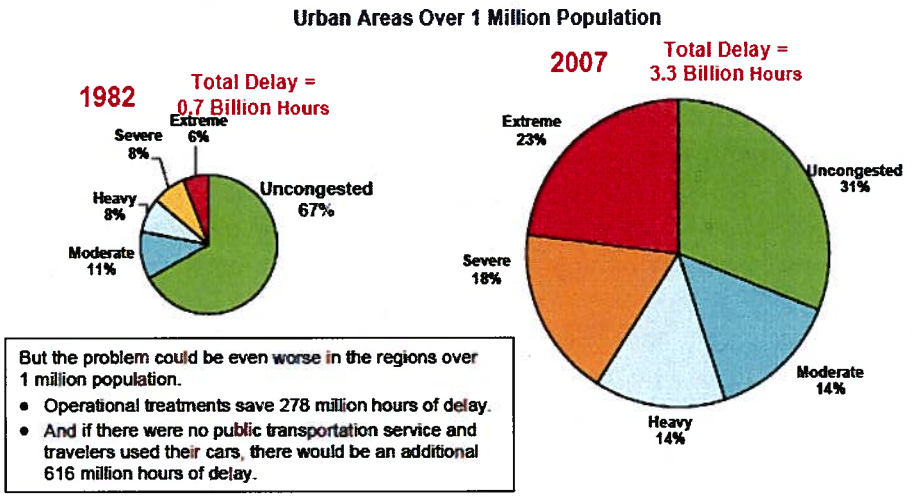
Tolls will vary dynamically based on traffic volumes and congestion in the Express lane and in the adjacent general purpose lanes. Higher tolls will be assessed during peak commute hours when available unused capacity is limited and will be lowered at other times. Peak spreading can be achieved by encouraging modal and temporal shifts to other hours of the peak, further reducing the magnitude of congestion.

Revenue generated by these lanes can help close the HOV gaps and increase corridors reliability for HOV lanes and help reduce congestion overall. Express lanes and toll lanes have been in operation in the southern California but the only Express lane currently operating in the Bay Area is a 14-miles segment of southbound I-680 between Route 84 in Alameda County to Route 237 in the Santa Clara County. The benefit provided by this Express lane is currently being evaluated as there has not been enough time to allow for the respective traffic operational patterns to stabilize.

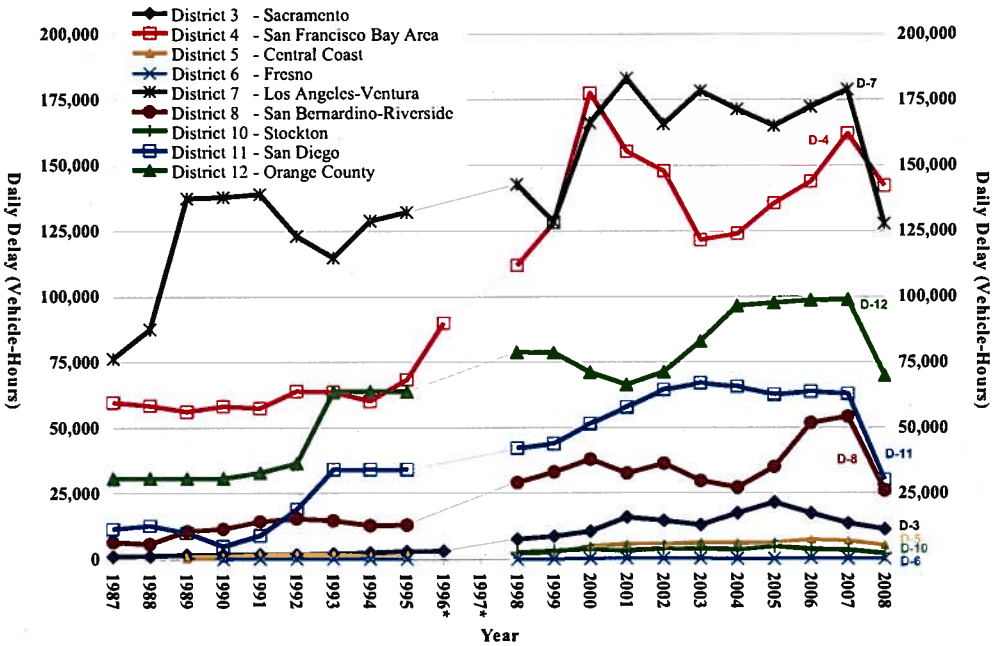
Allowing toll paying solo-drivers in the HOV lanes, when there is available unused capacity, facilitates optimization of the freeway system; thus, reducing congestion in mixed flow lanes. Carpoolers and transit will continue to enjoy travel time savings (and potentially cost savings over solo drivers). The proposed network will be dynamically priced to ensure continued optimum travel time savings for the ridesharing and transit in the lane converted from HOV to Express. Collected revenues will be applied towards operating and maintaining the system as well as the completion of the network which in turn will further promote ridesharing and transit through yet more travels time savings and reliability.

U.S. & California Congestion Trends:

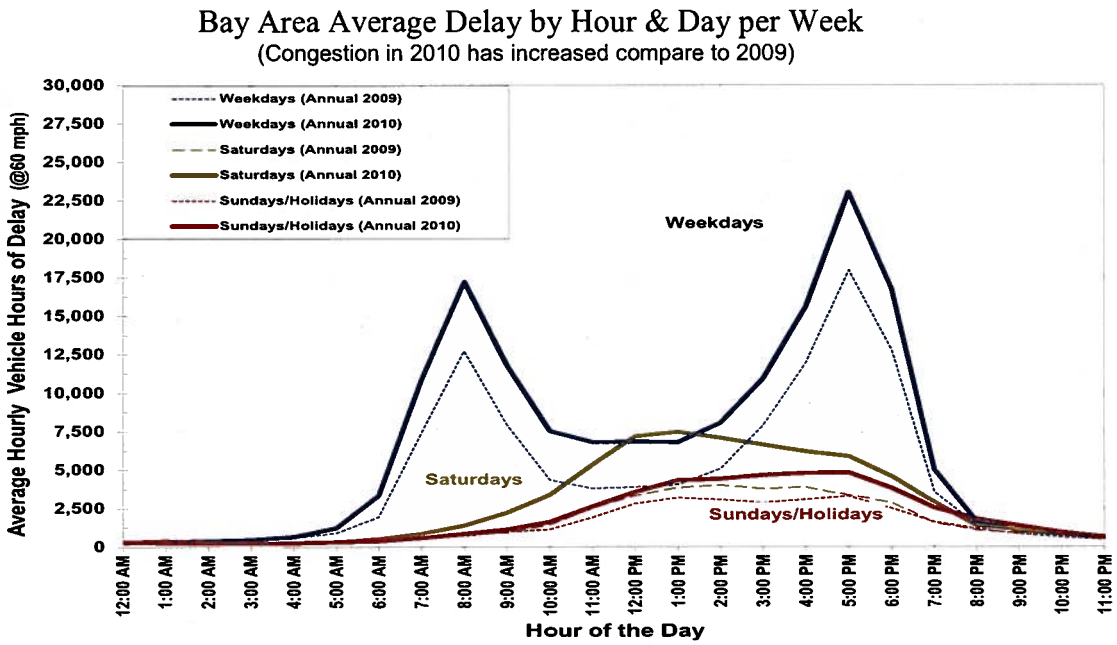
According to the 2009 Urban Mobility Report (UMR) by Texas Transportation Institute, nationwide congestion of the metropolitan area has grown significantly from 1982 with 0.7 billion hours of delay to 3.3 billion hours of delay in 2007.



Consistent with national trends, congestion has been on the increase from 1987 to 2007 in California and the Bay Area. In 2008 and 2009 the Bay Area and statewide congestion dropped slightly due to reduction in employment rate and the general slowing of economy.

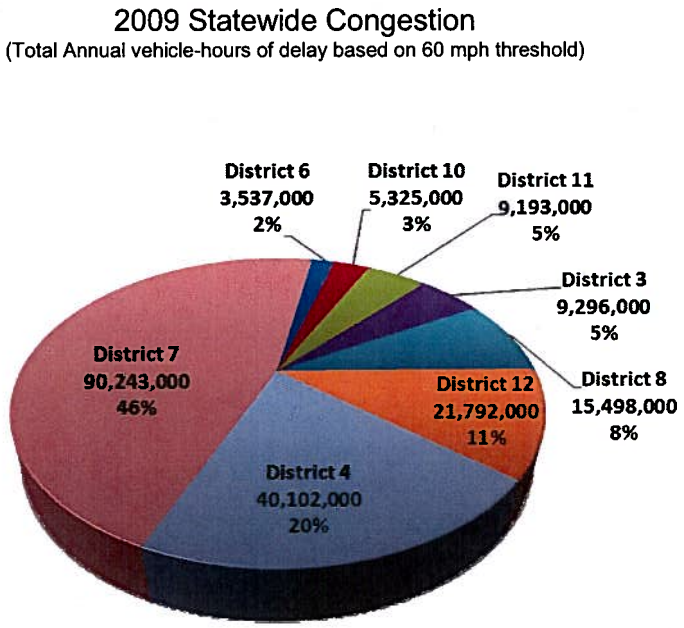


A preliminary comparison of data recently obtained from the California Performance Measurement System (PeMS) revealed that the slight reduction in congestion seen in 2008 and in 2009 has since reversed with increasing daily congestion recorded in 2010.



Congestion in the San Francisco Bay Area:

In 2009, the Bay Area commuters experienced an annual congestion of about four million hours of delay. As depicted below, based on data collected via PeMS, this, on average, is about 20% of the total statewide congestion on California freeways and highways.



The Bay Area annual congestion data for each county and the top 20 most congested locations are shown below. The Alameda County retained the number one congestion ranking followed by Santa Clara, Contra Costa, San Francisco, San Mateo, Solano, Sonoma, Marin, and Napa Counties. At the same time the Vehicle Miles Traveled (VMT) is also increased from 2009 to 2010, an indication of higher transportation demand.

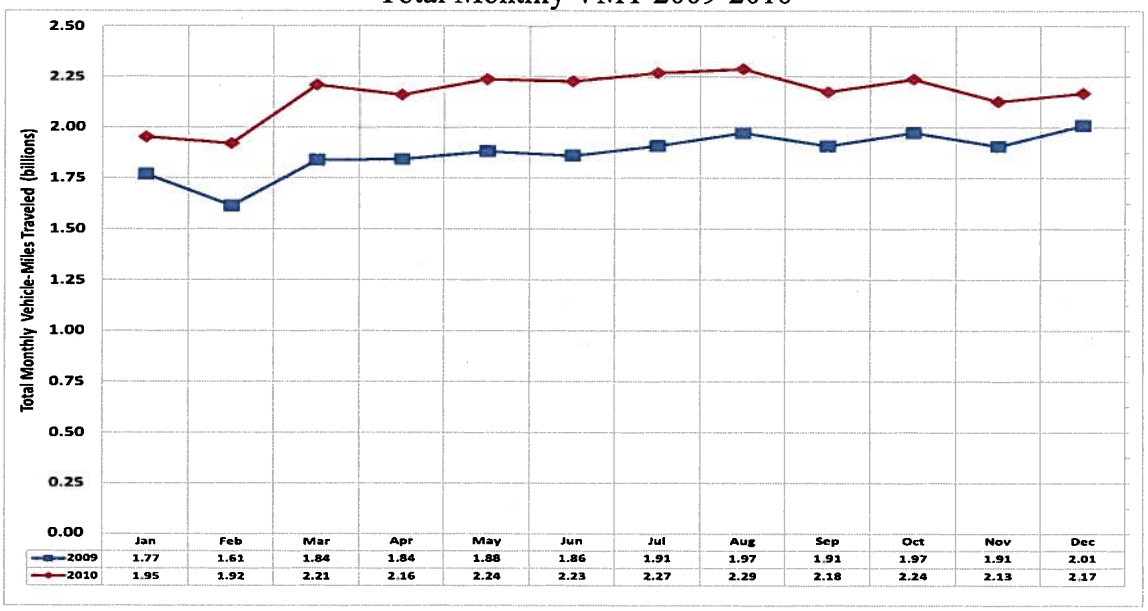
Bay Area Congestion by County

DISTRICT 4 ANNUAL VEHICLE HOURS OF DELAY BY COUNTY

County	2009 AVHD (35 mph)	Percent of District Total (35 mph)	2009 AVHD (60 mph)	Percent of District Total (60 mph)
Alameda	5,550,000	32.8	13,230,000	33.0
Contra Costa	2,257,000	13.3	5,284,000	13.2
Marin	440,000	2.6	1,239,000	3.1
Napa	2,000	0.0	33,000	0.1
San Francisco	2,139,000	12.6	4,509,000	11.2
San Mateo	1,851,000	10.9	3,745,000	9.3
Santa Clara	3,180,000	18.8	7,966,000	19.9
Solano	1,100,000	6.5	2,736,000	6.8
Sonoma	393,000	2.3	1,360,000	3.4
Total	16,911,000*	100.0	40,102,000	100.0

* The County figures for AVHD at 35 mph do not sum exactly to the Total because of rounding to the nearest thousand.

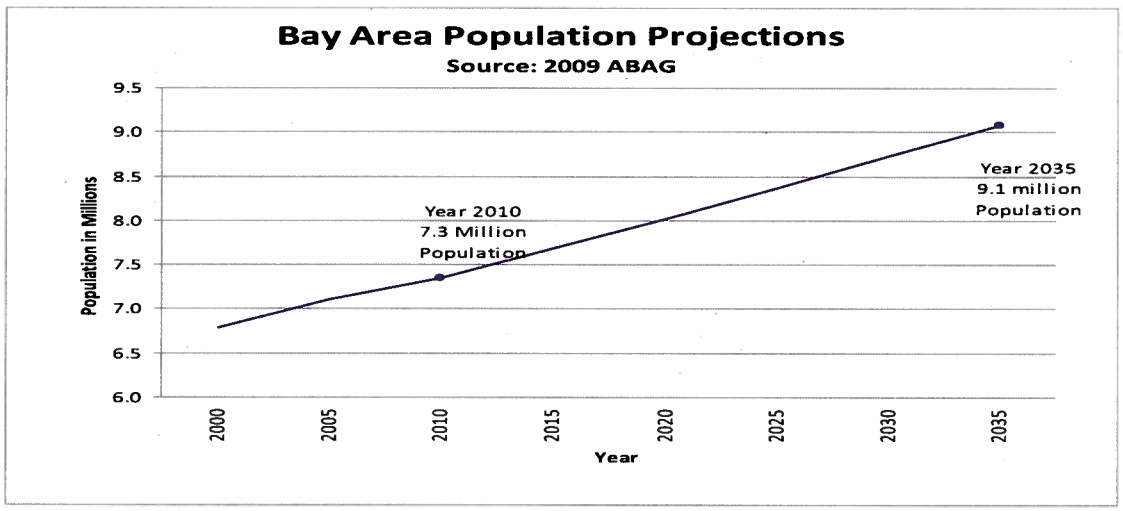
Total Monthly VMT 2009-2010



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	1.77	1.61	1.84	1.84	1.88	1.86	1.91	1.97	1.91	1.97	1.91	2.01
2010	1.95	1.92	2.21	2.16	2.24	2.23	2.27	2.29	2.18	2.24	2.13	2.17

