California Transportation Commission
Application for Toll Facility

STATE ROUTE 241/STATE ROUTE 91 (241/91)
EXPRESS CONNECTOR PROJECT

SUBMITTED BY:
FOOTHILL/EASTERN TRANSPORTATION CORRIDOR AGENCY (F/ETCA)

IN PARTNERSHIP WITH:
CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS) DISTRICT 12
ORANGE COUNTY TRANSPORTATION AUTHORITY (OCTA)
RIVERSIDE COUNTY TRANSPORTATION COMMISSION (RCTC)

PREPARED FOR:
CALIFORNIA TRANSPORTATION COMMISSION

SEPTEMBER 2025

San Joaquin Hills
Transportation
Corridor Agency
Chair: David Penaloza
Santa Ana

Transportation Corridor Agencies

Foothill/Eastern
Transportation
Corridor Agency
Chair: Patricia Kelley
Mission Viejo

September 17, 2025

Tanisha Taylor
Executive Director
California Transportation Commission
1120 North Street
Mail Station 52, Room 2233
Sacramento, CA 95814

RE: Toll Facility Application for the 241/91 Express Connector Project

Director Taylor,

On behalf of the Foothill/Eastern Transportation Corridor Agency (F/ETCA), with support from the county transportation commission, Orange County Transportation Authority (OCTA), and in coordination with Caltrans and the Riverside County Transportation Commission (RCTC), I am pleased to submit the enclosed toll facility application for the 241/91 Express Connector (241/91 EC) for consideration by the California Transportation Commission (CTC) in accordance with Assembly Bill (AB) 194 (Frazier, 2015) guidelines and codified in Streets and Highways Code Section 149.7. While F/ETCA has existing tolling authority for its existing facilities (State Routes (SR's) 133, 261, and 241) and capital improvement projects on these toll roads, this application for supplemental tolling authority is being submitted specifically for the 241/91 EC toll facility as the preferred tolling authority path for F/ETCA and partner agencies for this project and as continued demonstration of F/ETCA's commitment to transparency and coordination with our regional partners and public stakeholders. The content of this final application is the outcome of a collaborative effort with partner agencies and ongoing coordination with the California Transportation Commission since July 2024.

SR-241 is a toll road starting at the Oso Parkway interchange in south Orange County and extending to its northern terminus at SR-91 in the City of Anaheim. Tolling on SR-241 has been operated by F/ETCA for over 25 years, increasing the confidence that the 241/91 EC can be operated effectively and efficiently. The 91 Express Lanes is a four-lane, high-occupancy tolled facility (two lanes in each direction) located within the median of SR-91. The 91 Express Lanes extend from SR-55 in Orange County to Interstate (I) 15 in Riverside County. Tolling on the 91 Express Lanes is operated by OCTA in Orange County and RCTC in Riverside County. While the existing 241/91 interchange connects all lanes of the northbound (NB) and southbound (SB) SR-241 toll road to the non-tolled general-purpose lanes of eastbound (EB) and westbound (WB) SR-91, there is currently no direct connection between the SR-241 toll road and the 91 Express Lanes.

Demand on the north end of SR-241, where it meets SR-91, is a direct result of trips generated between major job centers in central Orange County (along SR's 241 and 261) and the more affordable housing areas in the Inland Empire (along SR-91). Origin-destination studies show 60% of observed trips using the interchange travel to points beyond the limits of the existing tolled facilities. Affirming the interregional nature of the SR-91 and SR-241 transportation corridors. Additionally, the lack of connectivity between the SR-241 toll road and the 91 Express Lanes requires weaving across SR-91 general-purpose lanes for users to transition between tolled facilities. This weaving adversely affects operations for all users by worsening the already congested SR-91 corridor during peak

Transportation Corridor Agencies

hours and further degrading regional movement of people, goods, and services in the high-demand SR-91 corridor. Direct improvements on the corridors along with enhancements to multi-modal transportation choices are necessary to improve the movement of people, goods, and services through these critical transportation corridors to and from Orange County and the Inland Empire to reduce congestion, provide options for commuters, and increase the operational efficiency of the SR-241 and SR-91 corridors.

