SHOPP Asset Management Pilot Request Form

SHOPPCPR: Ver 3 11/14

Submittal Date 08/14/2015

Caltrans

Division of Transportation Programming
State Highway Operation and Protection Program (SHOPP)

Project Manager: Steve Tran

Phone: (213) 897-0126

Dist	County	Route	Prefix	PM	Prefix	PM	EA	PPNO	Project ID
07	Los Angeles	91		6	R	20.7			

☒ Includes Multiple Locations (Complete Page 2 of this Form)

MPO: SCAG

Project Location/Description (Include the nearest city, town or landmark)

In Cities of Carson, Compton, Long Beach, Paramount, Bellflower, Cerritos on Route 91 from Vermont Avenue to the Orange County Line.

Need for project and proposed improvements (Elaborate using PID language)

This proposed multi-objective pilot project is comprised of several physical assets on State Route 91 in Los Angeles County. The planned work for the project involves pavement rumble strips and delineation, transportation management system upgrades, and connector widening. The several physical assets are identified within the SHOPP programs of Collision Reduction's Collision Severity Reduction (015) and Mobility's Transportation Management System (315). Rumble strips are placed as a countermeasure for driver error, rather than roadway deficiencies. The TMS, installed in 2000 will convert the communications system to an all fiber optic and digital communications system that will be less vulnerable to copper theft and have less electronic repeater type of equipment to maintain, thus reducing maintenance worker exposure. The new system will be more reliable, easier to maintain/trouble shoot operation problems and reduce field work time/trips. The connector for the EB/WB Rte 91 to SB Rte 710 connector revealed over turn truck related accidents from failing to adjust speed to curves, loads, brakes, road surface and driver inattention. Widening the connector shoulders will help reduce the potential of over turned accidents

PA&ED / M200	01/15/2019	R/W Cert / M410	08/10/2021	CCA / M600	08/01/2023
PS&E / M380	06/01/2021	RTL / M460	09/13/2021	END Project / M800	02/01/2025

Capital ($1,000)
(Escalated to FY of Programming)

	FY	Cost
R/W	2021/22	$0
Construction	2021/22	$15,588
	Total Capital	$15,588

Support ($1,000)

	FY	Cost
PA & ED	2018/19	$735
PS & E	2018/19	$1,471
R/W	2020/21	$0
Construction	2021/22	$2,206
	Total Support	$4,412

Legislative District Numbers
(Separate multiple Districts with a comma)

State Assembly	58, 63, 64
State Senate	32, 33, 35
Congressional	38, 44

☐ Approved ☐ Denied

CAPITAL CONSTRUCTION COST ESCALATION RATE

District SFP (Print)	Robert So	District SFP (Sign)	Robert So	Phone	(213) 897-0691
District Director (Print) for	Carrie Bowen	District Director (Sign)	Shirley Choate	Phone	(213) 897-0362
SHOPP Exec. (Print)		SHOPP Exec. (Sign)		Phone	

SHOPP Long Lead Request Form Attachment

07 -	Los Angeles	- 91
EA:	PPNO:	
EFIS:		

Multiple Locations Listing

Location	Perf Measure #	Performance Measure	County	Route	Prefix	PM	Prefix	PM	Bridge Number If Applicable
1	15	Collisions Reduced	Los Angeles	91		6	R	20.7	
2	73	Location(s)	Los Angeles	91		6	R	20.7	
3	47	Collisions Reduced	Los Angeles	91		11.4		11.4	
4	12	Collisions Reduced	Los Angeles	91		11.9		11.9	
5									
6									
7									
8									
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Asset Management Pilot Project Nomination SR 91 Corridor Improvements

State Department of Transportation – District 7 (Los Angeles and Ventura Counties)

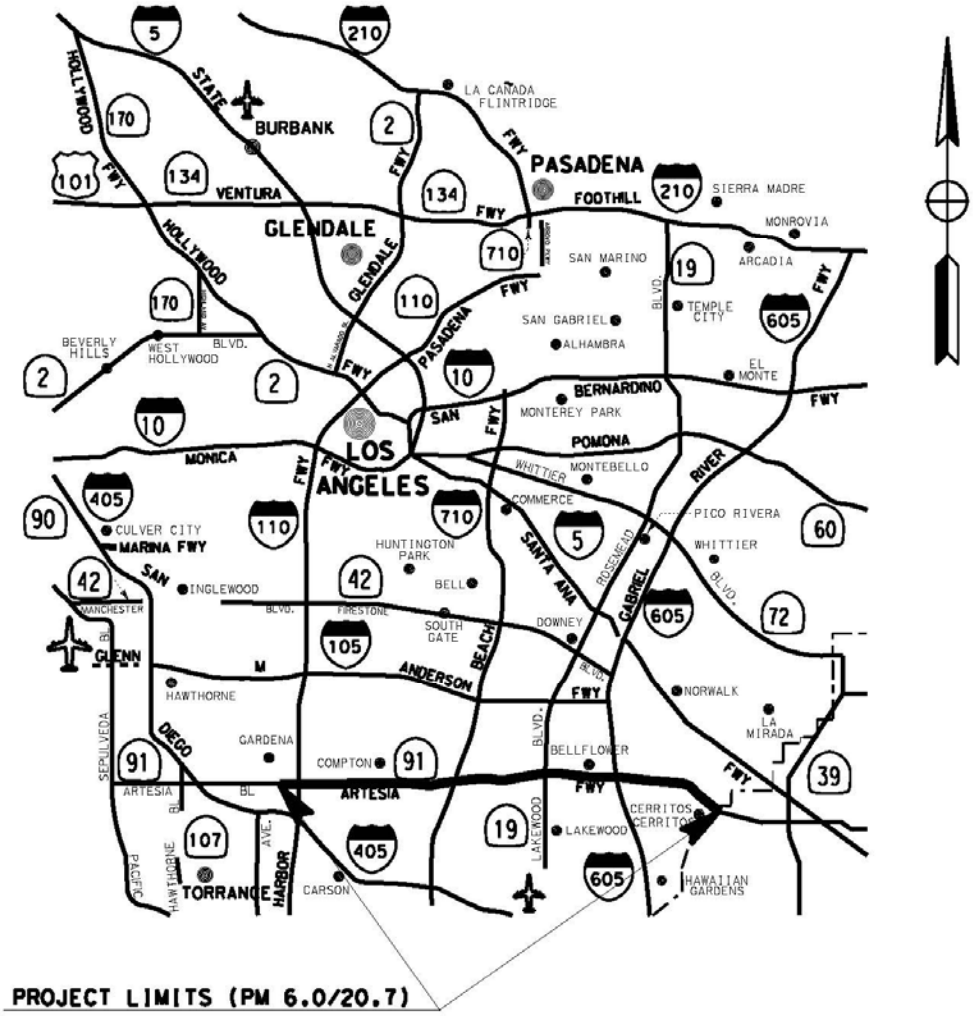
07 – LA – 91 - 6.0/R20.74

from

Vermont Avenue to the Orange County Line

August 14, 2015

VICINITY MAP



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ASSET MANAGEMENT PILOT PROJECT NOMINATION

07 – LA – 91 – 6.0/R20.74

1. INTRODUCTION

Los Angeles District 7 nominates State Route 91 in Los Angeles County from post mile 6.0 to R20.74, from Vermont Avenue to the Orange County Line, as one of the pilot projects proposed for the use of asset management principles to address the overall transportation needs of a major transportation project. (See Attachment A) This pilot project will quantify the combined SHOPP program benefits of collision reduction, and transportation management system (TMS) and will propose the corresponding programming for each need.