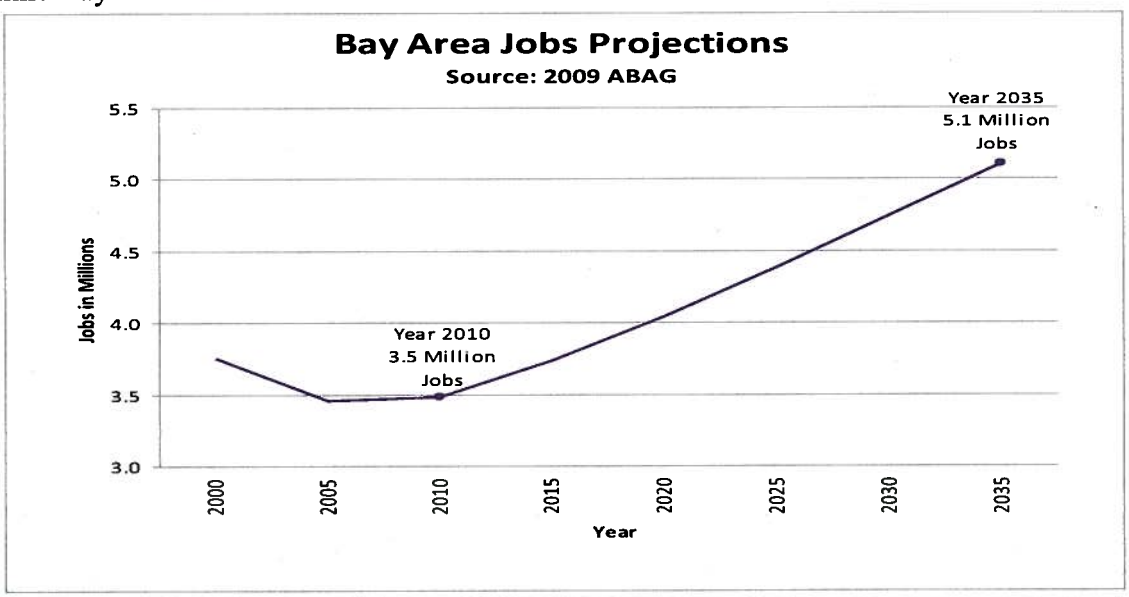
Future Population Growth:

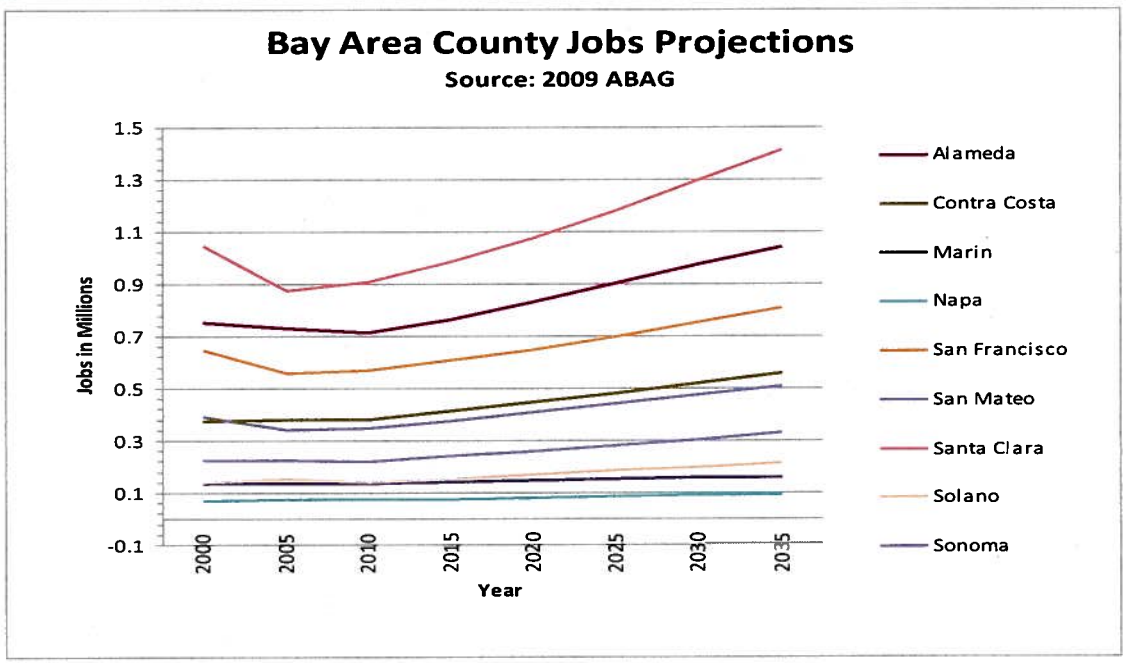
The population of California is expected to increase in the next 20 years. Based on Reason Foundation report in "Building Road to Reduce Congestion in America's Cities", California is expected to add another 10 million people by 2030. According to 2009 ABAG projection the Bay Area population will pass 9 million in the years 2035, an increase of 25% from about 7.3 million people in 2010.



Future Jobs Growth:

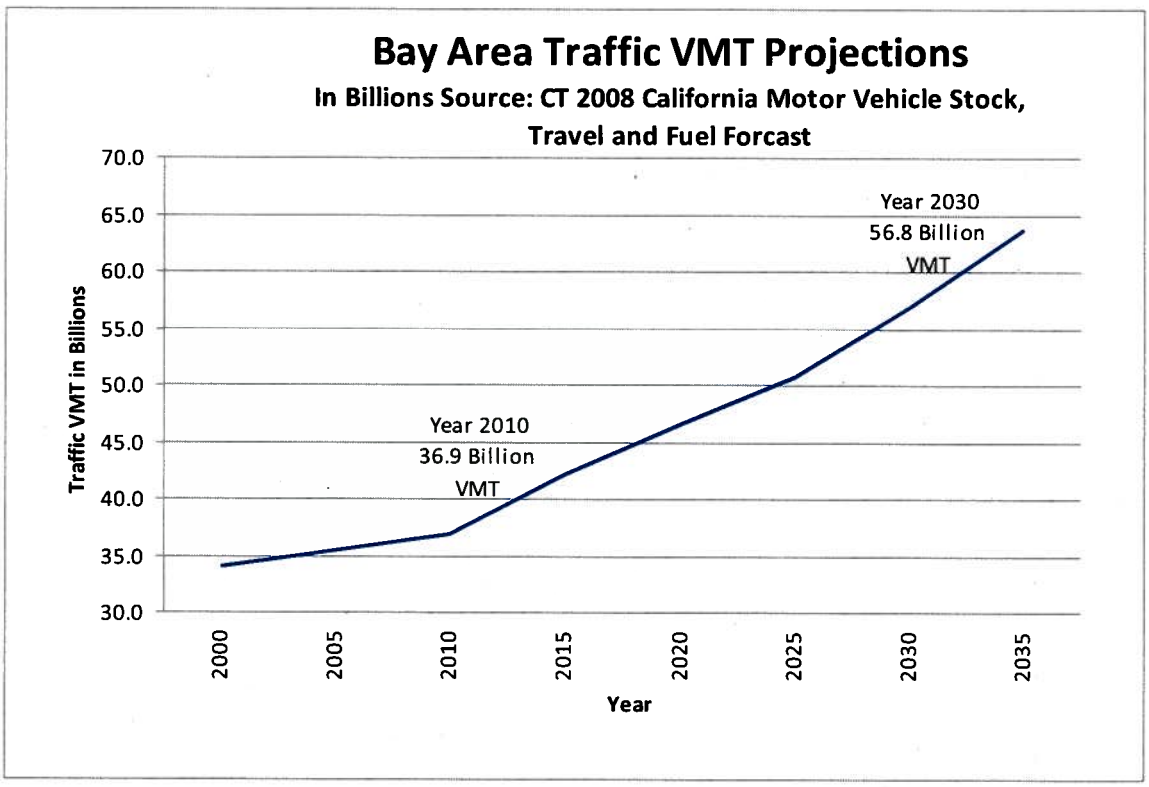
According to ABAG, about 3.5 million jobs were available in 2009 and that is expected to increase to 5.1 million jobs by 2035, an increase of 46%. Most of the job growth is expected to occur in the metropolitan area and while the growth rate is less than what was expected during the height of the Bay Area economy, it is still expected to increase in the future years. Below are job projections for each individual county and combined for all nine Bay Area counties.





Future VMT Increase:

The 2008 California Motor Vehicle Stock, Travel & Fuel Forecast (http://www.dot.ca.gov/hq/tsip/smb/mvstaff.html) reported by Caltrans Division of Transportation System Information, has indicated that the Bay Area VMT will continue to increase by 54% from 2010 to 2030, and to 73% by 2035.

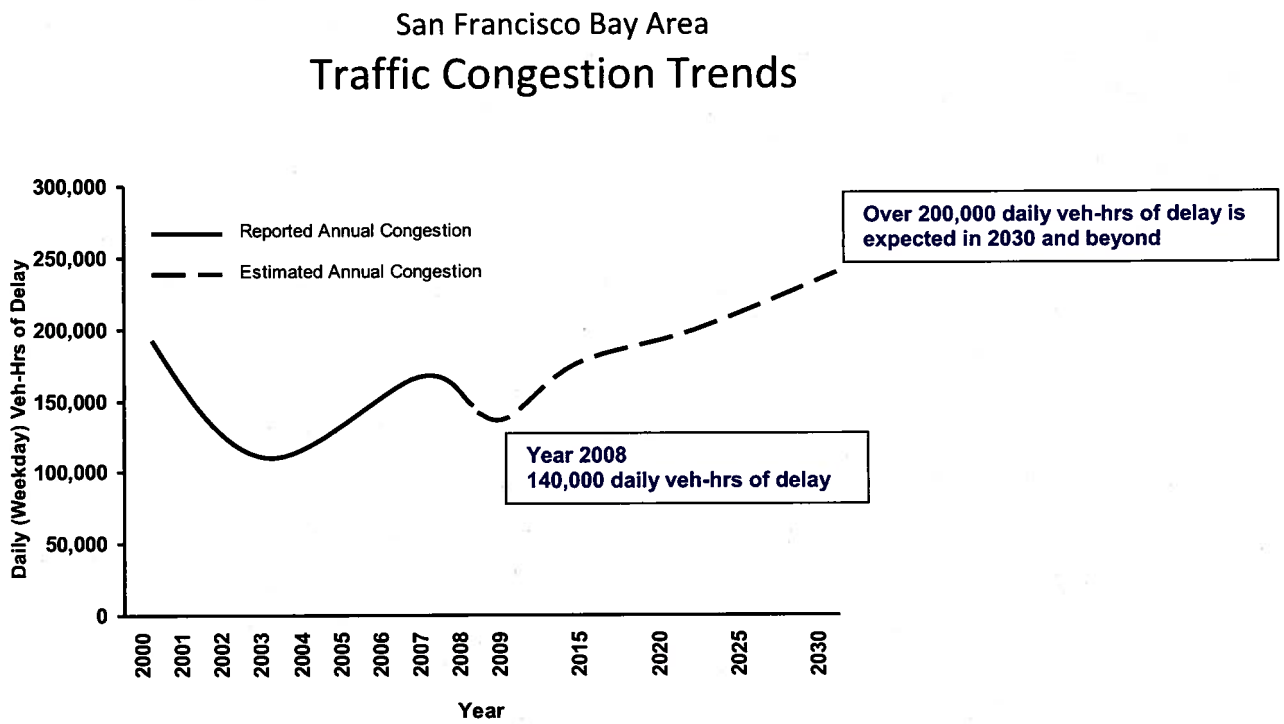


Future Traffic Congestion:

A more in-depth project level analysis for congestion for future years based on hourly traffic volumes for mainline corridors and for all ramps using Micro-Simulation models and more precise geometric plan will be completed as part of the individual project approval process. Study in that magnitude for all corridors in the backbone network will require significant amount of time and resources that cannot be completed at this time. However we can say for certain that as population, VMT, and jobs continuous to grow future congestion level will increase as well. According to Reason Foundation report in "Building Road to Reduce Congestion in America's Cities" currently San Francisco-Oakland Bay Area has the nation's third worst traffic congestion and it will experience

even more severe congestion in the future. According to that report San Francisco-Oakland currently has a Travel Time Index (TTI) of 1.54. This means that driving times during peak traffic hours are 54 percent longer than during off-peak times. In 2030, the travel time index is expected to be 1.86 meaning drivers will experience travel delays far worse than even present-day Los Angeles (1.75).

Using the available congestion data recorded from PeMS and other data, it is estimated that the current Bay Area congestion will increase by a minimum of about 50% in the next 20 to 25 years.



As seen by the above information, summarizing the existing and future congestion trends, population and employment growth, leading to increased vehicle miles of travel, there is a compelling case for ensuring full optimization of the transportation system. The proposed backbone Express Network can undoubtedly be expected to fulfill a proportionate role in enhancing the efficiency and full utilization of the capacity on the Bay Area freeway system.

III. TRAFFIC OPERATIONS EFFECTS OF EXPRESS LANES

Several approaches can be employed to better manage the existing transportation system to its optimum potential. Maximizing capacity, increasing person throughput, reducing traffic demand, or shifting demand to less congested periods are options to better manage our existing transportation system. Many of these strategies are included in the various Bay Area Corridor System Management Plans (CSMPs) and are being pursued in cooperation with MTC, through the Freeway Performance Initiative. The Express Lanes Network operations serve as a complementary and an effective tool for real-time multimodal system management operations, adding additional capacity, connectivity, travel time, reliability, transit, and system performance benefits. Of these, the added capacity afforded through full utilization of the unused available capacity in the HOV network and the enhance connectivity via extending and closing existing gaps in the HOV network are expected to have the most prominent effects.

1. Connectivity Benefits:

Continuity and connectivity to and from major employment centers are essential in the effectiveness of HOV lanes in encouraging ridesharing and transit as well as delivery of meaningful travel time savings. Unless gaps are closed and logical extensions are made in the HOV lane network, certain available capacity in the HOV lanes will remain unused, and full system efficiency will not be achieved. The time savings and trip reliability benefits provided by closing specific gaps in the HOV lane network can vary from location to location. A recently completed HOV gap closure on US-101 in Marin County provides an example of the level of congestion relief that can be accomplished:

Southbound, morning commute:

- *Maximum delay in general purpose lanes reduced by 72% from 29 to 8 minutes*
- *Maximum delay in HOV lane reduced by 77% from 22 to 5 minutes*
- *Congestion period reduced by 56% from 4.5 to 2 hours.*

Northbound, afternoon commute:

- *Maximum delay in general purpose lanes reduced by 50% from 12 to 6 minutes*
- *Maximum delay in HOV lanes reduced by 73% from 5.5 to 1.5 minutes*
- *Congested period reduced by 38% from 4 to 2.5 hours.*

With many gaps still in the HOV lane network, transit and HOV lane users will not fully experience reliable trips free of congestion in many freeway segments. Unfortunately, right-of-way challenges and the associated high costs preclude closing of the existing gaps in the HOV lanes network at this time and instead operational strategies will be implemented to enhance the mobility on these segments. Such gaps, for example, include

a 19.9-miles segment on both directions of I-880, between the I-80/580/880 distribution structure and Hegenberger Road, in Alameda County.