The 241/91 EC is a direct tolled freeway-to-freeway connector with left-side exits and entrances from the NB SR-241 toll road to the EB 91 Express Lanes and from the WB 91 Express Lanes to the SB SR-241 toll road. The 241/91 EC will improve roadway operations by reducing weaving across EB SR-91 at the Orange-Riverside county line and decreasing queueing on NB SR-241 in the afternoon peak period, resulting in time savings up to 20 minutes for commuters. The effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and offers improvements to all users within the high-demand, interregional mobility transportation corridors. The 241/91 EC will improve regional mobility by increasing customer transportation choices, encouraging increased person throughput at peak demand hours, and increasing travel time savings within the network spanning two counties. As required by AB 194, the revenue generated by the 241/91 EC will directly fund repayment of project debt, operations, and maintenance. Any remaining revenue can be used to fund additional projects or programs for improvements to roadway operations and multi-modal options through an expenditure plan that will improve the functionality of the SR-241 and SR-91 corridors.

F/ETCA will fund the delivery and construction of the 241/91 EC using a loan from its unrestricted cash reserves. Other than the 241/91 EC, F/ETCA has no existing near-term obligations requiring these funds. However, F/ETCA expects to utilize the repayment of its 241/91 EC contribution to replenish these reserves so that the funds will be available to F/ETCA for uses under its existing legal authority such as early bond principal repayment or future capital projects outside of the 241/91 EC expenditure plan. The 241/91 EC is included in the F/ETCA Capital Improvement Plan (CIP), the 91 Implementation Plan, the Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), and the OCTA 2022 Long Range Transportation Plan (LRTP). These documents demonstrate the consistency of the 241/91 EC with adopted regional plans.

The enclosed application provides the information required to meet, and in some areas exceed, the minimum eligibility criteria established by AB 194 and the supporting information requested through the toll facility application guidelines. We appreciate your consideration of this toll facility application and enclosed materials and look forward to your support in delivering this critical project. If you need any additional information or have questions on the information in this submittal, please contact Stephanie Blanco (sblanco@thetollroads.com, 949-754-3454).

Sincerely,

Ryan Chamberlain
Chief Executive Officer
Transportation Corridor Agencies

TABLE OF CONTENTS

1. Minimum Eligibility Criteria 1
1.1. Improvement in Corridor Performance 1
1.2. Regional Transportation Plan 4
1.3. Regional Agency Coordination 5
1.4. Streets and Highways Code Section 149.7 Compliance 6
1.5. Project Initiation Document 6
1.6. Funding Plan 6
2. Supporting Information 7
2.1. Compliance with State Law 7
2.2. System Compatibility 11
2.3. Corridor Improvement 12
2.3.1. Existing Conditions 17
2.3.2. Anticipated Impacts 20
2.4. Technical Feasibility 24
2.4.1. Project Definition 24
2.4.2. Proposed Project Timeline 30
2.4.3. Operation 32
2.4.4. Federal Involvement 36
2.4.5. Maintenance 37
2.5. Financial Feasibility 37
2.5.1. Funding Plan 37
2.5.2. Expenditure Plan for Excess Revenues 39
2.6. Regional Transportation Plan & Community Support 40
2.6.1. Consistency with Existing Plans 40
2.6.2. Considerations of Impacts 41
2.6.3. Fulfilling Policies and Goals 42
2.6.4. Environmental Considerations 42
2.6.5. Community and Stakeholder Support 43
2.7. Supplementary Topics 44
2.7.1. Commission Annual Report to the Legislature 44
2.7.2. Performance Assessment 44
2.7.3. Procurement Approach 44
2.7.4. Cost Estimates 45
2.7.5. Equity 46
3. Supplemental Information 47
3.1. Term Sheet and Caltrans Support Letter (2019) 47
3.2. Project Study Report / Project Development Support (PSR/PDS) (2012) 47
3.3. Executed Project Cooperative Agreements (Caltrans) – PA/ED (2014), PS&E and Right of Way (2017) 47
3.4. Summary of Final Supplemental Environmental Impact Report/Environmental Impact Statement (2020) 47
3.5. 241/91 Express Lanes Connector Traffic Analysis Report (2015) 47
3.6. Letter of Consent (OCTA) (anticipated September 2025) 47