2. PROJECT BACKGROUND

This proposed multi-objective pilot project is comprised of several physical assets on State Route 91 in Los Angeles County from Vermont Avenue to the Orange County Line. The planned work for the project involves pavement rumble strips and delineation, transportation management system upgrades, and connector widening. The several physical assets are identified within the SHOPP programs of Collision Reduction's Collision Severity Reduction (015) and Mobility's Transportation Management System (315).

The planned shoulder rumble strips will be installed along longitudinal Route 91 within the project limits. An edge line rumble strip is a special type of shoulder rumble strip placed directly at the edge of the travel lane with the edge line pavement marking placed through the line of rumble strips.

The planned transportation management system upgrades include upgrading the existing communication system to all fiber optic and digital communications along a portion of Route 91 from Route 110 (PM 6.5) to the Orange County Line (PM 20.7) and upgrade the communication system at the Los Angeles Regional Transportation Management Center (LARTMC) on Route 2 (PM R 18.6) at Route 134, at the Norwalk communications hub building on Route 5 (PM 6.8) at Route 605, and at the Los Angeles Airport communications hub building on Route 405 (PM R 21.3) at Route 105. It is proposed to upgrade the Closed Circuit Television (CCTV) cameras and upgrade the Changeable Message Sign (CMS) panels for life cycle replacements. It is also proposed to connect existing Transportation Management System (TMS) field elements, consisting of closed circuit television (CCTV) camera, ramp metering systems (RMS), vehicle detection stations (VDS), and changeable message signs (CMS), to the fiber optic and digital communication system and to upgrade TMS field elements and the communication hubs to be IP ready. (See Attachments I and J)

The proposed project also includes connector widening on EB Route 91 to SB I-710 and WB Route

91 to SB Route 710, which involves some or all of the following per connector: widening the outside and/or inside shoulders, upgrade damaged bridge railing, refresh lane line striping, install flashing beacon before the connector, install rumble strips on shoulders, construct higher bridge railings.

These project will address traffic congestion, safety, and fiber optic communications.

3. SAFETY AND HEALTH

One of the primary safety goals is to reduce the number and severity of roadway departure crashes. These consist of run-off-road (including cross median) crashes and cross center line crashes on undivided roads. Safety improvements proposed to address this goal include initiatives to keep vehicles on the roadway, to improve the likelihood of a safe recovery after a roadway departure, and to reduce the severity of those crashes that do occur. Shoulder or edge line rumble strips are one of the proven countermeasures that reduce the risks of run-off-road crashes.

Rumble strips are placed as a countermeasure for driver error, rather than roadway deficiencies. They are designed primarily to assist distracted, drowsy, or otherwise inattentive drivers who may unintentionally drift over the edge line. For this set of drivers, the audible and vibratory warning produced by rumble strips greatly improves the opportunity for a safe recovery.

The practice of placing the edge line pavement markings over the rumble strip improves nighttime marking visibility, particularly in wet conditions, by better positioning the marking optics on the back side of each rumble, compared to limiting their normal position within the flat marking. This practice can also increase the longevity of the markings, particularly within the rumble, due to reduced wear from tires and added protection from plowing activity.

[redacted]

Edge line and shoulder rumble strips have the potential to reduce run-off-road crashes on any paved road.

The TMS upgrades within the project limits will replace and upgrade the communication system from copper to fiber optic and analog communication to all digital communication along with upgrades to the TMS system field element communications. The TMS was installed in 2000 along

Rte 91 and is in need of a life cycle replacement for its communication system. By converting the communications system to an all fiber optic and digital communications system, the Rte 91 communication system will be less vulnerable to copper theft and have less electronic repeater type of equipment to maintain, thus the maintenance worker exposure can be reduced. Also, the digital communication system will be more reliable, easier to maintain and trouble shoot operation problems, reduce field work time and trips.

[redacted]

[redacted]

4. STEWARDSHIP AND EFFICIENCY NEEDS

Collision reduction, transportation management system, and bridge deck rehabilitation SHOPP related needs exist within the project limits of LA-91-6.0/R20.74.

[redacted] The eastbound Rte 91 and westbound Rte 91 connectors to southbound Rte 710 need to be widened by widening the shoulders and adding other features. The project will also install rumble strips and pavement delineation.

The practice of placing the edge line pavement markings over the rumble strip improves nighttime marking visibility, particularly in wet conditions, by better positioning the marking optics on the back side of each rumble, compared to limiting their normal position within the flat marking. This practice can also increase the longevity of the markings, particularly within the rumble, due to reduced wear from tires and added protection from plowing activity.

By upgrading the communications system, CCTV cameras, and CMS panels, the life cycle replacement needs will be extended over 10 years with the planned upgrades, reducing operations and maintenance costs and maintenance worker exposure as the newer communication system will have built in checks for fiber cuts and other equipment failure along with the versatility and visibility of the newer CCTV cameras and the new CMS panels.

The proposed project also includes connector widening on EB Route 91 to SB I-710 and WB Route 91 to SB Route 710, which involves some or all of the following per connector: widening the outside and/or inside shoulders, upgrade damaged bridge railing, refresh lane line striping, install flashing beacon before the connector, install rumble strips on shoulders, construct higher bridge railings.

Asset	Total Quantity	Pre-Project Condition				Post- Project Condition		
		Good	Fair	Poor		Good	Fair	Poor
In-ground rumble strips	12 miles	0	0	0		12 miles	0	0
Pavement delineation	12 miles	0	0	0		12 miles	0	0
Existing fiber optic communications	14.24 miles		014.24	0		0	0	0
Fiber optic communications	14.24 miles	0	0	0		14.24	0	0
Connector Widening	1 Each		1			1		
Connector Widening	1 Each		1			1		

Item (Program)	**Performance Measures**	**Description of Work**	**Cost (Construction Cost and Support Costs)**
Pavement Delineation (015)	15 F & I Collision Reduced	Costs include: rumble strips and pavement delineation	$1,600,000
ITS (315)	14.24 miles of Communication System Upgrade	Cost includes: Upgrading the communication system over the project limits and traffic control.	$10,200,000
Connector Widening (015)	47 F & I Collision Reduced	Costs include: Widen shoulders, concrete barrier, refresh striping, etc.	$ 2,500,000
Connector Widening (015)	12 F & I Collision Reduced	Costs include: Widen shoulders, concrete barrier, refresh striping, etc.	$5,700,000

Total $ 20,000,000

5. SUSTAINABILITY, LIVABILITY AND ECONOMY

The sustainable attributes of the project include the following.

The TMS communication upgrade and life cycle replacements of the CCTV cameras and CMS panels in the project will extend the life of the communications system and those TMS field elements to over 10 years and be sustainable, thus reducing operations and maintenance costs.

Edge line and shoulder rumble strips have the potential to reduce run-off-road crashes on any paved road, thus extending and sustaining the life and usefulness of the freeway's off-road features, such as landscaping, barrier and guard rail, sign structures, bridges, etc..

In widening the shoulders on the connectors, the potential of the over turned crashes is reduced, thus sustaining and extending the usefulness and life of the freeway features adjacent to the connectors.

The following defines the elements of the project that reduce the environmental impacts of the transportation system on the environment.

Air quality is expected to improve over the existing conditions with the construction of the proposed project. Long term green house emissions and congestion are expected to be reduced through the upgraded communications system, CCTV cameras, and CMS panels, and improved data and video management for the TMS field elements. This will result in less down time for the communication system, detection system, closed circuit television (CCTV) cameras, and the changeable message signs (CMS) along the project limits which will improve traffic incident verification/management dispatch, better traveler information and maximize system performance measurement with more consistent traffic management strategies.

6. SYSTEM PERFORMANCE

There are various aspects of the project that will improve system performance.

Due to the difficulty in determining where a driver will become distracted or drowsy, it is recommended that the rumble strips be installed system-wide or in corridors, prioritized by the frequency of the specific crash types targeted by the treatment.