Notwithstanding, as currently perceived, the proposed Express lanes network would promote connectivity by including new facilities, HOV lane extensions and gap closures on the Bay Area HOV Lane network. New and extensions projects included in the network are:

a) Eastbound and westbound I-80 between Airbase Parkway and I-505 in Solano County

b) Northbound I-680 between SR-237 and SR-84 in Alameda and Santa Clara Counties

c) Northbound I-680 between North Main Street and SR-242 in Contra Costa County

d) Westbound I-580 between San Ramon Valley Road/Foothill Boulevard and Greenville Road

e) Eastbound and westbound I-580 between Greenville Road and the San Joaquin County line in Alameda County

f) Northbound I-880 between Lewelling Boulevard and Hegenberger Road in Alameda County

g) Southbound I-880 between Hegenberger Road and Marina Boulevard in Alameda County

The network would also include system expansion to close the gap in the current HOV lane. These gap closure projects include:

a) Eastbound and westbound I-80 between Red Top Road and the Carquinez Bridge in Solano County

b) Northbound and Southbound I-680 between the Benicia-Martinez Bridge and I-80, including direct connectors between I-80 and I-680 in Solano County

c) I-680 between North Main Street and Livorna Road in Contra Costa County

d) I-680 between Alcosta Boulevard and SR-84, including direct connectors between I-580 and I-680 in Alameda County

The anticipated gap closures and the system extensions that promote connectivity within and to/from the Bay Area are expected to have significant operational benefits in travel delays for carpools and transit, as well as an overall reduction in duration of the congestion.

2. Capacity Benefits:

Utilization of the unused available capacity in the HOV lanes helps optimize the freeway network's overall capacity. With careful conversion of the HOV lanes to Express lanes, when there is available capacity, vehicle-throughput can be increased and mainline congestion can be reduced for all users. The conversion will provide choice for solo vehicles to access the Express lanes. The reduction in the mainline congestion will vary based upon the available capacity in the peak hour and other hours of the peak periods.

Constructing additional Express lanes particularly on corridors with high traffic demand will increase capacity and person throughput but it cannot be implemented on many corridors due to environmental and right-of-way constraints as well as prohibitive capital costs. Encouraging modal and temporal shifts to other hours of the peak period when capacity is available can increase the overall person throughput with careful pricing.

In order to help quantify the potential benefits of the proposed Express Lanes Network, available capacity in each of the proposed corridors was evaluated based on the respective current minimum HOV occupancy requirement, existing traffic volumes and future traffic projections. A preliminary evaluation was made for all Bay Area corridors using existing data from Caltrans HOV lane monitoring report and future peak hour HOV forecast provided by the Metropolitan Transportation Commission (Attachment 2) and approved by Caltrans. Please note that HOV forecast is based on current occupancy requirement. The tables, on the pages following, summarize the estimated increase in total capacity (or throughput) during peak hour for current and future years. As seen by the tables, with the current occupancy requirements remaining unchanged, there are certain corridors where there would be no expected available unused capacity. However, some corridors will have available (unused) capacity that may be utilized for tolling in the interest of system optimization, particularly during the near-term. For the longer term, additional available unused capacity may be available in some corridors such as Santa Clara Route 85 or on Interstate 580 in Alameda County, where adding a second Express lane is possible.

While the expected capacity enhancements vary widely from corridor to corridor, the overall benefit of the conversion from HOV to Express Lanes operation is considered significant.

Estimated Increase in Total Capacity
For
Routes Requesting Express Lane Authority (peak hour)

County/Dir/Rte/Peak	One Express Lane			Two Express Lanes	
	2010	2020	2035	2020	2035
ALA/CC EB I-80 (AM peak), 3+	18%	18%	18%	N/A	N/A
ALA/CC EB I-80 (PM peak), 3+	4%	4%	3%	N/A	N/A
ALA/CC WB I-80 (AM Peak), 3+	0%	0%	0%	N/A	N/A
ALA/CC WB I-80 (PM Peak), 3+	14%	11%	10%	N/A	N/A
SOL EB I-80 (AM Peak), *2+	16%	16%	15%	N/A	N/A
SOL EB I-80 (PM Peak), *2+	11%	9%	6%	N/A	N/A
SOL WB I-80 (AM Peak), *2+	14%	6%	5%	N/A	N/A
SOL WB I-80 (PM Peak), *2+	15%	9%	8%	N/A	N/A
ALA/SCL SB I-880 (AM Peak), 2+	0%	0%	^0%	N/A	N/A
ALA/SCL SB I-880 (PM Peak), 2+	8%	7%	5%	N/A	N/A
ALA/SCL NB I-880 (AM Peak), 2+	3%	3%	^0%	N/A	N/A
ALA/SCL NB I-880 (PM Peak), 2+	3%	3%	^0%	N/A	N/A
CC/SOL NB I-680 (AM Peak), 2+	10%	5%	^0%	N/A	N/A
CC/SOL NB I-680 (PM Peak), 2+	7%	3%	3%	N/A	N/A
CC/SOL SB I-680 (AM Peak), 2+	2%	0%	^0%	N/A	N/A
CC/SOL SB I-680 (PM Peak), 2+	15%	3%	^0%	N/A	N/A

Notes

Reflects current HOV occupancy requirement, unless otherwise noted.

^ Improved mobility can be expected with a 3+ occupancy requirement for 3 hours each during the a.m./p.m. peaks and careful pricing to attract adequate solo users. Minimum occupancy requirement can revert back to 2+ at all other times.

- 2+ occupancy requirement in Solano County must be increased to 3+ to match the occupancy in Contra Costa and Alameda Counties prior to the completion of the last HOV lane segments of this corridor to provide a seamless connected HOV lane.

Estimated Increase in Total Capacity

For

Routes with Existing Express Lane Legislative Authority (peak hour)

County/Dir/Rte/Peak	One Express Lane			Two Express Lanes	
	2010	2020	2035	2020	2035
ALA NB I-680 (AM Peak), 2+	N/A	8%	2%	N/A	N/A
ALA NB I-680 (PM Peak), 2+	N/A	7%	^0%	N/A	N/A
ALA SB I-680 (AM Peak), 2+	EL	EL	EL	N/A	N/A
ALA SB I-680 (PM Peak), 2+	EL	EL	EL	N/A	N/A
ALA EB I-580 (AM Peak), 2+	18%	18%	11%	38%	31%
ALA EB I-580 (PM Peak), 2+	10%	∞10%	0%	∞30%	∞20%
ALA WB I-580 (AM Peak), 2+	N/A	∞10%	0%	∞30%	∞20%
ALA WB I-580 (PM Peak), 2+	N/A	18%	6%	38%	26%
SCL/SM NB US 101 (AM Peak), 2+	0%	0%	0%	25%	20%
SCL/SM NB US 101 (PM Peak), 2+	13%	10%	7%	37%	33%
SCL/SM SB US 101 (AM Peak), 2+	10%	7%	2%	33%	28%
SCL/SM SB US 101 (PM Peak), 2+	0%	0%	0%	22%	18%
SCL NB SR 85 (AM Peak), 2+	0%	0%	0%	40%	38%
SCL NB SR 85 (PM Peak), 2+	33%	33%	25%	73%	65%
SCL SB SR 85 (AM Peak), 2+	35%	33%	33%	73%	73%
SCL SB SR 85 (PM Peak), 2+	0%	0%	0%	35%	33%

Notes

Reflects current HOV occupancy requirement, unless otherwise noted.

∞ Available capacity will be less, if higher forecast HOV volumes by Alameda County (2006) are used.

^ Improved mobility can be expected with a 3+ occupancy requirement for 3 hours each during the a.m./.m. peaks and careful pricing to attract adequate solo users. Minimum occupancy requirement can revert back to 2+ at all other times.

* 2+ occupancy requirement in Solano County must be increased to 3+ to match the occupancy in Contra Costa and Alameda Counties prior to the completion of the last HOV lane segments of this corridor to provide a seamless connected HOV lane.

A discussion of the expected capacity enhancement afforded by the proposed conversion of HOV to Express Lanes for each corridor is provided below:

INTERSTATE 80, from the Bay Bridge Toll Plaza in Alameda County to the Solano/Yolo County Line.

Alameda and Contra Costa Counties: The current HOV lane minimum occupancy requirement in both directions is 3+, hours of operations are: 5 – 10 a.m., 3 – 7 p.m., Monday through Friday.

- Eastbound: The peak direction of travel for eastbound direction occurs in the evening hours. Current peak hour usage in the HOV lane is just above 1300 vehicles per hour (vph). Because of physical constraints at the San Francisco Oakland Bay Bridge (SFOBB) and the distribution structure at I-80/I-580/I-880 interchange, future HOV volumes are not expected to increase significantly from current levels. Therefore some capacity will be available for express vehicles during the peak commute hours. With a conversion to an Express lane, existing mainline capacity can be increased by approximately 4% and future capacity in 2020 by approximately 4% and in 2035 by 3%. Minor improvement in congestion for general purpose lanes without degradation of HOV lane in the peak hour can be expected with conversion to an Express lane. In the shoulder of the peak additional capacity in the HOV lane is available although no major time savings is expected. An increase of capacity of about 8% in the shoulder of the peak can also be expected based on existing HOV lane volumes. Additional weekend capacity is also available however careful pricing will be needed to make sure adequate number of vehicles utilizing the Express lane to prevent creating congestion due to loss of unrestricted capacity.

  The eastbound morning peak will have capacity available but no congestion is expected to occur as this is/will be the off-peak direction, therefore no significant time saving from recurrent congestion will be realized. The conversion to Express lane will increase the capacity by 18%. With Express lane, the travel time savings for the off-peak hours and weekend from non-recurrent congestion due to incidents can be significant.

- Westbound: The westbound peak commute direction on I-80 is in the morning. Due to high time saving benefits experienced by HOV users, the current HOV lane in the peak hour is at capacity and some slow down and congestion in the HOV lane occurs daily. As a result, there is no capacity available for a conversion to an Express lane in the westbound morning peak hours within this segment of the corridor. In addition, with 3+ occupancy currently required in the HOV lane it would be impractical and unlikely that an increase in occupancy to 4+ would occur any time soon to provide additional capacity for an Express lane.

The HOV lane usage in the westbound evening peak is about 500 vph and is expected to increase to 800 vph in 2035. Capacity will be available for an Express lane conversion which could improve congestion in the general purpose lanes that currently exist between University Avenue and the I-580/I-880 junction. With conversion to an Express lane the existing capacity can be increased by approximately 14% and the available capacity in 2020 by approximately 11% and by 10% in 2035.

Solano County: The current HOV lane minimum occupancy requirement in both directions is 2+, hours of operations are: 5 – 10 a.m., 3 – 7 p.m., Monday through Friday.

- Eastbound: It is expected that capacity for I-80 corridor will also be available for Solano County as well. Unlike Alameda and Contra Costa Counties where the peak hour HOV lanes are either at or near capacity, the Solano County HOV lane has available capacity. Currently some evening congestion occurs on eastbound I-80 at around I-680 interchange. No degradation of HOV lane is expected as the current HOV lane usage is about 700 vph in the evening peak and that volumes are expected to grow to about 1100 vph in 2035. With a conversion to an Express lane the existing capacity can be increased by approximately 11% and available capacity in 2020 by approximately 9% and capacity increase in 2035 by 6%. In the shoulder of the peak and on weekends additional capacity in the HOV lane is also available although no major time savings is expected during typical traffic condition. During major incidents time savings can be noticeable and with proper pricing usage of the lane can be increased with conversion to an Express lane.

  The eastbound morning peak will have capacity available but no recurrent congestion is expected to occur as this is and will be the off-peak direction and therefore no significant time saving will be realized. Conversion to Express lane will increase the morning peak capacity by 15% to 16%. With Express lane the travel time savings for the off-peak hours and weekend from non-recurrent congestion due to incidents can be significant.

- Westbound: The westbound peak commute direction is in the morning and the current HOV usage is about 500 vph. The peak hour HOV usage by 2035 is expected to double the current volumes. There is existing congestion near I-780, which Express lane users can bypass. With a conversion to an Express lane existing capacity can be increased by approximately 14% and available capacity in 2020 by approximately 6% and capacity increase in 2035 by 5%.

  The westbound evening peak will have capacity available but no recurrent congestion is expected to occur as this is and will be the off-peak direction and therefore no significant time saving will be realized. The conversion to Express

lane will increase the existing capacity by 15% and future capacity from 8% to 9%.

The minimum occupancy requirement of 2+ in Solano County would have to be increased to 3+ to match the occupancy rate in Contra Costa and Alameda Counties prior to the completion of the last HOV lane segments of this corridor that will provide a seamless connected HOV lane. Additional capacity in the Express lane in the Solano County will be available with conversion to 3+ and with careful pricing the utilization of Express lane can be increased to prevent unnecessary slow down in the general purpose lanes.

INTERSTATE 880, from Route 85 in Santa Clara County to Hegenberger Road in Alameda County. This is the main corridor for trucks to access port of Oakland and truck percentage in this corridor is from 9% to 11% of total traffic.

Alameda and Santa Clara Counties: The current HOV lane minimum occupancy requirement in both directions is 2+, hours of operations are: 5 – 9 a.m., 3 – 7 p.m. Monday through Friday.

- Southbound: There is no defined peak direction in this corridor. Current HOV lane usage in the morning peak is about 1300 vph south of Hesperian and is expected to increase to about 1500 vph by 2035 in the morning peak hour. Congestion in the morning peak hour occurs between SR 238 and SR 92 for approximately 3 hours in the general purpose lanes. Theoretically the HOV lane has some available capacity in the current year but the lane slows down near SR 92 and therefore is most likely near capacity already. Because of that the conversion to Express lane would provide a minimal improvement to the future congestion in the general purpose lanes on southbound I-880 approaching SR 92 interchange. It is expected however that some capacity would still be available to improve trip reliability at other portions of this corridor.

  The existing HOV usage in the evening peak hour is slightly less than the peak hour usage in the morning. Currently, about 1100 vph utilized HOV lane in the peak hour. Congestion occurs between SR 238 and Industrial Boulevard in the general purpose lanes on a daily basis. HOV usage is expected to increase to about 1300 vph by 2035 near Whipple Road and near Coleman Avenue therefore there is available capacity in the HOV lane in the evening peak hour. With a conversion of HOV lane to an Express lane, existing general purpose lanes capacity can be increased by approximately 8%, by about 7% in 2020 and by about 5% in 2035.

- Northbound: Current HOV lane usage is about 1400 vph north of Whipple Road and is expected to increase to about 1600 vph by 2035 in the morning peak hour. Existing congestion occurs between Whipple Road to SR 92 for about 2 hours on a daily basis in the general purpose lanes. There is a small amount of capacity available in the HOV lane and with a conversion to an Express lane existing and 2020 capacity can be increased by approximately 3%. However, by 2035 there would be no capacity available in the HOV lane.

  Current HOV lane usage is about 1400 vph north of Whipple Road and is expected to increase to about 1600 vph by 2035 in the evening peak hour. Existing congestion occurs between Decoto Road to SR 92 for about 3 hours, also between SR 262 Mission and Automall Parkway for about 1 hour. There is a small amount of capacity available in the HOV lane and with a conversion to an EL existing capacity can be increased by approximately 3% and by about 3% in 2020. However, by 2035 there would be no capacity available in the HOV lane.

  With EL the travel time savings for the off-peak hours and weekend from non-recurrent congestion due to incidents can be significant.

INTERSTATE 680, from the Alameda/Contra Costa County Line to I-80 in Solano County.

Contra Costa and Solano Counties - the current HOV lane minimum occupancy requirement is 2+, hours of operation 5 – 9 a.m., 3 – 7 p.m., Monday through Friday on mainline, and 3+ during 5 – 10 a.m. and 3 – 7 p.m., Monday through Friday, at the Benicia/Martinez Bridge toll plaza.