LIST OF FIGURES

Figure 2-1. Project Vicinity Map 12
Figure 2-2. County Inflows and Outflows 13
Figure 2-3. Trip Origin-Destination Study 14
Figure 2-4 Queue During PM Peak Period 19
Figure 2-5. Project Area 25
Figure 2-6 . Current and Proposed Toll Facilities Diagram 26
Figure 2-7. County Population Growth Patterns - 1970 to 2040 28

LIST OF TABLES

Table 2-1: Proposed Project Timeline 30
Table 2-2: Historical and Future Agreement Timeline 31
Table 2-3: Anticipated Application of Progressive Demand Management in Opening Scenario 34
Table 2-4: Project Cost and Identified Funding Sources 39
Table 2-5: Estimated Average (2029-2067) Annual Net Operating Toll Revenue (Year of Expenditure Dollars, $1,000,000) 39
Table 2-6: Modeled Regional GHG Emissions 43
Table 2-7: Project Cost Comparison 45

ACRONYMS AND ABBREVIATIONS

AAA	Advertise, Award, Administer
AB	Assembly Bill
AM	morning
CA MUTCD	California Manual of Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CAPTI	Climate Action Plan for Transportation Infrastructure
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CIP	Corridor Improvement Project
CMCP	Comprehensive Multimodal Corridor Plan
CO_2	Carbon Dioxide
CSS	coastal sage scrub
CTC	California Transportation Commission
CTP	California Transportation Plan
DMV	Department of Motor Vehicles
EB	Eastbound
ECOP	Eastbound Corridor Operations Project
EIR	environmental impact report
EIS	environmental impact statement
F/ETCA	Foothill/Eastern Transportation Corridor Agency
FHWA	Federal Highway Administration
FSP	Freeway Service Patrol
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GHG	greenhouse gas
GP	General-purpose
HDM	Highway Design Manual
HOV	high-occupancy vehicle
I-	Interstate
LOS	Level of Service
LRTP	long range transportation plan
MOU	Memorandum of Understanding
Mph	Miles per hour
NB	Northbound
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOP	Notice of Preparation
NTP	Notice to Proceed
O-D	Origin-Destination
O&M	Operations & Maintenance
OCTA	Orange County Transportation Authority
PA/ED	Project Approval/Environmental Document
PDM	progressive demand management
PDT	project development team
PII	personally identifiable information

ACRONYMS AND ABBREVIATIONS

PM	afternoon
PR	Project Report
PRM	Project Risk Management
PS&E	Plans, Specifications and Estimates
PSR/PDS	Project Study Report-Project Development Support
RCTC	Riverside County Transportation Authority
RFID	radio frequency identification
ROW	right-of-way
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SB	Southbound
SCAG	Southern California Association of Governments
SR-	State Route
TCM	Transportation Control Measure
TOC	Traffic Operations Center
TSP	Toll System Provider
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
WB	Westbound

1. MINIMUM ELIGIBILITY CRITERIA

The Commission must find, at a minimum, that the criteria identified in AB 194 are met. Therefore, every application should clearly discuss how it meets the following minimum criteria:

1.1. Improvement in Corridor Performance

1. A demonstration that the proposed toll facility will improve the corridor's performance by, for example, increasing passenger throughput or reducing delays for freight shipments and travelers, especially those traveling by carpool, vanpool, and transit.