Travel delays will be reduced with the installation of the rumble strips and pavement delineation and the connector widening due to the reduction in off-road crashes and over turned truck crashes.

Within the project limits, there are five CMSs, fifteen CCTV cameras, and forty-nine ramp meter and detection stations, all communicating with the Los Angeles Regional Transportation Management Center through the Caltrans District 7 communication system. With the upgrade of the communication system, data and video management for the TMS field elements will be improved, resulting in less down time and maintenance repairs for the communication system, detection

system, closed circuit television (CCTV) cameras, and the changeable message signs (CMS) along the project limits. The fifteen CCTV cameras will be replaced with newer, more versatile cameras with internet protocol capabilities. The CMS panels will be replaced with new panels for better visibility resulting in improved traveler information dissemination. With the TMS life cycle replacement upgrades, the transportation management strategies will help to improve travel reliability, reduce traffic congestion, improve system optimization, and improve overall mobility and access to destinations within and beyond the project limits.

7. ORGANIZATIONAL EXCELLENCE

An asset management pilot project within the District can showcase the exceptional features and design of the project, thus showcasing the excellent staff involved with the project development and construction of the project. The project team working on the innovative asset management pilot project will meet all challenges, coordinate the different assets and objectives, and take the lead in pushing the project forward successfully..

8. FUNDING PLAN

By combining several projects from different SHOPP programs that are within the same project limits compared to the traditional single asset project delivery method, project costs can be reduced both in support costs and construction costs. By combining the projects, support cost savings can be seen in areas such as the aerial deposited lead contamination investigation and report, hazardous waste assessment, environmental assessment and documents, storm water data report, and right of way data report, along with project initiation document preparation and reviews, and Office Engineer functions including advertisement. And there would be cost savings for the Resident Engineer (RE) inspection on the project, documentation for the project and bid items, and RE office expenses. There may be lower bids for a combined project than that of the accumulated bids for the five projects advertised separately. For construction cost savings, the contractors may be able to plan some construction work in the same areas thus possibly reducing the traffic control costs. They could also bid lower for TRO, mobilization, SWPPP, and working days for a combined project. By reducing the number of working days on a project, the Contractor would be able to open up the roadway for travelers sooner so there would be less disruption to the motoring public.

Examples:

For Office Engineer functions during the final project design stage, a project of over $20 million can require about 2000 resource hours. Five smaller projects totaling over $20 million can have combined Office Engineer function resource needs of 4000 hours. That is a 50% cost savings in support costs for Office Engineer functions for one combined project verses five single projects.

For the Storm Water Data Report, writing the report for one combined asset management project compared to five of the traditional single asset projects along one route within the same project limits can have about a 50% reduction in resource needs.

Environmental Planning support resource needs for the four individual projects from the PID stage, phase K, through construction, phase 3, would total 2936 hours or $317,752. But if the projects are combined into one asset management pilot project, the Environmental Planning support resource needs would be 847 hours or $91,505. The Environmental Planning support cost savings could therefore be as significant as 2089 hours or $226,247 when combining the four Rte 91 projects into one asset management pilot project. That is a savings in support costs for the Environmental Planning support resource needs of 71%. (See Attachment K)

For the electrical construction support cost on the Rte 91 asset management pilot project, it could be 9,000 hours for one combined project verses 11,000 hours for the five separate projects. That is a 2000 hour savings in support hours for the electrical construction staff.

The funding needed for the Rte 91 pilot project is shown in the following table.

Capital Outlay Support and Project Estimates

Fund Source	Estimate
SHOPP 20.10.XXX.XXX	Total
Component	In thousands of dollars ($1,000)
PA&ED Support	$ 735
PS&E Support	$ 1,471
Right-of-Way Support	$ 0
Construction Support	$ 2,206
Right-of-Way	$ 0
Construction	$ 15,588
Total	$ 20,000

9. RECOMMENDATION

It is recommended that the project be nominated for the 2018 State Highway Operation and Protection Program (SHOPP) with a target programming year of 2021/2022 fiscal year in order to promote asset management. The current construction cost estimate for the project as of August 2015 is $15,588,000 and the support cost estimate is $4,412 for a total project cost estimate of $20,000,000.

10. ATTACHMENTS

Attachment A: Title Sheet

Attachment B: Average Daily Traffic on Rte 91

Attachment C: AM Bottlenecks

[redacted]

Upgrades

Attachment J: Location Map of Various Hubs and LARTMC

Attachment K: Tally Sheet for Environmental Planning Resource Needs on Rte 91 Pilot Project