- Northbound: The northbound peak in the morning hours occurs between Alcosta Boulevard and Livorna Road with an HOV lane usage of about 1000 vph. The HOV lane usage is expected to increase to 1700 vph by 2035. In the interim years there would be available capacity for a conversion to an Express lane. With a conversion to an Express lane the current capacity can be increased by approximately 10% and by about 5% in 2020. This will relieve some congestion in the general purpose lanes until the HOV lane usage reaches capacity prior to 2035.

  In the evening, the highest HOV usage will be between State Route 242 and Marina Vista interchange at about 1200 vph. The HOV lane usage is expected to increase to 1400 vph by 2035. There would be available capacity for a conversion to an EL that would also provide congestion improvement in the general purpose lanes. With a conversion to an Express lane existing capacity can be increased by

approximately 7% and future capacity by approximately 3% in 2020 and also in 2035.

- Southbound: In morning, the southbound peak direction of travel in this corridor is between the Marina Vista and North Main Street with an HOV lane usage of about 1400 vph. The HOV lane usage is expected to reach its capacity with projected volumes of about 1800 vph by 2035 or sooner. There is a small amount of capacity available in the HOV lane initially and with a conversion to an Express lane existing capacity can be increased by approximately 2%. However, by 2020 there would be no capacity available in the HOV lane.

  In the evening the HOV lane usage is about 700 vph, between Livorna Road and Alcosta Boulevard. The future HOV lane usage is expected to increase to 1700 vph by 2035. There is available capacity currently in the HOV lane and with a conversion to an Express lane existing capacity can be increased by approximately 15% and by 3% in 2020. However, by 2035 there would be no capacity available in the HOV lane.

Alameda County - The current HOV lane minimum occupancy requirement is 2+, and the hours of operation is 5 – 9 a.m., 3 – 7 p.m., Monday through Friday.

- Northbound: Currently significant delays occur in the evening peak as demand traffic exceeds the available capacity. There is no existing HOV lane in the northbound direction however the addition of HOV lane is expected to improve congestion from the day of opening. The usage of HOV lane during the evening peak period is expected to be similar to the morning peak in the southbound direction (600-800 vph) initially but that will increase to about 1200 vph in 2020 and about 1600 vph in 2035. In 2020, there would be about 7% available capacity in the HOV lane for an Express lane conversion. However, by 2035 there will be no available capacity.

  The northbound morning peak will have capacity available but no recurrent congestion is expected to occur as this is and will be the off-peak direction and therefore no significant time saving will be realized. The conversion to Express lane however will increase the capacity by 8% in 2020 and by 2% in 2035.

- Southbound: There is an EL from Route 84 in Alameda County to SR 237 in Santa Clara County in operation. The current usage of the Express lane is about 1100 vph in the morning peak with about one half HOV's and the other half solo vehicles. Travel times savings varies from day to day but on an average the Express lane provides about 3 minutes of time savings daily. The section north of

Route 84 is congested so an addition of Express lane in that area can add to the travel time savings for Express lane users.

There is no recurrent congestion in the evening peak hours in the southbound direction in Alameda County as that is the off peak direction. No recurrent congestion occurs on weekend.

INTERSTATE 580 corridor from I-680 to I-205 in Alameda County, a distance of 21 miles. This corridor is currently authorized for Express Lane operations. Main commute route between the affordable residential communities in San Joaquin Valley and employment centers at tri valley and Silicon Valley. The only HOV lane on this corridor is currently in eastbound direction with minimum occupancy requirement of 2+; hours of operation are 5 – 9 a.m., 3 – 7 p.m., Monday through Friday.

- Eastbound: In evening, the eastbound direction is the peak direction with an HOV lane usage of about 800 vph. The opening of HOV lanes completed recently has significantly reduced the recurrent congestion in the peak commute hours. Congestion however is expected to increase in the future. The HOV lane is expected to increase to about 1700 vph in 2035. There is available capacity for an EL conversion in the interim which would improve congestion in the GP lanes prior to 2035. With a conversion to an Express lane existing capacity can be increased by approximately 10% and capacity in 2020 by 10%. However, by 2035 there would be no capacity available in the HOV lane. A study by the Alameda County Transportation Commission in 2006 concluded that the capacity of the single HOV lane will be reached prior to 2020 and as a result a second HOV lane between Tassajara Road and Vasco Road is being designed to be constructed in time for conversion to Express lane. With the added second Express lane the available capacity will be increased by about 20%.

  There is no recurrent congestion in the morning peak hours and the current HOV usage is about 200 vph. The utilization of HOV's in expected to remain at 200 vph and to increase to about 700 vph by 2035. The increase in capacity by conversion to Express lane will be 18%, 18% in 2020, and 11% in 2035.

- Westbound: In the morning, the peak commute direction is in the westbound direction as San Joaquin residents headed to employment centers in the east and south bay that results in significant daily congestion. Currently there is no HOV lane in the westbound direction, however there is a planned HOV lane with an expected HOV lane usage of 800 vph in 2020 and 1800 vph in 2035. There is available capacity for an Express lane conversion in the interim, about 10% in 2020, which would improve the overall congestion prior to 2035 but similar to the

eastbound direction the single lane capacity can be reached by 2020. With the added second Express lane the capacity will be increased by about 20%.

There is no recurrent congestion in the evening hours except at the approach to the I-680 interchange. The HOV usage in 2020 is expected to be at about 200 vph and in 2035 at about 1100 vph and the increase in capacity will be 18% in 2020 and 6% in 2035.

US-101 corridor from Cochrane Road in Santa Clara County to Whipple Avenue in San Mateo County a distance of nearly 42 miles in each direction. The Santa Clara County portion of this corridor is currently authorized for Express lane operations and a new legislation extended authorization into San Mateo County. Authorization also exists for the segment between Cochrane Road and the San Benito County Line.

Santa Clara and San Mateo County: The minimum occupancy requirement for HOV lane is 2+ and the mainline hours of operations are 5 - 9 a.m., 3 - 7 p.m., –Monday through Friday.

- Northbound: The peak direction of travel is in the morning peak and the HOV lane is currently at capacity with about 1600 vph around downtown San Jose. Congestion in the HOV lane occurs at around Mckee Road and between North First Street and Trimble Road. Traffic demand for HOV lane is expected to increase to about 2000 vph in 2035. Because of high demand for the HOV lane already, for a conversion to an EL an additional lane would need to be constructed to provide a two lane EL facility with the needed capacity. With a two lane Express lane, the mainline capacity will be increased by 27% immediately, by 25% in 2020 and by 20% in 2035.

  In the evening, the northbound HOV lane usage is about 800 vph north of SR 85 interchange in Mountain View. The HOV lane usage is expected to increase to about 1200 vph in 2035. There is currently capacity available in the HOV lane. With an Express lane conversion existing capacity can be increased by about 13% and available capacity in 2020 by approximately 10% and by approximately 7% in 2035. However, about 37% more capacity will be added in 2020 when the second Express lane is provided and 33% in 2035.

- Southbound: In the evening, the southbound direction is the peak commute direction. Similar to the northbound direction, the southbound HOV lane is currently at capacity with about 1650 vph in the evening peak with HOV congestion approaching the downtown area. Daily congestion and slow-downs in the general purpose lanes occur between Lawrence Expressway and Tully Road. Before conversion to an Express lane, an additional lane would need to be

constructed to provide the needed capacity with a two lane Express lane facility. The expected HOV demand by 2035 is forecast to be at about 2100 vph. With the second Express lane, the overall capacity of the corridor is expected to increase by about 22% in 2020 and 18% in 2035.

In the morning, the southbound HOV lane usage is currently at about 1000 vph. This usage is expected to increase to about 1500 vph in 2035. There is currently capacity available in the HOV lane. With an Express lane conversion existing capacity can be increased by about 10% and available capacity in 2020 by 7% and by approximately 2% in 2035. However, in 2020 about 33% and in 2035 about 28% more capacity will be added when the second Express lane is provided.

State Route 85 corridor in Santa Clara County from southern US-101 interchange in south San Jose to northern US-101 interchange in Mountain View a distance of about 24 miles. This corridor currently has legislative authorization for Express lane operations. HOV lane minimum occupancy requirement, 2+, hours of operations 5 - 9 a.m., 3 - 7 p.m., –Monday through Friday on mainline.

- Northbound: In the morning, the northbound direction is the peak direction. The HOV lane is currently at capacity and mainline congestion between Santa Teresa Boulevard and Saratoga Avenue. The volumes in the HOV lanes are recorded to be at about 1200 vph but because of some slow down in the lane from SR 87 to north of Winchester Boulevard demand traffic are higher than what is recorded. The HOV lane usage is expected to increase by about 100 vph in 2035. To alleviate the current and future slow-downs in the HOV lanes an additional lane between Route 87 and I-280 where HOV demand is high will increase the available capacity by about 40% in 2020 and by 38% in 2035, when it is converted to Express lane.

  The evening peak will have capacity available but no recurrent congestion is expected to occur as this is/will be the off-peak direction and therefore no significant time saving will be realized except during incidents. The conversion to Express lane will increase the capacity by 33% and 25%. The capacity will increase significantly with the second Express lane.

- Southbound: The peak commute direction occurs in the evening hours with about 1200 vph HOV lane usage. Similar to the northbound direction, the HOV lane slows down between I-280 and Camden Avenue, which indicates that demand traffic is higher than the volumes recorded. As such capacity is not available. The HOV lane usage is expected to increase by an additional 300 vph in 2035. For a conversion to an Express lane an additional lane would need to be constructed

between I-280 and Route 87 to provide a two lane Express lane facility. That will increase the current available capacity by about 35% in 2020 and 33% in 2035.

The morning peak will have capacity available but no recurrent congestion is expected to occur as this is/will be the off-peak direction and therefore no significant time saving will be realized except during incidents. The current capacity with the conversion to Express lane will be about 35%, 33% in future years and significantly higher with the second Express lane.

Estimated traffic conditions with 3+ minimum occupancy requirement:

Table below summarizes the expected added freeway capacity with conversion to three-or-more persons per vehicle in 2020, based on 3+ forecast data, for corridors currently operating with 2+ minimum carpool occupancy requirement (see attachment 3).

Estimated Increase in Total Capacity For Routes Requesting Express Lane Authority with 3+ occupancy requirement (peak hour)

County/Dir/Rte/Peak	One Express Lane		
	2010	2020	2035
ALA/CC EB I-80 (AM peak), 3+	-	No Change	No Change
ALA/CC EB I-80 (PM peak), 3+	-	No Change	No Change
ALA/CC WB I-80 (AM Peak), 3+	-	No Change	No Change
ALA/CC WB I-80 (PM Peak), 3+	-	No Change	No Change
SOL EB I-80 (AM Peak), 3+	-	NR	NR
SOL EB I-80 (PM Peak), 3+	-	NR	NR
SOL WB I-80 (AM Peak), 3+	-	NR	NR
SOL WB I-80 (PM Peak), 3+	-	NR	NR
ALA SB I-880 (AM Peak), 3+	-	2-3%	1-5%
ALA SB I-880 (PM Peak), 3+	-	1-2%	2-3%
ALA NB I-880 (AM Peak), 3+	-	2-3%	1-3%
ALA NB I-880 (PM Peak), 3+	-	2-7%	2-5%
CC ** NB I-680 (AM Peak), 3+	-	3-6%	1-5%
CC ** NB I-680 (PM Peak), 3+	-	2-8%	3-7%
CC ** SB I-680 (AM Peak), 3+	-	2-6%	3-6%
CC ** SB I-680 (PM Peak), 3+	-	3-8%	2-8%
SOL** NB I-680 (AM Peak), 3+	-	NR	NR
SOL** NB I-680 (PM Peak), 3+	-	NR	NR
SOL** SB I-680 (AM Peak), 3+	-	NR	NR
SOL** SB I-680 (PM Peak), 3+	-	NR	NR

Notes

NR: Not recommended until all HOV/EL gaps in the entire corridor are completed and connected to CC portion, or unless future traffic volumes for HOV/EL will be higher than is forecasted.

** The estimated capacity increase shown are for segments of I-680 in CC County south of the SR 24 interchange. A 3+ conversion north of SR 24 interchange in Contra Costa County and in the entire Solano County on either direction and in both future years is not recommended unless all gaps in the HOV/EL are completed, or unless future traffic forecast for HOV/EL will actually be higher than what is forecasted today.

This evaluation is for all three corridors that are in the authorization request:

I-80 in Solano County: An increase in the minimum occupancy requirement to 3+ in the year 2020 is not expected to attract many users in the HOV/Express Lanes in Solano County and as a result it will increase traffic volumes in the general purpose lanes. However the added traffic volumes are not expected to cause congestion in the general purpose lanes but a 3+ requirement will cause HOV/Express lanes to be underutilized with low volumes, which can generate negative public reaction. As such increasing the occupancy requirement to 3+ in Solano County segment could be delayed until the last segment of gap closure project is completed, unless future traffic volumes for HOV/Express Lanes will actually be higher than is forecasted. Operating with the same occupancy requirement in the corridor without any gaps will ensure the continuity in the HOV/EL throughout this corridor.

I-680 in Alameda & Contra Costa Counties: An increase in the minimum occupancy requirement for I-680 HOV/EL to 3+ is expected to improve mobility for the segments south of the SR 24 interchange in both directions by the year 2020. But conversion to 3+ for segments north of SR 24 interchange could be delayed and evaluated later for years beyond 2020, unless future traffic volumes for HOV/EL will actually be higher than is forecasted. Conversion to 3+ for the segment north of the SR 24 interchange in 2020 in both directions will increase traffic volumes in the general purpose lanes however that is not expected to cause congestion in the GP lanes.

There is a gap closure project currently in preliminary evaluation phase for the southbound direction to connect the HOV lane north of the SR 24 interchange to the south of the interchange. If that project is completed by the year 2020 then the increase in minimum occupancy requirement to 3+ in the southbound direction will need to be implemented to avoid motorists' confusion. There is no cost effective project currently planned in the northbound direction of I-680 to connect the HOV lanes from south of the SR 24 interchange to the north of the interchange.

I-680 in Solano County: An increase in minimum occupancy requirement to 3+ for segments in Solano County is not expected to attract enough users to the HOV/EL. That would increase traffic volumes in the GP lanes however it is not expected to cause congestion on either direction. Beside the operational need, consistency in the minimum occupancy requirement on I-80 and I-680 in Solano County may be considered as one possible factor prior to change in the occupancy requirement.

I-880 in Alameda County: Increasing the minimum occupancy requirement to 3+ for this corridor in the Alameda County is expected to improve mobility in both directions.

SR 84 in Alameda County: Current peak hour usage of HOV lane is about 1,200 vph. It is expected that in the near future the capacity of the 2+ HOV lane will be reached. Increase in minimum occupancy requirement to 3+ will ensure time saving benefit for carpool and transit users is maintained. Conversion to Express Lane will therefore be necessary to alleviate the impact of additional traffic demand in the general purpose lanes by allowing access to the carpool lane by non-carpool lanes for fee. Prior to increasing the minimum occupancy requirement, the current legislation (AB 2132 enacted on January 1992) that mandated a two-or-more occupancy requirement must be amended.

SR 92 in Alameda County: Current peak hour usage of HOV lane is about 1,100 vph. It is expected that in the near future the capacity of the 2+ HOV lane will be reached. Increase in minimum occupancy requirement to 3+ will ensure time saving benefit for carpool and transit users is maintained. Conversion to Express Lane will therefore be necessary to alleviate the impact of additional traffic demand in the general purpose lanes by allowing access to the carpool lane by non-carpool lanes for fee. Prior to increasing the minimum occupancy requirement, the current legislation (AB 2132 enacted on January 1992) that mandated a two-or-more occupancy requirement must be amended.