Description of transportation corridors and 241/91 EC

SR-241 was approved and constructed as part of a unified Eastern Transportation Corridor (ETC) that also includes SR's 133 and 261 as an interconnected, tolled transportation corridor under the ETC environmental document approval in 1992. The initial construction of the ETC included multimodal improvements at local interchanges and the ultimate build-out concept includes accommodation for future carpool and transit facilities. The F/ETCA develops and approves a Capital Improvement Plan (CIP) annually which reflects the scope, schedule, and cost of projects for the ultimate build-out. The 91 Express Lanes transportation corridor has been identified and analyzed between SR-55 and I-15 since the 2003 inception of the 91 Implementation Plan, the guiding planning document for the corridor. The 91 Implementation Plan inventories projects across all modes that can contribute to the enhanced freeway capacity and/or improved mobility for SR-91. Both the ETC and 91 Express Lanes transportation corridors are connected by this project, the 241/91 EC.

Demand on the north end of SR-241, where it meets SR-91, is a direct result of trips generated between major job centers in central Orange County (along SR's 241 and 261) and the more affordable housing areas in the Inland Empire (along SR-91). Origin-destination studies show 60% of observed trips using the interchange travel to points beyond the limits of the existing tolled facilities. Affirming the interregional nature of the SR-91 and SR-241 transportation corridors. Direct improvements on these transportation corridors along with enhancements to multi-modal transportation choices are necessary to improve the movement of people, goods, and services through these critical transportation corridors to and from Orange County and the Inland Empire to reduce congestion, provide options for commuters, and increase the operational efficiency of the SR-241 and SR-91 corridors.

The 241/91 EC is a direct tolled freeway-to-freeway connector with left-side exits and entrances from the NB SR-241 toll road to the EB 91 Express Lanes and from the WB 91 Express Lanes to the SB SR-241 toll road. The 241/91 EC is identified as a project in F/ETCA's CIP and the 91 Implementation Plan. The effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and will offer improvements to all users within the high-demand, interregional mobility transportation corridors. Highway improvements, such as the 241/91 EC, result in improved operations and better throughput for passenger and freight vehicles. Coupled with projects and programs that address transportation demand management and multi-modal improvements can further optimize the performance and functionality of SR-241 and SR-91 corridors.

Operational performance metrics, defined below for the 241/91 EC, will maintain reliable travel times and operating conditions in the tolled facilities. These metrics will be controlled by an innovative approach termed progressive demand management[1] which are strategies that were developed from the 241/91 EC operational analyses.

- Maintaining at 60 miles per hour or more in the 91 Express Lanes critical zones
- Managing volumes to no more than 1,500 vehicles per hour on the 241/91 EC in either direction (north-to-east or west-to south)
- Managing volumes at the EB County Line egress to no more than 200 vehicles per hour
- Managing queue length not to exceed 100 vehicle storage at the Toll Connector Meter
- Monitoring performance of EB 91 Express Lanes East End conditions

The 241/91 EC will improve regional mobility by increasing customer transportation choices, encouraging increased person throughput at peak demand hours, and increasing travel time savings within the network spanning across two counties. These operational improvements improve system efficiency resulting in more fuel-efficient traffic operations and reduction of carbon dioxide (CO_2) emissions. Additionally, the 241/91 EC reduces friction in the SR-91 general-purpose lanes by reducing existing merging and weaving movements and decreases average queueing for the 241/91 NB connector; these effects improve the overall operations for SR-91 and SR-241 and will help reduce congestion and congestion related collisions such as sideswipe and rear-ends.

Improved operations in the transportation corridors – reduced delays for freight shipments and travelers