10. CONTACTS

Carrie L. Bowen, District 7 Director

Ali F. Zaghari, Deputy District Director, Operations

Robert So, Deputy District Director of Program & Project Management

Steve Tran, SHOPP Single Focal Point

Peter Wong, Office Chief, Office of ITS

Jacqueline Tan, Office of ITS

ATTACHMENT A

Title Sheet

INDEX OF PLANS

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

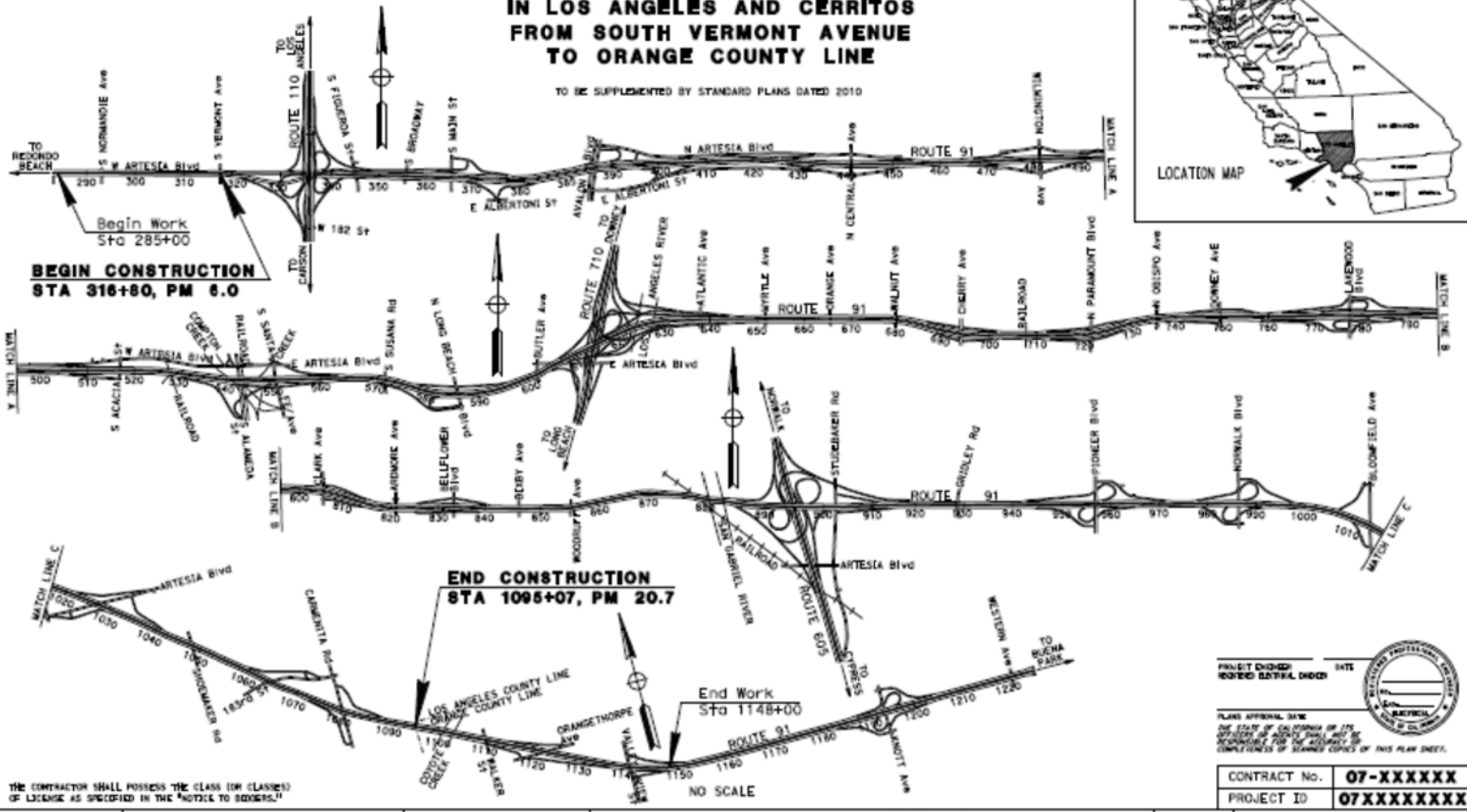
PROJECT PLANS FOR CONSTRUCTION ON

STATE HIGHWAY

IN LOS ANGELES COUNTY
IN LOS ANGELES AND CERRITOS
FROM SOUTH VERMONT AVENUE
TO ORANGE COUNTY LINE

TO BE SUPPLEMENTED BY STANDARD PLANS DATED 2010

District	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	91	6.0/R20.7		



PROJECT ENGINEER REGINALD BATRAL DAVIDSON DATE

PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

CONTRACT No.	07-XXXXXX
PROJECT ID	07XXXXXXXX

PROJECT MANAGER XXX XXX

DESIGN MANAGER JACQUELINE Q. TAN

SITE PLOTTED w/ 10-Jul-2015 SITE PLOTTED w/ 1503 05-03-15

BORDER LAST REVISED 10/4/2013 | CALTRANS WEB SITE IS: HTTP://WWW.DOT.CA.GOV/ | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => s139716 DGN FILE => Rte 91 EMile Sheet_2015-06-16.dgn | UNIT 1885 | PROJECT NUMBER & PHASE 07XXXXXXXX1

ATTACHMENT B

Average Daily Traffic

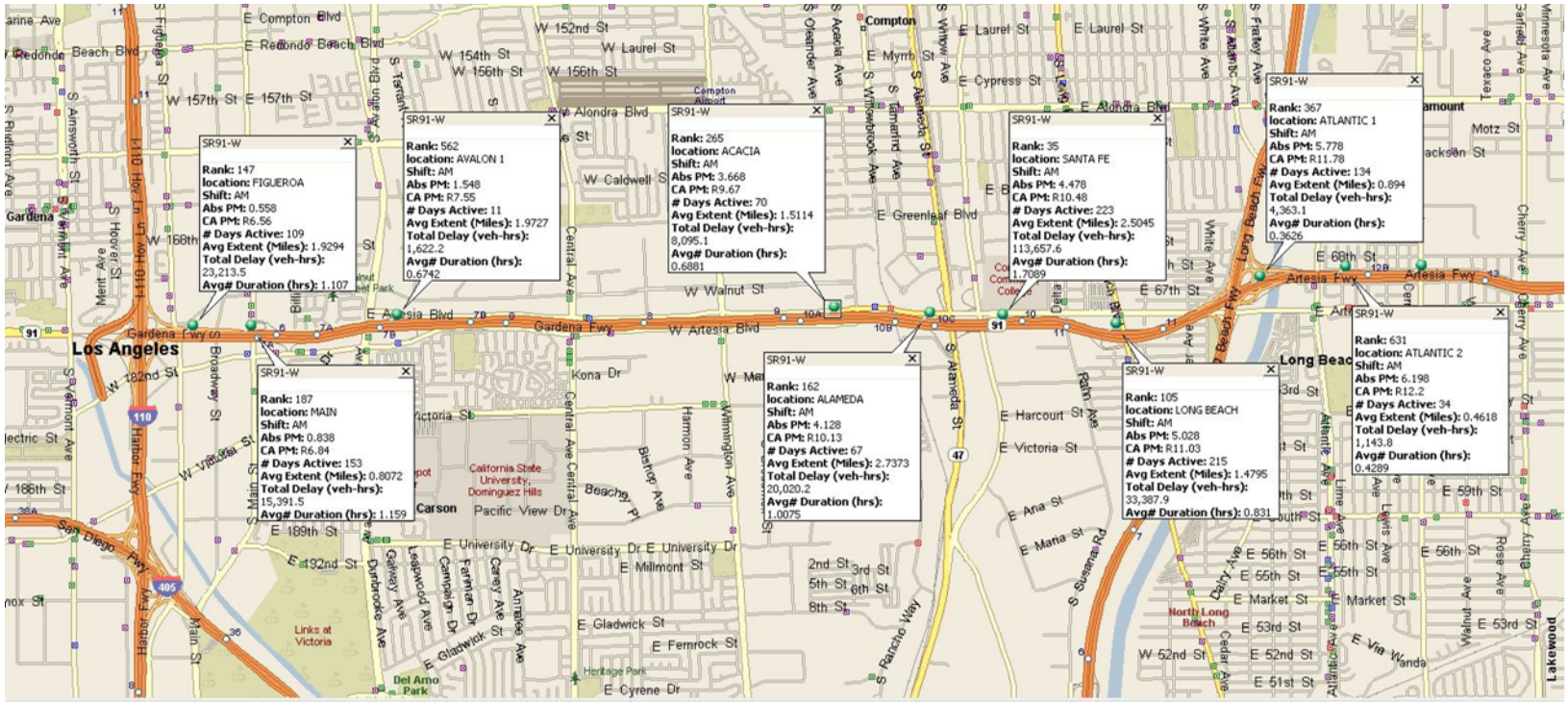
07 – LA – 91 - 6.0/R20.74

Dist	Rte	CO		Post Mile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
7	91	LA		6.012	LOS ANGELES, VERMONT AVENUE				4600	56000	54500
7	91	LA	R	6.344	LOS ANGELES, JCT. RTE. 110	4600	56000	54500	16000	187000	181500
7	91	LA	R	7.426	CARSON, AVALON BOULEVARD	16400	192000	186000	17700	207000	200000
7	91	LA	R	8.435	COMPTON, CENTRAL AVENUE	17700	207000	200000	18000	211000	204000
7	91	LA	R	9.162	COMPTON, WILMINGTON AVENUE	18000	211000	204000	18400	218000	211000
7	91	LA	R	10.27	COMPTON, ALAMEDA STREET	18400	218000	211000	18400	218000	211000
7	91	LA	R	10.41	COMPTON, ALAMEDA/SANTA FE AVE	18400	218000	211000	19000	226000	219000
7	91	LA	R	11.1	LONG BEACH, LONG BEACH BOULEVARD	19000	226000	219000	18900	227000	219000
7	91	LA	R	11.68	LONG BEACH, JCT. RTE. 710	18900	227000	219000	2100	274000	271000
7	91	LA	R	13.09	LONG BEACH, CHERRY AVENUE	21000	274000	271000	19800	279000	274000
7	91	LA	R	13.59	LONG BEACH, PARAMOUNT BOULEVARD	19800	279000	274000	19400	275000	270000