IV. Considerations & Criteria for Operational Effectiveness:

In order to gain the operational benefits of the available capacity in the Bay Area HOV lanes through a conversion to tolling, certain considerations and criteria are required as follows:

- With careful conversion of HOV lanes to Express lanes, network capacity and vehicle throughput can be increased and mainline congestion can be reduced for all users. The amount of congestion reduction will depend on the surplus HOV lane capacity in the peak hour and other hours of the peak periods.

- Even on corridors where HOV lanes operate at or near capacity during the peak hour, surplus capacity is available during the shoulder hours of the peak commute periods for use by tolled vehicles.

- All pertaining Statutes of California Streets and Highway Code section 149, which mandate appropriate traffic flow guidelines for the purpose of ensuring optimal use of the Express lanes by high-occupancy vehicles without adversely affecting other traffic on the state highway system, will be met.

- Priority for buses and carpools must be maintained. Current statutes require the HOV and Express lanes to operate at LOS C/D or better with operating speeds of 45 MPH or more. Tolls will be set dynamically based on traffic volumes and traffic conditions in both the Express lane and adjacent general purpose lanes. If the mandated level of service cannot be maintained consistently during certain periods, then the lane would be operated only as an HOV lane at those times. Thus, the proposed Express lanes must be operated such that capacity is never exceeded and operating speeds remain at or above 45 miles per hour to maintain time savings benefits.

- Maximizing use of the Express lane will require that access to the lane have as few restrictions as possible. The recently developed Caltrans Managed Lane Guidelines will be used to ensure that the most appropriate access design will be implemented.

- The access configuration for express lanes will need to be designed carefully to avoid operational impacts. The limited access configuration on the existing express lane on southbound Ala-680 has resulted in a reduction in the number of HOVs using the lane. District 4 is currently evaluating the possibility of implementing Express lanes with no access control on other corridors. The recently published Caltrans' Traffic Operation Program Policy Directive requires detailed analysis of all managed lanes in accordance with Streets and Highway Code section 149, which call for competent engineering estimates to be made on the effects of a managed lanes on safety, congestion, and highway capacity prior to constructing such lanes. Analysis will be done for 20 years after implementation to ensure future safety and mobility of freeways is preserved. See Attachment 1.

  It is intended that during the project level analyses for any future Express lanes, specific access configuration(s) will be analyzed in detail to ensure all concerns and impacts are addressed.

- Some HOV lane facilities have already reached capacity in parts of some corridors. If capacity in the peak hour throughout the corridor is not available, due to significant ridesharing, and widening is not feasible, consideration may be given to raising the minimum HOV occupancy requirement either during the entire peak period or the peak hour, subject to analyses of impacts in the general purpose lanes, and upon significant stakeholder and public outreach.

  Raising the minimum HOV occupancy is expected to associate significant public resistance and may increase congestion. Increasing the minimum HOV occupancy requirement from 2+ to 3+ passengers per vehicle can ensure time savings incentive for transit and qualified HOV lane users. However, absent increased transit use and formation of 3+ carpools, moving the existing (made ineligible) 2+ occupancy vehicles into the general purpose lanes can result in increased congestion. If not

mitigated, the added congestion will negatively impact mobility and will most likely result in public dissatisfaction. The negative result will be particularly apparent in those corridors where with 2+ occupancy carpool eligibility, congestion in the HOV lanes is not significant in magnitude; occurs only for a short period; and/or occurs only at few isolated spots within a long corridor.

Accordingly, to ensure public acceptance and to avoid increased congestion, any increase in the minimum occupancy requirement for an existing HOV facility, when warranted by analyses and convincing data, would have to start with a short period of time during the hours that HOV lane is congested, and must then revert back to the lower occupancy requirement when congestion in the HOV/Express lane is not present. The hours that the change in occupancy requirement is necessary must be well publicized in advance and supported by clear signing (e.g. changeable message signs along the corridor). Prior to that change, a detail analysis and evaluation using up to date traffic volumes would have to be completed to make sure impacts to the general purpose lanes are minimized. Prior to any change, all stakeholders, including the California Highway Patrol will be consulted, and the motoring public will be notified and full aware.

Additionally, to ensure optimum operations and to avoid motorists' confusion, careful consideration must be given towards consistency and continuity of the carpool occupancy requirements and operations along the network and within long transportation corridors. Changes in carpool occupancy requirement within a corridor may only be introduced at locations where the change is readily apparent to motorists through an accompanying gap in the HOV/Express lane.

- Interstate 80 HOV lane in Alameda County is already operating at capacity during the morning commute. As a result, operating this segment of the I-80 corridor as an Express lane during the period of greatest congestion will be challenging. Raising the HOV eligibility requirement from 3+ to 4+ would free up capacity to operate as an express lane, but is not practical. A 4+ minimum HOV occupancy has not been attempted anywhere in the state or in the nation. Adding new lanes in this corridor is not feasible as there is no available right-of-way for widening. This HOV lane does, however, have surplus capacity available in the shoulder hours of the peak periods. There is also CMIA-funded project that will add ITS elements in the corridor to improve safety and the associate operational improvements. These elements will provide the infrastructure needed to enable a more flexible mode of operation of an Express lane that may be needed in this corridor. However if the express lane continues to operate at capacity in the peak commute hours even with higher tolls then the lane would be operated only as an HOV lane at those times.

- If a significant portion of an HOV/Express lane nears or reaches capacity, in order to alleviate congestion in the Express lane and/or to avert increased congestion in the general purpose lanes, additional lanes will be considered where feasible, other alternatives may be considered:

  a) Full-time conversion: This will reduce confusion and will help for a better trip planning, but it could add to congestion particularly at shoulder hours of the peak and in the off-peak hours. The congestion may be alleviated with pricing to entice an appropriate number of vehicles into the Express lane; thus, reducing congestion in the general purpose lanes. It should be noted that an increase in minimum HOV occupancy requirement subsequent to opening has not been tried in this region, and would be challenging politically as such an action will be considered a "take away" by motorists.
  b) Part-time conversion: A higher HOV definition could be employed only during the height of the peak when additional capacity is needed, and revert back to the lower occupancy requirement at all other times. This approach could cause motorist confusion, without sufficient advance notice to motorists, but may be more politically acceptable as drivers in northern California are already accustomed to part time HOV operation.
  c) Graduated tolling scheme: This will include cost savings for carpools such as free passage for 3+ carpools and/or 50% discount for 2+ carpools.

  These alternatives will likely impose other requirements for carpoolers such as carrying transponders in their vehicles or advance registration that need to be evaluated before implementation, as needed, consistent with applicable or enabling legislation.

- Hours of operation for Express lanes must be carefully analyzed and selected to avoid creating unnecessary congestion or a poor public perception. In San Francisco Bay Area, where carpool lanes are operated part-time only, 24/7 operations help clearly distinguish the Express lanes from HOV lanes. However, tolling during the off-peak periods can be viewed as a takeaway and excessive by the motoring public, or potentially leading to an unused lane (or capacity) during certain periods. Therefore, Express lane hours of operation must be selected upon a careful evaluation while keeping in mind congestion periods, carpool/transit and solo volume patterns, potential impacts on general purpose lanes, and consistency within the corridor.

- While certain operational or characteristic variations within individual corridors are expected, certain aspects of the San Francisco Bay Area Express Network must remain uniform and consistent throughout the transportation system, including the seven state operated toll bridges and the Golden Gate Bridge, particularly as viewed

by motorists. These include a uniform tolling system including the existing FasTrak® transponders used at toll bridges and a common customer service center.

- Express lane tolling operations will also need to be integrated with tolling and/or metering operations at the Bay Area toll bridges so that carpoolers and toll-paying solo users pay their applicable bridge tolls along with the respective and dynamically priced Express lane toll. Special care must be exercised to ensure that the dynamic pricing is set such that downstream capacity on the toll bridges' mainline sections is not exceeded by solo drivers from the Express lane.

- A change in the minimum carpool occupancy requirement from 2+ to 3+ is only considered as an strategy to enhance transit operations and to provide an incentives for ridesharing. Accordingly, such a change would be deferred to only when justified by congestion in the carpool lanes and only if adding an additional carpool (or Express) is determined infeasible. A change in the minimum occupancy could also entail a respective change in carpool operational hours, including weekends, and may include staggered eligibility (2+ or 3+) depending on time of day during the day. It is expected that a change in the minimum carpool eligibility requirements would result in increased traffic volumes in the adjacent general purpose lanes and would accompany additional congestion, at least initially while the intended increase in usage of transit and ridesharing take effect. As an augmenting strategy, tolling and Express lane operations can help reduce this impact by allowing solo drivers access to the carpool lane, not only reducing demand and congestion in the adjacent lanes but also helping attain optimum efficiency and full capacity of the system.

  Such changes are expected to be applied incrementally over time and on a corridor by corridor basis upon detailed analyses of needs, and as needed to maintain the integrity of carpool operations. More specifically and by way of an example, a change to 3+ carpool occupancy within the proposed Express Lane Network and years 2020/2035 planning scenarios, is expected to increase capacity on Interstate 880 in Alameda County and the portion of Interstate 680 in Contra Costa County south of the State Route 24. Conversely, the portion of Interstate 680 in Contra Costa County north of the State Route 24 and in Solano County, a 3+ occupancy requirement is not expected to attract enough carpool and/or Express Lane users to increase the freeway capacity (although at the same time also not expected to cause congestion in the general purpose lanes). Similarly, the Express Lane on Interstate 80 in Solano County will be underutilized with 3+ minimum occupancy requirement but that also is not expected to cause congestion in the general purpose lanes. As such, conversion to 3+ carpool occupancy for segments of Interstates 80 and 680 in Solano County, and the portion of Interstate 680 north of State Route 24 in the Contra Costa County, can be delayed to completion of the existing gaps in carpool lanes within those corridors.

V. CONCLUSION

With the criteria stated above and with careful evaluation and detail analyses at project level for each corridor, the implementation of an Express Lane Network is expected to be beneficial in reducing overall congestion on the Bay Area freeways and in improving trip reliability.

With an appropriate marketing and revenue generation scheme, Express lanes would provide an opportunity for additional funding for reinvestments within each corridor and the region to expand and complete the HOV network, improve transit facilities and services, or other congestion-reducing roadway improvements decades sooner than would be possible by using the traditional state and federal funding sources.

Overall, the proposed Express Lane Network is consistent with the Caltrans' Traffic Operations Program's goals, including preserving safety, enhancing mobility, real-time multimodal transportation system management, and providing choice and control for travelers. In addition, the Express lane network also allows Caltrans to engage in innovative solutions, potentially involving public-private sector partnerships, in addressing transportation challenges.

California Transportation Commission (CTC)

FINANCIAL ANALYSIS BAY AREA EXPRESS LANES PUBLIC PARTNERSHIP APPLICATION FOR HIGH OCCUPANCY TOLL (HOT) LANES

FINDINGS

October 10, 2011

Table of Contents

2 Overview 3
1. Review of Application Completeness 5
2. Assessment of Project Objectives 7
2.1. Project Rationale 7
2.2. Operational Challenges 7
2.3. Benefit / Cost Analysis 8
3. Review of Financial Plan and Model 10
3.1 Assumptions of the Financial Model 14
3.2 Financial Model Testing 22
4. Findings and Conclusion 23

Overview

This draft report summarizes the main findings of System Metrics Group, Inc. (SMG) in association with Public Resources Advisory Group (PRAG) and Aldaron Inc. (the "Consultant Team") in evaluating the eligibility, from the standpoint of financial feasibility, of the application filed by the Metropolitan Transportation Commission (MTC) to develop and implement a network of high occupancy toll (HOT) lanes (the "HOT Lane Facility" or "Facility"). MTC's application was filed in accordance with Assembly Bill (AB) 1467 and California Transportation Commission (CTC) HOT Lane guidelines promulgated pursuant to AB1467. The CTC guidelines specify numerous eligibility criteria, amongst which is "Financial Feasibility."

MTC's application contains economic, traffic, and financial forecasts that must be viewed as subject to refinement during later stages of project development. Accordingly, our finding of financial feasibility is based on a level of due diligence that is appropriate at this stage. Based on the data submitted, the MTC's HOT Lane Facility appears to be financially feasible. This report identifies an analysis of a number of financial and operational risks that MTC understands and will have to address as it moves to implement its proposed HOT Lanes. However, it must be noted that an accommodative HOV policy is the key driver to the feasibility of financing the entire Network as envisioned in the MTC application. Implementing an HOV3+ policy on all HOT lanes by 2020 or 2035 is required for financial feasibility.

The *Bay Area Express Lanes Facility* encompasses five freeway routes: Interstate 80 in Alameda, Contra Costa, and Solano counties, Interstate 880 in Alameda County, Interstate 680 in Solano and Contra Costa counties, State Route 84 in Alameda County, and State Route 92 in Alameda County. The implementation of the HOT Lane Facility includes the conversion of 149 lane miles from normal HOV to HOT operations and the construction of 116 new HOT lane miles.

The Financial Plan of the *Bay Area Express Lane Facility* in this application includes the impacts of the implementation of express lanes on two other corridors that already have statutory authority for express lanes under Streets and Highways Code Section 149.5. These facilities are referred to as the "Legacy Programs" in the MTC application and include the I-680 and the I-580 in Alameda County. (The HOT Lanes Facility and the Legacy Programs are referred to herein as the "HOT Lanes Network" or "Network.")A total of 14 lane miles have already been converted to HOT operations on I-680. An additional 24 lane miles will be converted from normal HOV to HOT operations and the 54 new HOT lane miles will be constructed.

The application represents an ambitious and complex infrastructure construction and value pricing program implementation project that encompasses multiple freeway routes. The implementation of the Facility will evolve over time, partly to address operational challenges as they arise. The implementation will provide mobility benefits by optimizing throughput on the associated freeway corridors and provide funding to help close gaps in the existing HOV system thereby providing additional benefits to carpools and buses.

MTC's application was based on a number of initial analyses and was necessarily submitted prior to MTC expending additional resources to undertake more detailed studies and forecasts and in advance of environmental approvals. Thus, the data and assumptions contained therein and reviewed in this report must be viewed as being preliminary and subject to refinement during later stages of project development. Accordingly, our finding of financial feasibility is based on a level of due diligence that is appropriate and possible given the technical analyses that have been performed to date. It can be anticipated that additional analyses and refinements, including an investment-grade toll revenue study, will be conducted prior to MTC's seeking financing from capital markets.

Given the relatively early stage of comprehensive project development, a number of issues have been identified that cannot reasonably be definitively resolved at this juncture, and these are described at appropriate points in this report. The identification and subsequent resolution of such issues is typical for any project of the magnitude and complexity being contemplated. None of these issues can be said, at this stage, to render the project financially *infeasible*, but instead should be viewed as matters that require further refinement and resolution prior to final project financing arrangements being put in place.

This report is comprised of four sections:

1. Review of Application Completeness
2. Assessment of Project Objectives
3. Review of Financial Plan and Model
4. Findings and Conclusions

1. Review of Application Completeness

The Consultant Team screened the applicant's proposal and determined that the financial-related elements required under Sections D1 – 11, of AB 1467 were submitted. A review of each element follows in Sections 2 through 4 of this report.