The initial traffic study area for the 241/91 EC included SR-91 from west of the Weir Canyon Road interchange in Anaheim Hills to east of the Serfas Club Drive/Auto Center Drive interchange in Corona, SR-241 from north of the Santiago Canyon Road interchange, and SR-71 south of the Butterfield Ranch Road interchange. Prior to project approval, the traffic study area was expanded to include the SR-91 corridor from SR-55 to McKinley St, east of I-15 since it was determined that the 241/91 EC influences traffic behavior throughout the existing 91 Express Lanes corridor and to verify results of the initial traffic study. As project delivery progressed in final design, operational analyses scenarios were identified to further define the operational parameters and performance metrics necessary for efficient 241/91 EC operations and quantify network-wide benefits of the 241/91 EC. It is important to note for those unfamiliar with the existing 91 Express Lanes that access to the express lane facility is allowed at just three points along the 17-mile system - generally in the vicinity of SR-55, at the Orange-Riverside county line and in the vicinity I-15. As the 241/91 EC connects with the 91 Express Lanes west of the Orange-Riverside county line, for peak period NB SR-241 to EB SR-91 traffic on the 241/91 EC, the impact to EB SR-91 traffic can be felt upstream (or west of SR-55) as that is the point that 91 Express Lanes demand is managed prior to entering the facility. Analysis of existing conditions revealed key travel patterns: WB on SR-91 in the morning (AM) and EB in the afternoon (PM), with SR-241 volumes primarily moving south in the AM and north in the PM. In the AM peak, WB speeds are congested at 25-35 miles per hour (mph) east of the 241/91 interchange but recover to over 55 mph west of the interchange. In the PM peak, EB speeds drop significantly, averaging below 35 mph throughout the area and below 20 mph near the 241/91 interchange. The 241/91 EC decreases congestion, improves throughput, travel speeds and reduces delay, particularly in the WB direction.

[1] Progressive demand management are the operational control strategies that will be applied to the 241/91 EC to effectively manage demand such that the expected performance metrics are achieved. Strategies to be applied include Dynamic Pricing, Toll Connector Meter, HOV-only mode, and Bus/Registered Vanpool mode. See Section 2.4.3 for more detail.

Network-wide, vehicle hours traveled improves for all vehicles traveling in the peak direction in both the ELs and GP lanes in the study area.

- On westbound SR-91, average weekday morning travel time savings between SR-55 and I-15 are anticipated to be about 27 minutes across the peak period.
- On eastbound SR-91, average weekday afternoon travel time savings between SR-55 and I-15 are anticipated to be about 28 minutes across the peak period. On Fridays (and sometimes Thursdays) SR-91 eastbound travel time savings between SR-55 and I-15 are anticipated to be about 3 minutes across the peak period.
- The ingress/egress area for Express Lane traffic near the County Line, described as the "mixing bowl," average travel speeds along SR-91 are anticipated to improve up to 30 mph (from 30 mph to 60 mph) in the Horizon Year during peak periods.
- On SR-241, a 2.5-to-5-mile reduction of north-to-east connector queue is anticipated and travel time savings of 22 to 55 minutes for 241/91 EC and GP connector users is anticipated.

As a major freight corridor serving seaports and inland ports, these improvements to SR-91 enhance the region's economic vitality and ability to compete in the global markets. As a multi-modal commuting corridor, these improvements to SR-91 and SR-241 also serve to connect commuters from the Inland Empire to jobs in Orange and Riverside counties.

See Section 2.3.2 for more on traffic analyses results.

Demonstrating improved operations – reducing weaving and potential collisions

While the existing 241/91 interchange connects the SR-241 toll road to the non-tolled general-purpose lanes of SR-91, there is currently no direct connection between the SR-241 toll road and the 91 Express Lanes. The lack of connectivity between the SR-241 toll road and the 91 Express Lanes requires weaving across five SR-91 general-purpose lanes for users to transition between tolled facilities. This weaving of over 350 vehicles during the peak hour adversely affects operations for all users by worsening the already congested SR-91 corridor during peak hours and further degrading regional movement of people, goods, and services in the high-demand SR-91 corridor.

The 241/91 EC collision analysis indicates that, within the project area, there are five segments on SR-91 and five segments on SR-241 with greater than average statewide collision rates. The highest percentage of reported types of collisions for the segments are rear end and sideswipe collisions. 32% of collisions in these areas were rear end collisions and 19% of collisions were side swipe collisions during congested peak hours (6 AM to 9 AM and 3PM to 6PM), suggesting congestion may have been a primary reason for these collisions.