7	91	LA	R	14.1	LONG BEACH, DOWNEY AVENUE	19400	275000	270000	19200	274000	269000
7	91	LA	R	14.62	BELLFLOWER, JCT. RTE. 19	19200	274000	269000	18200	262000	258000
7	91	LA	R	15.11	BELLFLOWER, CLARK AVENUE	18200	262000	258000	19000	275000	270000
7	91	LA	R	15.61	BELLFLOWER, BELLFLOWER BOULEVARD	19000	275000	270000	18600	271000	266000
7	91	LA	R	16.94	CERRITOS, JCT. RTE. 605	18600	271000	266000	23800	306000	281000
7	91	LA	R	18.09	ARTESIA, PIONEER BOULEVARD	23800	306000	281000	23000	297000	273000
7	91	LA	R	18.65	CERRITOS, NORWALK BOULEVARD	23000	297000	273000	22800	295000	271000
7	91	LA	R	19.17	CERRITOS, BLOOMFIELD AVENUE	22800	295000	271000	21100	273000	250000
7	91	LA	R	19.43	CERRITOS, ARTESIA AVENUE	21100	273000	250000	20800	270000	248000
7	91	LA	R	20.45	CERRITOS, CARMENITA AVENUE	20800	270000	248000	20200	264000	243000
7	91	LA	R	20.74	LOS ANGELES/ORANGE COUNTY LINE	20200	264000	243000			

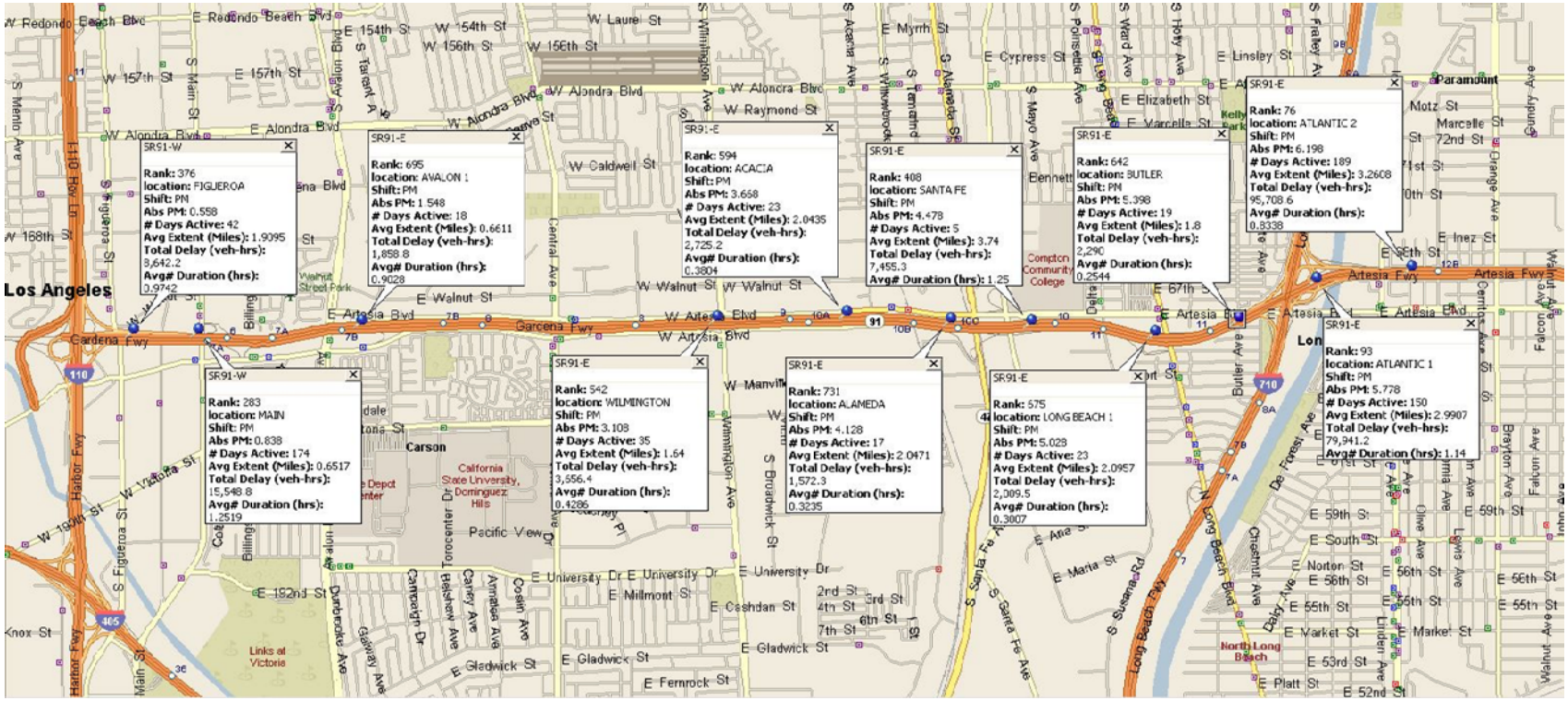
ATTACHMENT C

AM Bottlenecks


SR91-W
Rank: 147
location: FIGUEROA
Shift: AM
Abs PM: 0.558
CA PM: R6.56
Days Active: 109
Avg Extent (Miles): 1.9294
Total Delay (veh-hrs): 23,213.5
Avg# Duration (hrs): 1.107
SR91-W
Rank: 562
location: AVALON 1
Shift: AM
Abs PM: 1.548
CA PM: R7.55
Days Active: 11
Avg Extent (Miles): 1.9727
Total Delay (veh-hrs): 1,622.2
Avg# Duration (hrs): 0.6742
SR91-W
Rank: 265
location: ACACIA
Shift: AM
Abs PM: 3.668
CA PM: R9.67
Days Active: 70
Avg Extent (Miles): 1.5114
Total Delay (veh-hrs): 8,095.1
Avg# Duration (hrs): 0.6881
SR91-W
Rank: 35
location: SANTA FE
Shift: AM
Abs PM: 4.478
CA PM: R10.48
Days Active: 223
Avg Extent (Miles): 2.5045
Total Delay (veh-hrs): 113,657.6
Avg# Duration (hrs): 1.7089
SR91-W
Rank: 367
location: ATLANTIC 1
Shift: AM
Abs PM: 5.778
CA PM: R11.78
Days Active: 134
Avg Extent (Miles): 0.894
Total Delay (veh-hrs): 4,363.1
Avg# Duration (hrs): 0.3626
SR91-W
Rank: 631
location: ATLANTIC 2
Shift: AM
Abs PM: 6.198
CA PM: R12.2
Days Active: 34
Avg Extent (Miles): 0.4618
Total Delay (veh-hrs): 1,143.8
Avg# Duration (hrs): 0.4289
SR91-W
Rank: 187
location: MAIN
Shift: AM
Abs PM: 0.838
CA PM: R6.84
Days Active: 153
Avg Extent (Miles): 0.8072
Total Delay (veh-hrs): 15,391.5
Avg# Duration (hrs): 1.159
SR91-W
Rank: 162
location: ALAMEDA
Shift: AM
Abs PM: 4.128
CA PM: R10.13
Days Active: 67
Avg Extent (Miles): 2.7373
Total Delay (veh-hrs): 20,020.2
Avg# Duration (hrs): 1.0075
SR91-W
Rank: 105
location: LONG BEACH
Shift: AM
Abs PM: 5.028
CA PM: R11.03
Days Active: 215
Avg Extent (Miles): 1.4795
Total Delay (veh-hrs): 33,387.9
Avg# Duration (hrs): 0.831
Los Angeles
Gardena
Compton
Long Beach
Carson
Lakewood
Gardena Fwy
Artesia Fwy
Long Beach Fwy
Harbor Fwy
San Diego Fwy
W Artesia Blvd
E Artesia Blvd
W Walnut St
E Compton Blvd
E Redondo Beach Blvd
W Laurel St
E Laurel St
E Cypress St
E Alondra Blvd
W Caldwell St
E Greenleaf Blvd
E 68th St
E 67th St
E Harcourt St
E Victoria St
E Ana St
E Maria St
E 59th St
E 56th St
E 55th St
E Market St
E 53rd St
E 52nd St
E 51st St
W 52nd St
E Via Wanda
Market St
Walnut Ave
Rose Ave
Cherry Ave
Atlantic Ave
Lime Ave
Lewis Ave
Paramount Blvd
Alameda St
Central Ave
Avalon Blvd
Figueroa St
Broadway St
Main St
Vermont Ave
Normandie Ave
Hoover St
Harbor Fwy
Long Beach Fwy
Cherry Ave
Bellflower Blvd
Pacific Coast Hwy
W 182nd St
W 186th St
W 168th St
W 157th St
E 157th St
W 154th St
W 156th St
W 152nd St
E 189th St
E 192nd St
E University Dr
E Millmont St
E Gladwick St
E Fernrock St
E Cyrene Dr
Kona Dr
Victoria St
W Victoria St
California State University, Dominguez Hills
Pacific View Dr
Links at Victoria
Del Amo Park
Heritage Park
North Long Beach
Compton Airport
Cerritos College
Bishop Ave
Harmon Ave
Wilmington Ave
Beach Pl
Durfee Ave
Galway Ave
Leadwood Ave
Campaign Dr
Farman Dr
Carey Ave
Arlington Ave
Gladwick St
2nd St
3rd St
5th St
6th St
8th St
S Rancho Way
S Susana Rd
Palm Ave
Dairy Ave
Clear Ave
Motz St
Jackson St
Cherry Ave
Rudmon Ave
Ainsworth St
Merit Ave
Vermont Ave
Electric St
Nox St
Marine Ave
Redondo Beach Blvd
Gardena
Los Angeles
Carson
Long Beach
Lakewood
110
91
405
47