Under AB 1467, each proposal must contain the following elements regarding financial feasibility:

D 1: Provide information relative to the project financial plan and feasibility.	Application Part D.1 (pp. 24-34) Attachment 7 – Pro Forma Cash Flows Attachment 8 – Detailed Financial Plan Assumptions Project Study Report (PSR)
D 2: Document a financial plan and financial guarantees which will allow for access to the necessary capital to finance the facility.	Application Part D.2 (pp. 34-37)
D 3: Provide evidence of the proposer's ability and commitment to provide sufficient equity in the project as well as the ability to obtain the other necessary financing.	Application Part D.3 (pp. 37-38)
D 4: Explain how shortfalls will be funded if revenues do not meet projections.	Application Part D.4 (pp. 38-39)
D 5: Explain how the financial plan demonstrates a reasonable basis for funding project development and operations.	Application Part D.5 (pp. 40-41)
D 6: If, applicable, describe the nature and amount of the proposer's financial contribution to the project.	Application Part D.6 (p. 41 refers to Part D.2 on pp. 34-37)
D 7: Describe how the estimated cost of the facility is reasonable in relation to the cost of similar projects through a cost/benefit analysis.	Application Part D.7 (pp. 41-43) and Attachment 9 to the application provide the B/C analysis. The application states that the overall B/C ratio is 2.94 if the direct freeway-freeway connectors and the SFOBB HOV bypass are included. If not included, then the reported B/C ratio is 3.31 (page 6 of Attachment 9)
D 8: Provide an analysis of the projected rate of return	Application Part D.8 (p. 43 refers to Part D.7 on pp. 41-43)

and life cycle cost estimate of the proposed project and/or facility.	
D 9: Explain how the financial information submitted is sufficient to determine the financial capability to fulfill the obligations described in the project application.	Application Part D.9 (pp. 43-44)
D 10: Identify the proposed ownership arrangements for each phase of the project and indicate assumptions on legal liabilities and responsibilities during each phase of the project.	Application Part D.10 (p. 44)
D 11: Describe the extent that adequate and transparent procurement policies have been adopted to maximize competitive bidding opportunities for potential contractors and suppliers.	Application Part D.11 (p. 45) states that MTC will follow MTC's and BATA's procurement procedures set forth in Executive Director's Management Memorandum (EDMM) No. 352. EDMM 352 is based on MTC's and BATA's policy that goods and services be procured in a manner that provides full and open competition to the maximum extent feasible, consistent with federal and state statutes and regulations applicable to its funding sources, most notably 49 Code of Federal regulations Section 1836, and that contracts not suitable for selection based on low bid be awarded to the responsible individual or firm whose services are the most advantageous and of the best value. Factors such as the quality of professional personnel, technical design, approach to performance, soundness of the management plan, financials, acceleration of project delivery and cost are relevant to determining the most advantageous and best value offer.

2. Assessment of Project Objectives

MTC is seeking approval to develop and implement High-Occupancy Toll Lanes ("HOT Lanes") on an "Express Lane Facility" comprised of five freeway routes: Interstate 80 in Alameda, Contra Costa, and Solano counties; Interstate 880 in Alameda County; Interstate 680 in Solano and Contra Costa counties; State Route 84 in Alameda County; and State Route 92 in Alameda County. The implementation of the HOT Lane Facility includes the conversion of 149 lane miles from normal HOV to HOT operations and the construction of 116 new HOT lane miles.

MTC's application incorporates the implementation of express lanes on two other corridors that already have statutory authority for express lanes under Streets and Highways Code Section 149.5. These facilities are referred to as the "Legacy Programs" in the MTC application and include Interstate 680 and Interstate 580 in Alameda County. MTC refers to the combination of the proposed facility and these two legacy programs as the "Express Lane Network."

MTC's application also commits to seamlessly integrate the implementation of value pricing on two additional corridors in Santa Clara: State Route 237 and U.S. 101/State Route 85. However, the financial plan contained in the MTC application does not include these two corridors in the Network. MTC refers to the combination of the Express Lane Network and these two corridors as the "Express Lane System".

2.1. Project Rationale

MTC's application is consistent with the region's adopted long-range transportation plan, Transportation 2035, which envisions a seamless, regionally managed network of express lanes in the Bay Area. The development and implementation of the HOT Lane Network will generate toll revenue that will help close gaps in the existing HOV lane system and thereby increase travel time savings for carpools and buses. For instance, HOV connectors would allow carpools and buses to move from freeway to freeway without having to merge into the mixed flow lanes at any point. The analysis provided suggests that HOV connectors would save up to 10 minutes for each vehicle.

The Network implementation is also meant to "optimize throughput on freeway corridors to better meet current and future traffic demands, using excess capacity in the existing HOV system." This translates into benefits for both the HOV users and the mixed flow lane users. Network implementation is also meant to continue to "provide a reliable, congestion free transportation option". This reflects a commitment by MTC and Caltrans to maintain a high level of service even with the additional tolled users using the HOV lanes.

2.2. Operational Challenges

The MTC application represents an ambitious and complex infrastructure construction and value pricing implementation project that encompasses multiple freeway routes. The implementation will evolve over time, partly to address operational challenges as they arise. Some of the main challenges include:

- *Ingress and Egress Locations* – MTC will have to be careful in identifying the most appropriate locations for ingress and egress into the express lanes without causing potential traffic disruptions or bottlenecks. For instance, egress locations just before a major destination could lead to a significant number of tolled vehicles exiting the express lanes and merging into the mixed flow lanes and then needing to merge from lane to lane to reach their destination off-ramp. A high level of merges can create traffic "turbulence" which can lead to bottlenecks and incremental congestion. The same issue can occur at ingress locations, especially on corridors with one lane express lane. Merges into the express lane may create bottlenecks at the ingress locations and lead to reduced speeds.

- *Level of Service Commitment* – MTC and Caltrans are committed to ensuring a high level of service on the express lane system. MTC intends to use the toll "value" as a means to manage the performance of the express lanes. As the system expands (i.e., additional corridors are added to the Network), pricing will become more challenging. A driver who chooses to pay a toll to use the express lanes on Interstate 80 in Solano County may be forced to exit in Berkeley as the toll rate suddenly increases significantly. This in turn may lead to additional merges into the already congested mixed flow lanes.

- *Operational Consistency* – In its letter of support, Caltrans reiterated its policy for HOV occupancy requirement, namely that "a change in the minimum carpool occupancy requirement from 2+ to 3+ is only considered as a strategy to enhance transit operations and to provide incentives for ridesharing." Such a change will likely occur at different times for different corridors. MTC and Caltrans will have to manage changes to the minimum occupancy requirements carefully so that two person carpoolers who use multiple corridors understand that they may be charged a toll on one freeway and not on another.

MTC will have to work closely with Caltrans to properly analyze these and other operational challenges, monitor the performance at each step, and make adjustments as needed.

2.3. Benefit / Cost Analysis

SMG reviewed the benefit-cost analysis (BCA) submitted by MTC for its HOT lanes application. As part of its submittal in Attachment 9, MTC provided project input sheets and the results pages from California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C). Based on information provided elsewhere in MTC's application, SMG identified a number of changes (described below) that might be appropriate to make the B/C analysis more accurately reflect the project benefits. These changes are not likely to change the benefit-cost results significantly.

The MTC application did not provide details on how the operational impacts of the projects were modeled for the benefit-cost analysis. However, the application referred to a "traffic model." Through subsequent conversations with MTC's consultants, SMG has determined that the HOT lanes were modeled using a combination of the Metropolitan Transportation Commission's

(MTC's) activity-based, regional travel demand model and a tolling analysis conducted by a consultant.

The MTC travel demand model was run for 2010, 2020, and 2035 timeframes for each of the project bundles (grouped by approximate construction date). A few projects already "in the pipeline" were included in the no-build case. The model results were adjusted using the results of a separate tolling analysis to determine the effects of pricing. The resultant speeds were recalculated using the standard MTC travel demand model factors for alpha, beta, and capacity.

Since the project benefits were modeled independently for the four project groupings (2015 projects, 2020 projects, 2025 projects, and 2030 projects), the benefit-cost results do not take into account potential synergies or cross-effects among the project groupings. These cross-effects could be captured by including prior projects in the no-build scenario when modeling subsequent projects. Since the projects in the groupings appear to occur in separate parts of the corridor, it is less likely that the modeling in the application includes double-counting (i.e., subsequent projects address mobility issues already addressed by prior projects). If the project bundles generate synergistic effects, the benefit-cost analysis presented in the application underestimates the full project benefits.

The application provides a benefit-cost analysis for the base scenario, but not for the conservative scenario. Through discussions with MTC's consultants, it was determined that a benefit-cost analysis was run for the Conservative Case (as described in Section 3 of this report). Since the Conservative Case assumes that particular projects open later due to greatly reduced revenue, the overall project benefits are reduced. According to MTC's consultants, the benefit-cost ratio for the Conservative Case is 2.6 to 2.7 compared to the 3.3 ratio presented in the application for the Base Case.

To estimate the benefits of the direct connector ramps, MTC assumes that travelers would save 10 minutes per vehicle, but the application does not document the basis of this assumption or identify the travelers to which the savings apply. Through direct communication with the MTC consultants, SMG determined that the assumption was derived from a 2009 Santa Clara Valley Transportation Authority (VTA) study of travel time savings for the SR-237/I-880 direct connector. According to the MTC consultants, the SR-237/I-880 direct connector was estimated by VTA to save HOV users 5 to 12 minutes in 2009. Although the 10-minute assumption is higher than the middle of the range (8.5 minutes), the same savings is applied to all years of the benefit cost analysis. Since the travel time savings are likely to grow with traffic over the years of the analysis, the MTC consultant believes the 10-minute assumption is conservative. Provided that the SR-237/I-880 direct connector is reasonably representative of the I-680/I-580 express connectors, this approach appears reasonable.

The 10-minute travel time savings were applied only to managed lane vehicles using the direct connectors. Since the direct connector ramps would reduce weaving by managed lane vehicles across general purpose lanes, they would also generate travel time savings for travelers in the general purpose lanes. These benefits have not been captured in the benefit-cost analysis and would increase the benefit-cost ratio.

In estimating the benefit-cost ratio for the direct connector ramps, MTC subtracted the operating and maintenance costs from the travel time benefits rather than adding them to the project costs. This methodology is unconventional and different than that used in the Cal-B/C model. It increases the benefit-cost ratio, but the effect is relatively modest. For example, in the extremely conservative case that the entire direct connector ramp benefits are eliminated from the analysis but the costs are included, the overall benefit-cost ratio would be reduced by only about 0.12.

A few other changes would produce minor impacts on the benefit-cost estimate:

- The MTC application incorrectly states that the payback period is calculated as the weighted average of the separate payback period calculations for the four project groupings. Subsequent conversations with the MTC consultant confirmed that the payback period was calculated correctly as the first time the undiscounted net benefit stream breaks even after all project costs have been expended (across all project groupings). Changing the description does not affect the benefit-cost ratio.
- MTC updated the economic values in Cal-B/C to 2010 using own factors rather than using the 2010 values provided on the Caltrans website:

  http://www.dot.ca.gov/hq/tpp/offices/ote/benefit_cost/eab-econ-valuations.html. MTC estimated that the automobile value of time is $12.20 per hour, while Caltrans provides a value of $12.07. Using the Caltrans value would reduce the travel time benefits by about 1 percent.
- MTC did not update the non-fuel vehicle operating costs and emission benefits from 2007 to 2010 dollars. Updating these values would increase the benefits slightly, but not affect the overall benefit-cost ratio. For example, updating the emissions benefits by the 4.4 percent change in the GDP deflator from 2007 to 2010 would increase the total benefits by about $8 million.
- MTC did not estimate the fuel consumption and emission benefits of the direct connectors and the Bay Bridge HOV bypass. Including these benefits would have a minor impact on the overall benefit-cost ratio.

Overall, the aforementioned analytical observations and conclusions do not significantly change the overall conclusion that the benefit cost of the MTC application is relatively high and therefore provides for a reasonable return on the associated investment.

3. Review of Financial Plan and Model

This section presents an overview and discussion of the financial elements of the submission. PRAG met with Jeffrey Parker & Associates ("JPA"), the MTC's financial consultants, to conduct a live review of the financial model, and received "locked output" versions of certain of the worksheets associated with the model. PRAG did not, however, have access to a soft copy of the entire financial model. Accordingly, the team's ability to comment on the accuracy of the model is limited to testing the reasonableness of the resulting debt capacity calculations given the revenue assumptions provided, and not to testing the accurateness of the larger scenario analysis.

MTC's application provides two scenarios: "Base Case" and "Conservative Case." These cases differ with respect to the assumed tolling policy and project phasing (which are both sources of the decreased revenue assumed under the Conservative Case), but not with respect to any other revenue, expenditure or financing assumption. Both cases assume a Network-wide conversion to HOV3+ by a year certain (2020 in the Base Case and 2035 in the Conservative Case), which differs from Caltrans' current policy of converting to HOV3+ in those lanes where demand reaches capacity (i.e., Level of Service C cannot be assured.)

Since uniform Network-wide HOV3+ policies will facilitate the operational benefits of the Network and many of the existing HOV lanes will reach their capacities in the future, an assumption of uniform HOV3+ policy at some point in the future appears reasonable. That said, it is important to emphasize that the assumption of Network conversion to uniform HOV3+ policy, whether in 2020 or 2035, is key to the project's financial feasibility. Further, it is likely that earlier conversion, as is assumed with the Base Case, may be important to ensure other factors that could impact financial results (such as those factors described below that were the subject of sensitivity analyses) do not seriously compromise the ability of MTC to deliver the Network. **Accommodative HOV policy is the key driver to the feasibility of financing the entire Network as envisioned in the MTC application.**

The two cases also differ in the hours of operations of the express lanes, with the Base Case assuming daytime operation on weekdays and partial daytime operation on weekends, and the Conservative Case assuming the current HOV hours of operation. While not necessarily representing either a best case or worst case, the Base Case and Conservative Case illustrate the impact tolling policy has on revenue and hence the velocity of project delivery, and also form a basis for evaluating the impact of changes in a number of assumptions. Table 1 summarizes the sources and uses of funds for the Base Case and Conservative Case.

Table 1: Summary of Cases and Funding Sources

	Base Case	Conservative Case
Tolling Assumptions and Network Delivery		
HOV3+ Conversion (Network)	2020	2035
Hours of Tolling	6AM-7PM WD; 12-7PM WE ("Daytime")	6-10AM & 3-7PM WD; 12-7PM WE ("Peak Period")
Network Completion	2030	2035
Funding Sources Applied (YOE$ in millions)		
Senior CIBs	1,133 (33%)	1,283 (30%)
TIFIA Loans	968 (28%)	1,094 (26%)
Local Funding	96 (3%)	96 (2%)
Capital Grants	384 (11%)	796 (19%)
PAYGO	902 (26%)	1,011 (24%)
Total Uses of Funds (YOE$ in millions)		
CapEx and Financing	3,482 (100%)	4,280 (100%)

PRAG reviewed the assumptions underlying the financial results presented in the Base Case and Conservative Case, and on the basis of that review requested the JPA to run three sensitivity scenarios. For each sensitivity analysis, the Base Case was used as a starting point and the metrics used for comparison were (1) project phasing impacts and/or (2) changes to capital grant funding requirements.

- *No TIFIA* – Financing sources for the Facility include debt financing (both publicly offered senior lien toll revenue bonds and TIFIA loans), local funding already dedicated to the project, potential federal, State and local sources of grant funding, and pay-as-you-go ("PAYGO") funds representing toll revenues not required to pay operating and rehabilitation expenses and debt service. Both the Base Case and Conservative Case rely on financing through the federal TIFIA loan program, which provides debt financing at attractive interest rates and, more important, aggressively low (1.1x) debt service coverage requirements. As the future of the TIFIA program is uncertain due to delayed reauthorization of federal surface transportation funding act of which the TIFIA program is a component, PRAG considers TIFIA an uncertain funding source and requested JPA to run the Base Case assuming no TIFIA loan program is available and all of the debt financing is through the issuance of publicly offered tax-exempt senior lien current interest bonds. The results of this sensitivity analysis on the Base Case revealed that a no-TIFIA financing scenario would delay project delivery and require additional capital grant funding, but the impacts to project delivery and capital grant funding were not as severe as the Conservative Case.

- *Legacy Programs Not Included* – The MTC application assumes the inclusion of (a) the existing value pricing high occupancy vehicle express lanes on I-680 and (b) the planned high occupancy vehicle express lanes on the I-580, in the Network. While the two agencies responsible for these corridors, Alameda County Transportation Commission ("ACTC") and Sunol Smart Carpool Lane Joint Powers Authority ("Sunol JPA"), have expressed their interest in entering into an agreement with MTC to include the Legacy Programs in the Network, those agreements have not yet been drafted nor executed. Accordingly, the Consultant Team requested a sensitivity analysis that removes the Legacy Programs from the Network to determine what impact a potential failure to reach agreement could have on the financial results. The sensitivity analysis revealed that removal of the Legacy Programs actually improved the financial results and project delivery timelines – all projects currently scheduled for delivery in 2025 under the Base Case were accelerated to 2020 and the one case (Project 1 in Solano County) scheduled for 2030 delivery was accelerated to 2025.

- *Pavement Rehabilitation Expenses* – The MTC application assumes Caltrans will support 80% of the maintenance expenses of the Network. However, neither Caltrans nor the CTC has the authority to commit to funding the maintenance and rehabilitation expenses of the facility. As this type of ongoing funding commitment would require legislative approval to continuously appropriate Caltrans funds to the Network and such approvals are not in place, PRAG requested JPA conduct a sensitivity analysis to test the impact of the Network absorbing 100% of ongoing rehabilitation expenses. The results of that sensitivity analysis demonstrated that the Network could be funded assuming the same project delivery schedule as the Conservative Case and a capital grants funding higher than the Base Case but still considerably lower than the Conservative Case capital grant funding requirement.

As discussed in detail below, while many of the assumptions of the financial model were reasonable, PRAG found some assumptions to be aggressive. However, the presence of significant offsetting conservative assumptions that could add to project funding was deemed sufficient to address these relatively more aggressive assumptions.

Based on the current scope of the Facility, the funding proposal and available information associated with the MTC application, and assuming accommodative HOV policy by Caltrans and local CMAs, MTC appears to be able to fund the Express Lanes Facility. While the ability to finance the Facility could be significantly constrained by the existence of one or more adverse outcomes, particularly in combination, MTC does have a number of tools and options to address funding shortfalls that may occur, the most significant of which include:

- *HOV Policy* – The advancement of HOV3+ tolling exemption, subject to operational and policy considerations, adds significantly to Network revenue – the Base Case (HOV3+ conversion in 2020) results in estimated toll revenue of $6.49 billion (nominal), versus $4.396 billion for the Conservative Case (conversion in 2035). Further, if some or all of the more adverse scenarios modeled in the sensitivity analysis were modeling using the Conservative Case's HOV policy assumptions (i.e., HOV3+ conversion in 2035 versus the Base Case's 2020), the ability of MTC to finance the Facility contemplated by this application would be severely constrained. **Thus, accommodative HOV policy is a key assumption in the financial feasibility of constructing the Network envisioned in the MTC application.**

- *Project Phasing* – MTC has the flexibility to postpone projects, particularly those that are revenue negative[1] and, if actual conditions are more favorable, accelerate relatively high revenue positive (low capital/high revenue) projects to generate additional positive cash flow. This modular approach and the front-loading of more revenue positive projects means that if certain assumptions that impact financial feasibility are not realized (such as accommodative HOV policy), MTC could construct some project phases and not others.

- *Toll Policy* – Both expanded hours of tolling and toll algorithms can produce enhanced revenue versus the current algorithm that maximizes throughput could provide additional revenue, but would require a significant policy shift to implement.

- *Contingency Reduction* – Construction costs include a relatively conservative 40% contingency assumption. Reductions in these contingencies over time, as appropriate given each project's stage of development, would improve financial results.

- *Bond Structuring and Issuance Strategies* – The financial model assumptions included several relatively conservative assumptions regarding securities used (i.e., CIBs only, no capital appreciation bonds and no subordinate debt), amortization and the timing of bond issuances that either reduced the potential construction proceeds available from the forecast toll revenue stream or resulted in the premature issuance of bonds and the

[1] Projects 1, 4, 8,9, 15, 18 and 19, with a combined capital cost of $1.3B in 2010$

attendant avoidable interest and carrying costs. Optimizing the bond structure and issuance strategy could also provide additional project funding.

As the project evolves from its current preliminary state, MTC will evaluate some or all of the above options to address potential funding shortfalls, among others not summarized here, such as the potential to increase and/or accelerate capital grant funding and the potential for additional revenues such as new local sales taxes. However, the factor most critical to the financial feasibility of constructing the Facility envisioned by the MTC application is Caltrans' future HOV policy, as detailed above and discussed further below.

3.1 Assumptions of the Financial Model

A. Funding Sources

Toll Revenues

Net toll revenues, in the form of bond and loan proceeds secured by toll revenues and PAYGO funding, comprises the vast majority of project funding for the Facility: 87% for the Base Case and 80% for the Conservative Case. Accordingly, the financial feasibility of the HOT Lanes Facility is most impacted by the degree to which observed traffic and revenue equals or exceeds that which is forecast. Traffic forecasts were produced by Parsons Brinckerhoff ("PB") and the tolling study and revenue forecasts were carried out by Stantec. The major traffic and revenue assumptions of the forecasting models are detailed in Table 2.

Table 2: Major Assumptions of the Traffic and Revenue Forecasts

Variable	Assumption
Baseline Year	2010 – based on PeMS volume and speed data from Tuesdays through Thursdays in September 2010, excluding Labor Day week
Forecast Years	2020 and 2035, with straight line interpolation between and straight line growth thereafter; assumes all projects currently in RTP
Economic Forecast	ABAG "Draft Projections 2011" Output
Travel Model	MTC Travel Model One
Tolling Strategy	Dynamic Tolling
Tolling Technology	Barrier-free ETC operated by BATA
Tolling Objective	Maximize Throughput/Travel Time Savings
Toll Rates	$7.50 maximum, average peak $3.00 (consistent with I-680 Sunol Express Lane), with per mile rates ranging from $0.13 to $1.16; HOVs free
Hours of Tolling	24/7
Maximum Vehicles Per Hour[2]	1,550 single lane / 3,200 dual lane
HOV Volumes	Forecast separately for HOV2+ and HOV3+
HOV Policy	Base Case assumes Network-wide conversion to HOV3+ in 2020; Conservative Case assumes Network-wide conversion in 2035
Value of Time[3]	$20 - $30 (consistent with revealed VOT for SR 91 and I-680)
Market Share Analysis	Based on SR 91 Express Lanes
Induced Demand	Not assumed (may increase revenues)
Peak-Hour Spreading	Not assumed (may increase revenues)

[2] Bay Area Express Lanes Network, Traffic and Revenue Forecasting Methodology and Results, July 27, 2011 – Technical Memorandum prepared by Parsons Brinckerhoff, p. 2. Please note that Caltrans' acceptable range for maintaining Level of Service "C" is between 1,100 and 1,600 vehicles per lane per hour.
[3] Ibid, p. 23

Both the baseline 2010 and forecast 2020 and 2035 traffic were modeled by segment. The following adjustments then were made to the revenue forecasts by the MTC finance team in consultation with PB/Stantec to account for a variety of factors as shown in Table 3.

Table 3: Adjustments to Revenue Forecasts

Variable	Base Case	Conservative Case
Revenue Reduction from 24/7 tolling	10%	25%
HOV3+ Conversion	2020	2035
Ramp-Up	20% reduction in year 1, 10% reduction in year 2, no reduction thereafter	20% reduction in year 1, 10% reduction in year 2, no reduction thereafter
Violations	5% reduction yrs 1-5; 2% yrs 6+	5% reduction yrs 1-5; 2% yrs 6+

The toll revenue forecast produce by Stantec is preliminary in nature and is not investment grade. The Consultant Team's review of the forecast methodology provided by PB and the further assumptions provided by PB/Stantec to MTC result in the following observations:

- *HOV3+ Conversion* is a key assumption underlying the revenue forecast. At present, Caltrans is evaluating conversion to HOV3+ on a corridor by corridor basis, based on observed congestion levels, and has not stated any intention to move toward a Network-wide HOV policy. Further, Caltrans' Traffic Operational Assessment of the Network[4] states that "[a] change in the minimum carpool occupancy requirement from 2+ to 3+ is only considered as an [sic] strategy to enhance transit operations and to provide an [sic] incentives for ridesharing." While operational efficiencies on a Network-wide basis may be factored in to future HOV policy decisions, it is important to note this is an assumption and not a statement of policy. Given the profound impact moving to HOV3+ has on forecast traffic and revenue in the express lanes (tolled traffic increases nearly four-fold), this is the most critical and vulnerable of assumptions in the traffic and revenue study and hence in the ability to fund the Facility envisioned in the MTC application.
- *Market Share Analysis/Value of Time* is based at least in part on SR 91 experience. The SR 91 facility draws from a different catchment demographic and has physical characteristics that are substantially dissimilar to the proposed Network (having a physical barrier and limited access and egress, while the Network will operate barrier-free.) How appropriate a comparison SR 91 is to the Network will be revealed as the project moves to an investment grade study and stated preference surveys are conducted.
- *Violations* – Assumed revenue reductions due to violations of 5% in the first five years and 2% thereafter are based on a preliminary study performed by BATA in 2010, which indicated that revenues collected from the assessment of toll violation and administrative fees would be sufficient to offset estimated revenue loss as a result of toll violations. While MTC assumed 100% cost recovery might not be possible, we note that the BATA study referenced applied to toll bridges and not express lanes. Given access to express lanes in the Network will be less constrained than access to toll bridges, the potential for

[4] Traffic Operational Assessment, San Francisco Bay Area Backbone Express Lanes Network, California Department of Transportation, District 4 – Office of Highway Operations, August 31, 2011

revenue leakage from violations is higher than for bridges. Therefore, the potential exists for the net revenue impact from violations to exceed that assumed by the MTC application.

- *Economic forecast* – The use of current economic forecasts and current traffic counts that reflect the recent recessionary environment is a significant positive factor in the robustness of the forecast, as they reflect both updated economic conditions as well as actual traffic. Economic outlook cannot be overstated as a key driver to traffic and revenue forecasts. For example, the original forecasts developed in 2003 for the I-680 Sunol southbound express lane project estimated 2010 revenues of $4.2 million based on ABAG projections made in 2000 and the assumption of 24/7 tolling. Actual revenue in June 2010 for weekday tolling was estimated to be as low as $640,000 for nine months of operation after adjustments for disputes. It was noted that actual jobs is one million lower than the 2010 forecast made in 2000. How much of the difference in actual revenue versus forecast was based on population and employment actuals versus forecast is not known, but as a major driver of both traffic and value of time, they likely are the major contributing factor to the extreme deviation of actual from forecast result for this express lane. While the ABAG Projections 2011 may not materialize as forecast, they at least benefit from having been developed during an economic downturn when projections of future growth generally are more likely to err on the conservative than the optimistic side.

The robustness of the toll revenue forecasts is critical to the financial feasibility of the Network, given heavy reliance on toll revenues and debt secured by toll revenues to finance the Facility. However, offsetting this significant risk is the modularity of the project and the ability to implement the Network in phases and advancing high value lane conversion projects (i.e., low capital cost/higher net revenue potential) to subsidize higher cost new construction projects, which provide relatively less robust financial results.

Local Funding for Projects

Both the Base Case and the Conservative Case assume the application of $96 million of local funds already dedicated to the project, which comprises 3% and 2% of total project funding for each case, respectively. These funds include existing dedicated sales tax, local Regional Measure 2 and Federal funding commitments to certain of the projects. JPA reported that this funding already has been committed to the relevant projects.

Capital Grant Funding

Capital grants comprised of (i) potential new or extended local sales taxes not yet enacted, (ii) new or future Federal, State or local programs, and/or (iii) BATA bridge toll revenues available for eligible projects account for $384 million and $796 million (year of expenditure) of assumed funding for the Base Case and Conservative Case, respectively. In present value dollars, this equates to $334 million and $496 million for the Base Case and Conservative Case, assuming a 5% discount rate. Capital grants account for 11% of total project funding in the Base Case and 19% in the Conservative Case. While capital grants are a relatively large and uncertain source of funding for the project, the review of detailed construction costs by project revealed that those projects which would be considered BATA eligible (i.e., projects funding express lanes that are contiguous with BATA bridges) have

capital costs in excess of the total funding from capital grants assumed in the MTC application under both the Base Case and the Conservative Case.

No commitments of capital grant funds, including BATA bridge tolls or any other Federal, State or local source of grant funds, have yet been made and provide a fair amount of uncertainty in a potentially significant revenue source.

B. Costs

Initial Capital Expenditures

Construction cost estimates are detailed in the PSR for the Facility, which estimates costs by project and by category of expenditures – support, right of way acquisition and construction. Construction costs include a 40% contingency amount and are inflated at an annual construction cost inflation rate of 3.2%. This 3.2% rate, while not directly sourced in the MTC application, is equivalent to the trend line rate of growth in the California Highway Construction Cost Index between 1980 and 2010, factoring out the extreme peaks in materials prices that occurred in the mid-2000s, and also compares to the 3.2% growth rate for the U.S. Army Corps of Engineers Index for Roads, Railroads and Bridges for the same period.

The Facility projects are comprised of approximately 55% conversion of existing lanes to express lanes (based on total lane miles), and 45% construction of new express lanes. The capital costs for conversions are dramatically lower than expansion projects: they represent only 8% of the total construction costs of the Facility.

Operations, Maintenance and Rehabilitation Costs

The fixed operating and maintenance ("O&M") cost assumptions were based on per lane-mile estimates derived from comparable costs of peer managed lanes facilities around the country. The estimate accounts for toll processing, equipment maintenance, telecommunications, utilities, administration, Caltrans support, marketing and manual enforcement. The per-lane-mile cost was validated against current experience on the existing I-680 Sunol express lane. Transaction-based costs were also applied to account for customer service center and invoicing operations performed by BATA. Transaction costs also include violation enforcement processing expenses and banking fees.

Rehabilitation costs were assumed to be shared between the Network and Caltrans, with the Network paying 20% of ongoing rehabilitation costs and Caltrans paying the 80% balance. According to JPA, this assumption was derived from an estimate that approximately 80% of the express lane traffic would be HOV users, and the presumption that Caltrans would pay the rehabilitation costs related to HOV use. However, neither Caltrans nor the CTC has the authority to commit to funding the maintenance and rehabilitation expenses of the facility. Accordingly, one of the sensitivity analyses requested and discussed in Section 3.2 below is a scenario wherein 100% of the rehabilitation costs are borne by the Network.

Scheduling / Phasing

Phasing was determined by the MTC based on a combination of individual project economics and operational considerations, and all projects of each phase are assumed to be constructed simultaneously. The resultant phasing determined by MTC emphasizes constructing higher net revenue projects earlier to subsidize more costly projects later. For example, all of Phase I projects, except roughly half of one of the nine projects, are conversions and all of Phases III-IV projects are new lane construction projects. The Base Case delivers all projects by 2030, while the Conservative Case delivers all projects by 2035, since the more conservative toll and HOV policy assumptions of the Conservative Case result in reduced revenues and requires slower phasing.