ATTACHMENT D

PM Bottlenecks


SR91-W
Rank: 376
location: FIGUEROA
Shift: PM
Abs PM: 0.558
Days Active: 42
Avg Extent (Miles): 1.9095
Total Delay (veh-hrs): 3,642.2
Avg# Duration (hrs): 0.9742
SR91-E
Rank: 695
location: AVALON 1
Shift: PM
Abs PM: 1.548
Days Active: 18
Avg Extent (Miles): 0.6611
Total Delay (veh-hrs): 1,858.8
Avg# Duration (hrs): 0.9028
SR91-E
Rank: 594
location: ACACIA
Shift: PM
Abs PM: 3.658
Days Active: 23
Avg Extent (Miles): 2.0435
Total Delay (veh-hrs): 2,725.2
Avg# Duration (hrs): 0.3804
SR91-E
Rank: 408
location: SANTA FE
Shift: PM
Abs PM: 4.478
Days Active: 5
Avg Extent (Miles): 3.74
Total Delay (veh-hrs): 7,455.3
Avg# Duration (hrs): 1.25
SR91-E
Rank: 642
location: BUTLER
Shift: PM
Abs PM: 5.398
Days Active: 19
Avg Extent (Miles): 1.8
Total Delay (veh-hrs): 2,290
Avg# Duration (hrs): 0.2544
SR91-E
Rank: 76
location: ATLANTIC 2
Shift: PM
Abs PM: 6.198
Days Active: 189
Avg Extent (Miles): 3.2608
Total Delay (veh-hrs): 95,708.6
Avg# Duration (hrs): 0.8338
SR91-W
Rank: 283
location: MAIN
Shift: PM
Abs PM: 0.838
Days Active: 174
Avg Extent (Miles): 0.6517
Total Delay (veh-hrs): 15,548.8
Avg# Duration (hrs): 1.2519
SR91-E
Rank: 542
location: WILMINGTON
Shift: PM
Abs PM: 3.108
Days Active: 35
Avg Extent (Miles): 1.64
Total Delay (veh-hrs): 3,556.4
Avg# Duration (hrs): 0.4286
SR91-E
Rank: 731
location: ALAMEDA
Shift: PM
Abs PM: 4.128
Days Active: 17
Avg Extent (Miles): 2.0471
Total Delay (veh-hrs): 1,572.3
Avg# Duration (hrs): 0.3235
SR91-E
Rank: 575
location: LONG BEACH 1
Shift: PM
Abs PM: 5.028
Days Active: 23
Avg Extent (Miles): 2.0957
Total Delay (veh-hrs): 2,009.5
Avg# Duration (hrs): 0.3007
SR91-E
Rank: 93
location: ATLANTIC 1
Shift: PM
Abs PM: 5.778
Days Active: 150
Avg Extent (Miles): 2.9907
Total Delay (veh-hrs): 79,941.2
Avg# Duration (hrs): 1.14
Los Angeles
Carson
Paramount
Compton Community College
California State University, Dominguez Hills
Pacific View
Links at Victoria
North Long Beach
Gardena Fwy
Artesia Fwy
Harbor Fwy
Long Beach Fwy
W Artesia Blvd
E Artesia Blvd
W Alondra Blvd
E Alondra Blvd
W Walnut St
E Walnut St
W Redondo Beach Blvd
E Redondo Beach Blvd
W 157th St
E 157th St
W 154th St
E 154th St
W 156th St
W 155th St
W Laurel St
W Caldwell St
W Raymond St
E Myrtle St
E Cypress St
E Linsley St
E Elizabeth St
E Marcella St
E 67th St
E Inez St
E 59th St
E South St
E Norton St
E 56th St
E 55th St
E Market St
E 53rd St
E Platt St
E 52nd St
E 152nd St
E University Dr
E Millmont St
E Cashdan St
E Gladwick St
E Fernrock St
W 190th St
W Victoria St
Knox St
Main St
Figueroa St
Avalon Blvd
Central Ave
Wilmington Ave
S Broadway St
Alameda St
Santa Fe Ave
Long Beach Blvd
Atlantic Ave
Cherry Ave
Chestnut Ave
Olive Ave
Lewis Ave
Walnut Ave
Brayton Ave
Falcon Ave
Orange Ave
Cundry Ave
Motz St
Marcelle St
72nd St
Butler Ave
Delta
Bennett
Mayo Ave
Holly Ave
Ward Ave
Poinsettia Ave
Acacia Ave
Myrtle St
Tamarind
Willowbrook
Tarrant Ave
Avalon Blvd
Billings
Torrecenter Dr
Carson Ave
Belshaw Ave
Amaranta Ave
Cosin Ave
Dumbarton Ave
Galway Ave
Campaign Dr
Santa Fe Ave
S Susana Rd
E Maria St
E Anne St
Delay Ave
Linden Ave
Walnut Ave
Manville
Harbor Fwy
Figueroa St
Main St
Knox St
110
405
91
710
Kelly Park
Walnut Street Park

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[redacted]

[redacted]

[redacted]

[redacted]

ATTACHMENT I

List of Existing Transportation Management System Field Elements with Planned Upgrades

EXISTING CLOSED CIRCUIT TELEVISION CAMERAS
TO HAVE SOME UPGRADES

CCTV ID	FWY	DIRECTION	PM PREFIX	POSTMILE	LOCATION	CCTV
251	91	E	R	6.72	BROADWAY	CCTV
252	91	W	R	7.63	E/O AVALON BLVD	CCTV
253	91	W	R	8.3	W/O CENTRAL AVE	CCTV
254	91	E	R	8.87	W/O WILMINGTON AVE	CCTV
255	91	W	R	10.16	ALAMEDA ST	CCTV
256	91	E	R	11.2	LONG BEACH BLVD	CCTV
257	91	W	R	12.42	E/O ATLANTIC BLVD	CCTV
258	91	E	R	13.38	PARAMOUNT	CCTV
259	91	W	R	14.09	DOWNEY AVE	CCTV
536	91	W	R	14.96	W/O CLARK AVE	CCTV
537	91	E	R	15.96	E/O BIXBY/BELLFLOWER	CCTV
538	91	W	R	16.82	W/O ROUTE 605	CCTV
539	91	W	R	18.15	PIONEER BLVD	CCTV
540	91	W	R	19.58	ARTESIA BLVD	CCTV
541	91	E	R	20.43	CARMENITA AVE	CCTV

EXISTING CHANGEABLE MESSAGE SIGNS
TO HAVE SOME UPGRADES

CMS #	FWY	DIRECTION	PM PREFIX	POSTMILE	LOCATION	CMS
4	91	W	R	8.23	CENTRAL AVE	CMS
22	91	W	R	14.07	DOWNEY AVE	CMS
71	91	W	R	19.51	ARTESIA BLVD.	CMS
72	91	E	R	9.06	WILMINGTON AVE.	CMS

EXISTING COMMUNICATION HUBS AND CENTRAL HUBS
TO HAVE SOME UPGRADES

HUB ID	FWY	DIRECTION	PM	LOCATION	NUMBER
LARTMC	2	S	18.6	RTE 134	7
NWK	5	E	6.8	RTE 605	3
ELA	5	N	16.9	RTE 10	1
D.O.	101	S	0.91	LOS ANGELES AVENUE	6
LAX	105	S	2.1	RTE 405	4

EXISTING VEHICLE DETECTION STATIONS AND RAMP METERS TO HAVE SOME UPGRADES

MS ID	FWY	DIRECTION	PM PREFIX	POSTMILE	LOCATION	VDS or RMS
2257	91	E		6.12	VERMONT	VDS
2256	91	W	R	6.56	FIGUEROA	VDS
4506	91	W	R	6.94	MAIN	RMS
4513	91	E	R	7.16	MAIN	RMS
4139	91	W	R	7.55	AVALON 1	RMS
4076	91	E	R	7.81	AVALON 2	RMS
4138	91	W	R	8.27	CENTRAL 1	RMS
4077	91	E	R	8.58	CENTRAL 2	RMS
4137	91	W	R	9.1	WILMINGTON	RMS
4078	91	E	R	9.11	WILMINGTON	RMS
4136	91	W	R	9.67	ACACIA	RMS
4079	91	E	R	10.13	ALAMEDA	RMS
4080	91	E	R	10.48	SANTA FE	RMS
4081	91	E	R	11.03	LONG BEACH 1	RMS
4507	91	W	R	11.03	LONG BEACH 2	RMS
2371	91	E	R	11.4	BUTLER	VDS
3329	91	W	R	11.78	ATLANTIC 1	RMS
3292	91	E	R	12.21	ATLANTIC 2	RMS
2168	91	W	R	12.57	ORANGE	VDS
3328	91	W	R	13.01	CHERRY	RMS
3293	91	E	R	13.26	CHERRY	RMS
3327	91	W	R	13.51	PARAMOUNT	RMS
3294	91	E	R	13.69	PARAMOUNT	RMS
3326	91	W	R	14.04	DOWNEY 1	RMS
4505	91	E	R	14.21	DOWNEY 2	RMS
3325	91	W	R	14.55	LAKEWOOD 1	RMS
3295	91	E	R	14.59	LAKEWOOD 1	RMS
3324	91	W	R	14.65	LAKEWOOD 2	RMS
3296	91	E	R	14.8	LAKEWOOD 2	RMS
3297	91	E	R	15.22	CLARK	RMS
3323	91	W	R	15.54	BELLFLOWER 1	RMS
3298	91	E	R	15.76	BELLFLOWER 2	RMS
2169	91	W	R	16.22	CALIFORNIA	VDS
2384	91	W	R	16.8	W OF 605	VDS
2383	91	W	R	17	WB 91 TO 605	VDS
3299	91	E	R	17.37	STUDEBAKER	RMS

MS ID	FWY	DIRECTION	PM PREFIX	POSTMILE	LOCATION	VDS or RMS
3300	91	E	R	17.96	PIONEER 1	RMS
3322	91	W	R	17.96	PIONEER 1	RMS
3321	91	W	R	18.21	PIONEER 2	RMS
3301	91	E	R	18.21	PIONEER 2	RMS
3320	91	W	R	18.5	NORWALK 1	RMS
3302	91	E	R	18.54	NORWALK 1	RMS
3319	91	W	R	18.7	NORWALK 2	RMS
3303	91	E	R	18.77	NORWALK 2	RMS
3318	91	W	R	19.06	BLOOMFIELD	RMS
3304	91	E	R	19.4	SHOEMAKER	RMS
3317	91	W	R	19.5	ARTESIA	RMS
3316	91	W	R	20.14	183RD	RMS
2674	91	W	R	20.7	CARMENITA	VDS

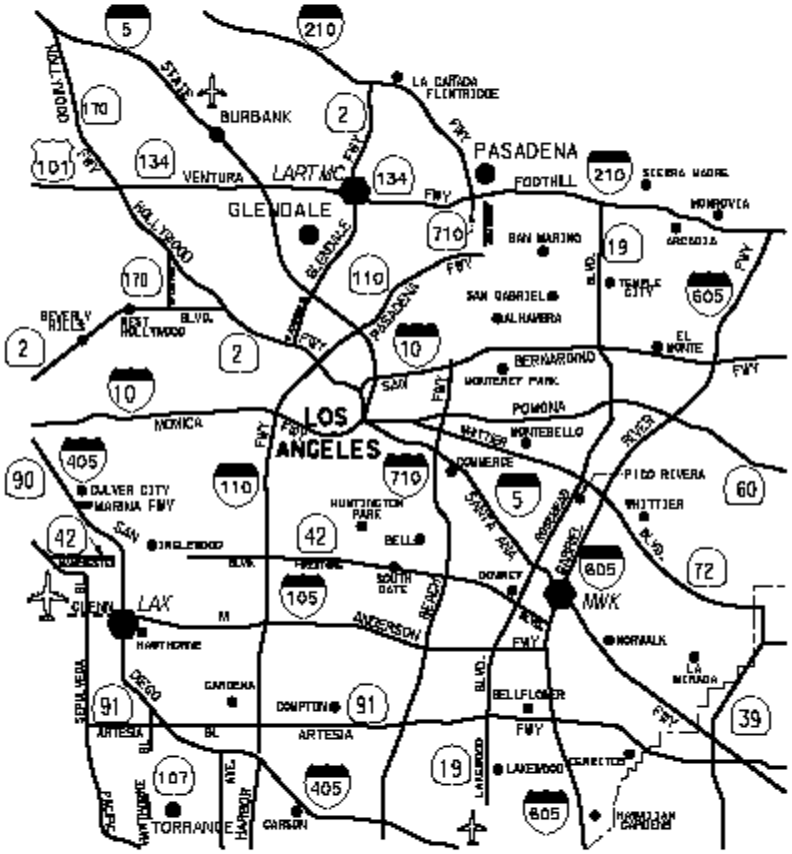
ATTACHMENT J

Location Map of Various Hubs and LARTMC

LOCATION MAP

VARIOUS HUBS AND LARTMC

LOS ANGELES REGIONAL TRAFFIC MANAGEMENT CENTER (LARTMC), LA 2 PM R18.6
NORWALK (NWK) HUB, LA 5 PM 6.8
LOS ANGELES AIRPORT (LAX) HUB, LA 405 PM R21.3



- LEGEND -

● *EXISTING HUBS AND LARTMC*

UPGRADE EQUIPMENT AT VARIOUS HUBS AND LARTMC.