The ability to defer the more capital intensive and less positive net revenue expansion projects is a key factor in the future financial feasibility of the Network.

Indexation and Contingencies

Given the long timeframe over which projects will be constructed and net revenues are forecast, the reliability of the financial model's results is highly dependent on the reasonableness of the inflation assumptions. PRAG's review of the inflation assumptions finds them to be in line with recent historical data. Table 4 details the inflation assumptions for capital and operating costs, comparing them to available historical metrics.

Table 4: Inflation Assumptions

Variable	MTC Assumptions	Comparable Data
Toll Revenue Annual Inflation Factors	2.2% to 2040; 2.5% thereafter	Bay Area CPI Avg. 2001-2010: 2.37% U.S. CPI Avg. 2.4%
Operations and Maintenance Annual Inflation Factors	2.2% to 2040; 2.5% thereafter	Bay Area CPI Avg. 2001-2010: 2.37% U.S. CPI Avg. 2.4%
Construction and Pavement Rehabilitation Cost Annual Inflation Factors	3.2%	Trend line for California Highway Construction Cost Index between 1980 and 2010 = 3.2%

Contingencies of 40% and 25% were added to construction costs and operations and maintenance costs, respectively.

C. Financing Assumptions

More than half of the funding for the Facility is expected to be provided for by toll revenue-secured debt, for both the Base Case (61%) and Conservative Case (56%). A discussion of each of the key assumptions underlying the debt capacity of the toll revenue stream is provided below.

Debt Securities and Credit Structure

Debt financing is assumed to take the form of tax-exempt senior lien current interest bonds ("CIBs") and loans from the federal TIFIA program, with roughly half of total debt financing assumed to come from each source. The credit is assumed to be a system-wide credit, which is a stronger security pledge than an individual corridor or project-based credit.

CIBs in the amount of approximately $1.1 billion to $1.3 billion are assumed to be issued under the Base Case and Conservative Case, respectively. The CIBs are publicly issued tax-exempt bonds structured to provide a minimum debt service coverage ratio ("DSCR") of 2.0x (although senior coverage is projected to average 5.77x over the life of the CIBs, and all-in coverage including TIFIA is projected to average 2.63x over the same period) and are assumed to carry low investment grade credit ratings in the "BBB" category. This minimum debt service coverage ratio and corresponding rating assumption is reasonable, especially given many of the Facility projects represent conversion of existing lanes to express lanes rather than all new capacity expansion projects.

Coverage is calculated based on gross toll revenues minus operating and maintenance expenses and rehabilitation costs. It is common in toll financed facilities for coverage to be calculated based on gross toll revenues minus only operating and maintenance expenses, with rehabilitation being paid after debt service. Accordingly, this is a relatively conservative treatment of the coverage requirement. Further, credit ratings are not assumed to improve through the debt issuance phases, although depending on the revenue performance of the Network ratings could be expected to improve over time to reach "A" category ratings. No subordinate debt layer between the senior CIBs and TIFIA loan was assumed, and no capital appreciation bonds ("CABs") were structured.

CABs are zero coupon bonds that pay no interest until maturity, and while costly to issue, can be used to capture the present value of the significant excess cash flow projected to be available after 2035 and provide additional project funding. Overall, and based on current municipal market conditions, the assumptions of the MTC financial model with respect to the issuance of tax-exempt CIBs are reasonable, and bonds structured using the parameters of the model should be marketable in the public capital markets under current market conditions.

The finance plan also relies on the availability of loans made available under the Transportation Infrastructure Finance and Innovation Act, 23 U.S.C. §§ 601 et seq. ("TIFIA"), with between $968 million and $1.1 billion of TIFIA issuance modeled under the Base Case and Conservative Case, respectively, or approximately 25% of the project costs.

TIFIA loans are assumed to be available either for each phase of Facility construction or through a potential future programmatic TIFIA commitment, as has been included in certain federal transportation funding re-authorization proposals. While the parameters applied to the TIFIA loans are consistent with the current TIFIA program – a maximum of 33% of eligible project costs funded through TIFIA, TIFIA loans do not exceed senior debt (CIBs), aggregate minimum debt service coverage of 1.1x, etc. – the most aggressive assumption is the availability of TIFIA and the amount of funding the projects might receive.

The largest TIFIA loan closed to date was a $900 million loan to the Central Texas Turnpike Authority in 2001. Several managed lanes projects have received significant TIFIA credit assistance in the form of loans:

- *The IH 635 Managed Lanes (LBJ Freeway) project* was awarded an $850 million TIFIA loan in FFY 2008, representing 32.5%of eligible project costs;

- *The North Tarrant Express project* (also in Texas) was awarded a $650 million TIFIA loan in FFY 2009, representing 31.7% of eligible costs; and
- *The I-495 Capitol Beltway HOT Lanes project* in Virginia, which received a $589 million TIFIA loan in FFY 2008, representing 30.4% of eligible project costs.

Further, in the most recent round of applications for TIFIA loans, TIFIA received 34 letters of interest, from which eight projects were invited to submit an application for TIFIA loan approval. Of those eight projects invited to apply for TIFIA loans, three were HOT lanes projects.

As the future of the TIFIA program is uncertain due to delayed reauthorization of federal surface transportation funding of which the TIFIA program is a component, and because the TIFIA program provides significant advantages to the financial plan given the low coverage requirements, favorable interest rates and accommodative structuring parameters, PRAG considers the assumption of TIFIA availability as a risk factor to the Facility financial plan and requested that JPA model the Base Case assuming no TIFIA loan availability, as detailed in Section 3.2 Financial Model Testing, below.

Issuance Strategy, Amortization and Assumed Interest Rates

Debt financing is assumed to rely first on the issuance of CIBs, followed by draws from TIFIA loans, irrespective of whether other funding sources (such as capital grants) are assumed to be available to pay project construction costs. All CIBs are assumed to be issued in tranches at the beginning of each construction phase. Amortization is delayed until one year past each phase's delivery date, and interest is assumed to be paid out of current revenues (i.e., not capitalized with bond proceeds). The final maturity of the CIBs ranges from 26 years to 30 years in the Base Case and is 30 years in the Conservative Case. The amortization assumptions of the MTC model were derived based on matching the implied average life to the interest rate assumption, and are reasonable. In practice, CIBs likely would be issued with 30 year final maturities, with longer final maturities of up to 40 years possible under certain market conditions. Further, the issuance strategy that assumes all CIBs are issued in one series at the beginning of each phase, results in suboptimal financial results in that interest costs and negative carry create significant and unnecessary financial drag. For example, in reviewing the model for Phase I under the Base Case, it was noted that CIBs are assumed to be issued several years in advance of project funding needs, resulting in approximately $28 million of interest costs annually over two years that could be avoided with an issuance strategy better timed to project funding needs.

The TIFIA loans are structured according to TIFIA guidelines, i.e., a final maturity of 35 years, with five years of interest capitalization and loan principal payment grace periods of 10 years past project completion. This is consistent with the structures of past TIFIA loans.

Interest rate assumptions assumed by MTC are provided in Table 5.

Table 5: Interest Rate Assumptions

	Current Interest Bonds		TIFIA Loans	
Phase	Base Case	Conservative Case	Base Case	Conservative Case
I	5.50%	6.00%	5.00%	5.00%
II	6.50%	7.00%	5.00%	5.00%
III	7.00%	7.00%	5.00%	5.00%
IV	7.50%	8.00%	6.00%	6.00%
V	n/a	7.50%	n/a	7.00%

The CIBs interest rate assumptions, particularly for Phase I, appear aggressive based on actual rates for similar projects. The North Tarrant Express and IH 635 LBJ Freeway projects involved the issuance of tax-exempt bonds rated in the low "BBB" category, as assumed for the Network, and in 2009 and 2010 achieved interest rates in the 7.0%-7.25% range. While rates generally have declined since 2009-2010, and the Network managed lanes projects differ from the two Texas managed lanes projects in that they are largely conversion rather than all Greenfield projects, we find the 5.50% and 6.00% near-term interest rate assumptions to be overly optimistic. However, we view the relatively more conservative issuance and amortization assumptions noted above, as well as the relatively more conservative near-term TIFIA interest rate assumptions discussed below, as offsetting these more aggressive CIBs interest rate assumptions.

TIFIA loans carry interest at one basis point higher than the 30 year U.S. Treasury Bond, which currently yields approximately 3.02% and has averaged 5.24% over the last ten years. Thus, the interest rate assumptions for TIFIA loans appear reasonable, at least in the near term, in light of current and historical average U.S. Treasury rates.

Reserves and Other Assumptions

CIBs were structured assuming the funding of a debt service reserve fund ("DSRF") equal to maximum annual debt service on the CIBs, which is an appropriate funding level for a toll facility DSRF. We note, however, that all excess Network cash flow is diverted to PAYGO expenditures prior to project completion in both the Base Case and the Conservative Case. As a practical matter, the Network will have to fund some liquidity reserves to cover unexpected operating and maintenance expenditures. A common metric used by rating agencies to determine liquidity is "days cash on hand", which takes outstanding unencumbered cash balances, divides that amount by annual operating expenses and multiplies by 365. The average days cash for all toll facilities rated by Moody's Investors Service as of FY 2010 is 672 days[5]. So, for example, in 2020 when operating expenses are projected to be approximately $37.1 million, and assuming the Network maintains an average level of liquidity relative to other rated toll facilities, this would imply a cash balance of $68.3 million in 2020.

Other assumptions we noted that were understated but not of sufficient relative significance to warrant additional scenario analysis were issuance costs and ongoing administrative costs related to the debt portfolio. Issuance costs are assumed to total 1%, when actual total issuance costs (i.e., including underwriters' discount and costs of issuance such as legal

[5] U.S. Toll Road Sector Medians for Fiscal Year 2010, Moody's Investors Service, July 21, 2011

counsel, advisors and rating agencies) would likely be in the range of 2%-3%. The annual costs of rating agency surveillance and bond trustees are likely to be approximately $100,000 (inflated annually), versus the $35,000 annual costs assumed in the MTC financial model. Further, other annual costs may be incurred by BAIFA or whichever entity issues debt for the Facility, such as ongoing legal and financial advisory fees and expenses. Again, however, none of these expenses are expected to be of the order of magnitude to affect project financial feasibility, so they were not adjusted in a sensitivity scenario.

D. <u>Project Organization and Responsibilities</u>

According to the MTC application, the MTC will develop and operate the Network in collaboration with a number of entities. MTC may enter into an agreement with the Bay Area Infrastructure Financing Authority ("BAIFA"), a joint exercise of powers agency formed by the MTC and BATA, to plan, develop, operate and finance the project. MTC must enter into agreements with BATA to operate and manage the toll collection system, and with Caltrans for certain aspects of design, construction, maintenance and operations, and with the California Highway Patrol for enforcement. Further, as the Network assumes the inclusion of the Legacy Programs currently managed by the ACTC and Sunol JPA, MTC will need to enter into memoranda of understanding with these two congestion management agencies outlining the parameters under which the Legacy Programs will be included in the Network, including provisions for revenue and cost sharing.

3.2 Financial Model Testing

In conjunction with PRAG's review of the MTC application, several sensitivity scenarios were requested, as described above, to determine the impact of certain key assumptions not being realized. Each scenario was compared to the Base Case and the metrics used to evaluate the impact of each change in assumptions were the impact on project delivery and the amount of capital grants assumed to be required. The results of these analyses are presented in Table 6.

Table 6: Results of Sensitivity Analyses

Sensitivity Scenario	Project Delivery	Capital Grants Required
CIBs Only / No TIFIA	Conservative Case Phasing – Network Completion by 2035	Increased by $108 million over Base Case to $492 million (nominal) to reflect inflation due to project phasing delays
Legacy Programs Excluded	Network Completion by 2025, with all projects scheduled for 2025 completion in Base Case accelerated to 2020	Unchanged from Base Case
Network Funds 100% Maintenance and Renewal Expenses	Conservative Case Phasing – Network Completion by 2035	Increased by $83 million over Base Case to $467 million (nominal) to reflect inflation due to project phasing delays

As Table 6 indicates, the potential future unavailability of TIFIA would impact the Facility financing plan by delaying project delivery to equal that of the Conservative Case, i.e., with all projects being delivered by 2035 rather than 2030 under the Base Case, and requiring an increase in capital grants due largely to inflation. The exclusion of the Legacy Programs actually results

in an improvement to the Base Case results, allowing for more rapid Network completion, with all projects currently scheduled for completion in 2025 to be accelerated to 2020 and the one Yolo County project scheduled for 2030 completion in the Base Case to be accelerated to 2025. This result assumes capital grant funding remains equal to the Base Case assumption.

Lastly, should 100% of rehabilitation costs be borne by the Network and Caltrans pays none of these costs, the impact on the financial plan would be to result in project phasing equivalent to the Conservative Case and an increase in assumed capital grants, largely due to inflation from project funding delays. It is important to note two things: (1) each of the three sensitivity analyses provided results that were better than the Conservative Case, in that even in situations where project phasing was equivalent, the required capital grant funding amounts were lower than the Conservative Case, and (2) these sensitivity analyses all started from the Base Case assumptions with respect to toll policy. The ability of the financial model to fund the entire Facility as envisioned in the MTC application (without significantly increased capital grant assumptions and/or even more delayed phasing) would break down were these scenarios analyzed given the Conservative Case assumptions regarding toll and HOV policy.

That said, there are several factors that could add funding capacity that were not included in the financial assumptions, namely the inclusion of a subordinate debt layer below the senior debt, which could serve as an offsetting source of borrowing to fund the Network, and the use of capital appreciation bonds ("CABs") to capture the present value of future excess cash flow of the Network. To illustrate the potential capacity of these excess cash flows to produce additional proceeds from the issuance of CABs, PRAG calculated the theoretical CABs bonding capacity available in 2025 (Phase IV of the project) assuming a conservative 3.0x debt service coverage level and interest rates of 7.50%. Given these assumptions, senior CABs totaling $439 million could be issued under the Base Case to provide approximately $400 million in net additional funds for Facility construction after payment of issuance costs and funding of reserves.

4. Findings and Conclusion

Based on the materials and assumptions provided to the CTC by the MTC, and considering the preliminary nature of the project, the construction of the Bay Area Express Lanes Facility is feasible from a financial perspective.

The feasibility analysis undertaken to date is preliminary in nature, which is expected given a project in the early stages of development. The financial feasibility of the Network is most vulnerable to the degree to which toll revenues are realized as forecast, which is in turn largely impacted by the future direction of toll policy – both HOV policy and hours of operation assumptions.

The financial feasibility is further impacted by the future availability of the federal TIFIA loan program to provide a low cost/high leverage financing option, as well as degree to which the Network will be required to bear the costs of ongoing rehabilitation expenses. Any one of these factors could negatively impact the ability to deliver the Network as envisioned in the MTC application, particularly if they occur in combination.

However, offsetting these risks are (1) the flexibility inherent in the modular nature of the Network – the ability to finance and construct the Facility as funds are available – advancing more financially viable (i.e., low capital cost) conversion projects while delaying high capital cost expansion projects until necessary funding is available; (2) the potential to optimize the financial plan to provide bond proceeds timed better to meet project draw requirements and thereby reduce interest costs and carrying costs; and (3) the ability to leverage additional bond proceeds from the projected revenue stream through the issuance of subordinate debt and/or CABs.