ATTACHMENT K

Tally Sheet for Environmental Planning

Resource Needs for Rte 91 Pilot Project

TALLY SHEET:

Los Angeles Co. Route 091 (5 projects):

No.	BPM	APM	Project Description	CEQA ED	PID Phase (K)		PAED Phase (0)		PS&E Phase (1)		Const Phase (3)		Total Resources	
					Hrs	$$	Hrs	$$	Hrs	$$	Hrs	$$	Hrs	$$
1	5	10	Install groundin rumble strips and pavement delineation	CE	72	$ 8,288	190	$ 20,086	252	$ 28,517	184	$ 18,400	698	$ 75,690
2	8.5	20.7	Upgrade Transportation Management System	CE	72	$ 8,288	190	$ 20,086	252	$ 28,517	184	$ 18,400	698	$ 75,690
3	11.6	11.8	Widen connector	CE	72	$ 8,288	238	$ 25,364	288	$ 30,395	192	$ 19,139	770	$ 83,186
4	11.681	11.681	Connector widening and replacement	CE	72	$ 8,288	238	$ 25,364	288	$ 30,395	192	$ 19,139	770	$ 83,186
			Total for 5 Separate Projects:		288	$ 33,152	856	$ 90,898	1040	$118,824	752	$ 75,078	2938	$ 317,752

Estimate Resource for all 5 projects combined as one project	CE	79	$ 9,117	262	$ 27,800	295	$ 33,435	211	$ 21,053	847	$ 91,505

Envision Rating System
Self-Assessment Checklist
For Public Comment Only - Not for Project Use

Project:

Sustainability Goal points minimally includes Green Assessment Questions on 5 Tabs (Quality of life, Leadership, Resource Allocation, Natural World, and Climate & Risk). One point is earned for each "Yes" Answer (50 points possible) and bonus points for additional question may be considered (93 additional points). Projects will be ranked for the Sustainability Goal based on these points.

			Caltrans G3 PM's		Y	N	NA		
1	QUALITY OF LIFE	PURPOSE	Livability	QL1.1 Improve community quality of life	3	0	0	3 of 3	NA 12%
2			Livability	QL1.2 Stimulate sustainable growth and development	3	0	0	3 of 3	
3			Livability	QL1.3 Develop local skills and capabilities	3	0	0	3 of 3	4%
4		COMMUNITY	Health & Safety	QL2.1 Enhance public health and safety	1	0	0	1 of 1	
5			Noise Pollution	QL2.2 Minimize noise and vibration	1	0	0	1 of 1	
6			Light Pollution	QL2.3 Minimize light pollution	0	1	0	0 of 1	
7			Livability	QL2.4 Improve community mobility and access	3	0	0	3 of 3	Yes 85%
8			Mode Shift	QL2.5 Encourage alternative modes of transportation	1	0	1	1 of 1	
9			Accessibility	QL2.6 Improve site accessibility, safety and wayfinding	3	0	0	3 of 3	
10		WELLBEING	Cultural Resources	QL3.1 Preserve historic and cultural resources	2	0	0	2 of 2	
11			Livability	QL3.2 Preserve views and local character	2	0	0	2 of 2	
12			Livability	QL3.3 Enhance public space	0	0	2	0 of 0	
				TOTAL	**22**	**1**	**3**	22 of 23	
13	LEADERSHIP	COLLABORATION	Community Partnership	LD1.1 Provide effective leadership and commitment	3	0	0	3 of 3	NA 21%
14			Community Partnership	LD1.2 Establish a sustainability management system	1	0	0	1 of 1	
15			Community Partnership	LD1.3 Foster collaboration and teamwork	3	0	0	3 of 3	No 5%
16			Community Partnership	LD1.4 Provide for stakeholder involvement	3	0	0	3 of 3	
17		MANAGEMENT	Resource Consumption	LD2.1 Pursue by-product synergy opportunities	0	0	1	0 of 0	
18			Community Integration	LD2.2 Improve infrastructure integration	2	0	1	2 of 2	Yes 74%
19		PLANNING	Environmental	LD3.1 Plan for long-term monitoring and maintenance	0	1	1	0 of 1	
20			Community Partnership	LD3.2 Address conflicting regulations and policies	2	0	0	2 of 2	
21			Energy	LD3.3 Extend useful life	0	0	1	0 of 0	
				TOTAL	**14**	**1**	**4**	14 of 15	
22	RESOURCE ALLOCATION	MATERIALS	Resource Consumption	RA1.1 Reduce Net Embodied Energy	0	0	2	0 of 0	
23			Resource Consumption	RA1.2 Support Sustainable Procurement Practices	0	0	3	0 of 0	
24			Resource Consumption	RA1.3 Use Recycled Materials	2	0	0	2 of 2	
25			Resource Consumption	RA1.4 Use Regional Materials	2	0	0	2 of 2	
26			Resource Consumption	RA1.5 Divert Waste from Landfills	0	1	2	0 of 1	NA 66%
27			Resource Consumption	RA1.6 Reduce Excavated Materials Taken off Site	3	0	0	3 of 3	
28			Resource Consumption	RA1.7 Provide for Deconstruction and Recycling	3	0	0	3 of 3	
29		ENERGY	Energy	RA2.1 Reduce energy consumption	0	1	2	0 of 1	
30			Energy	RA2.2 Use renewable energy	0	0	2	0 of 0	No 5%
31			Energy	RA2.3 Commission and monitor energy systems	0	0	3	0 of 0	
32		WATER	Water	RA3.1 Protect fresh water availability	2	0	5	2 of 2	Yes 29%
33			Water	RA3.2 Reduce potable water consumption	0	0	4	0 of 0	
34			Water	RA3.3 Monitor water systems	0	0	4	0 of 0	
				TOTAL	**12**	**2**	**27**	12 of 14	
35	NATURAL WORLD	SITING	Environmental	NW1.1 Preserve prime habitat	0	2	3	0 of 2	
36			Environmental	NW1.2 Protect wetlands and surface water	0	0	3	0 of 0	
37			Environmental	NW1.3 Preserve prime farmland	0	0	1	0 of 0	
38			Environmental	NW1.4 Avoid adverse geology	0	0	3	0 of 0	
39			Environmental	NW1.5 Preserve floodplain functions	1	0	5	1 of 1	NA 74%
40			Environmental	NW1.6 Avoid unsuitable development on steep slopes	2	0	0	2 of 2	
41			Environmental	NW1.7 Preserve greenfields	2	0	0	2 of 2	
42		LAND & WATER	Water Pollution	NW2.1 Manage stormwater	1	0	1	1 of 1	
43			Pollution	NW2.2 Reduce pesticide and fertilizer impacts	0	1	4	0 of 1	
44			Water Pollution	NW2.3 Prevent surface and groundwater contamination	0	0	3	0 of 0	
45		BIODIVERSITY	Environmental	NW3.1 Preserve species biodiversity	0	1	3	0 of 1	No 11%
46			Environmental	NW3.2 Control invasive species	0	1	2	0 of 1	
47			Environmental	NW3.3 Restore disturbed soils	1	0	1	1 of 1	Yes 15%
48			Environmental	NW3.4 Maintain wetland and surface water functions	0	0	5	0 of 0	
				TOTAL	**7**	**5**	**34**	7 of 12	
49	CLIMATE	EMISSION	Air Pollution	CR1.1 Reduce greenhouse gas emissions	2	0	0	2 of 2	
50			Air Pollution	CR1.2 Reduce air pollutant emissions	2	0	0	2 of 2	
51			Resiliency-Climate Change	CR2.1 Assess climate threat	0	0	1	0 of 0	NA 74%
52			Resiliency-Climate Change	CR2.2 Avoid traps and vulnerabilities	2	0	0	2 of 2	
53		RESILIENCE	Resiliency-Climate Change	CR2.3 Prepare for long-term adaptability	0	0	1	0 of 0	
54			Resiliency-Climate Change	CR2.4 Prepare for short-term hazards	2	0	0	2 of 2	No 14%
55			Resiliency-Climate Change	CR2.5 Manage heat islands effects	0	1	0	0 of 1	Yes 15%
				TOTAL	**8**	**1**	**2**	8 of 9	
				Grand Total	**63**	**10**	**70**		