The 241/91 EC project need identifies existing weaving operations between the GP connectors and the median Express Lanes as a concern because the weaving contributes to sideswipe collisions, and also because the weaving degrades the level of service (LOS) due to increased density. The approved 241/91 EC project purpose affirms that direct access between toll facilities, provided by the 241/91 EC, will improve traffic flow and operations by reducing weaving across multiple SR-91 GP lanes between the SR-91 Express Lanes and the SR-241 GP lane connectors. The occurrence of sideswipe and rear end collisions may be mitigated by these improvements.

Increasing passenger throughput and encouraging carpool, vanpool, and transit

Partner agencies have also agreed that buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder, will travel toll-free at all

times on the 241/91 EC. High-Occupancy Vehicles (HOV) with three or more passengers (3+) will travel toll-free except during weekday peak periods[2]. During peak periods, HOV 3+ will pay full toll to better manage peak period demand in accordance with expected available capacity on the 91 Express Lanes. Electric vehicles and motorcycles will pay full tolls at all times.

Opportunities for further transportation system improvements

Excess revenue may be generated by the 241/91 EC. In compliance with SHC 149.7, "all remaining revenue generated by the toll facility shall be used in the corridor from which the revenue was generated pursuant to an expenditure plan developed by the sponsoring agency." In partnership with OCTA, RCTC, and Caltrans, F/ETCA will coordinate and prioritize the use of all remaining revenue generated by the 241/91 EC in the corridors from which the revenue was generated. The expenditure plan shall be incorporated as part of the F/ETCA Capital Improvement Plan (CIP) and be adopted annually by the F/ETCA Board of Directors. F/ETCA shall submit the CIP to OCTA for consistency review with the Regional Transportation Plan and related programs.

It is anticipated that excess revenue expenditure will include a variety of projects and programs to improve operations to all users within the high-demand, interregional mobility transportation corridors. Not limited to capital projects on the highway system, it is envisioned that multimodal projects, transportation control measures, and travel demand management programs will be eligible expenditures to increase vehicle occupancy and manage demand within the broader transportation corridors.

The 241/91 EC is part of the SR-91 Implementation Plan and the State Route 91 Comprehensive Multimodal Corridor Plan (CMCP), each of which includes improvements across Orange and Riverside counties. The CMCP, completed in 2022, is a multi-modal assessment that expands on projects and programs included in the OCTA LRTP. The plan defines characteristics of the corridor including demographics, economic data, disadvantaged and low-income communities, employment, existing facilities, and land uses. The purpose of the plan is to establish current conditions and needs along the corridor and identify a range of improvements. The Plan is intended to provide transportation choices for residents, commuters, and visitors to the corridor area. The SR-91 Implementation Plan, in compliance with AB 1010 and Senate Bill 1316, establishes a program of potential improvements to improve operations in the SR-91 corridor. The 241/91 EC has been included in the SR-91 Implementation Plan since the plan's inception in 2003.

1.2. Regional Transportation Plan

2. A requirement that the proposed toll facility is contained in the constrained portion of a conforming regional transportation plan prepared pursuant to Section 65080 of the Government Code.

The 241/91 EC is included in the current Orange County Transportation Authority (OCTA) Long-Range Transportation Plan (LRTP) – Directions 2045 (dated May 2023) and in the Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), adopted in April 2024 (Project ID ORA111207). See Section 2.6 for more on the 241/91 EC's compatibility with regional plans.

[2] During peak periods (below, subject to change based on demand), HOV 3+, pay full toll.
EB - Monday through Thursday 2-6 PM; Friday 1-7 PM
WB - Monday through Thursday 5-9 AM; Friday toll-free all day

1.3. Regional Agency Coordination

3. For projects involving the state highway system, evidence of cooperation between the applicable regional transportation agency and Caltrans. Examples of acceptable evidence of cooperation could be in the form of a completed cooperative agreement or a signed letter between the parties to demonstrate that the parties are working cooperatively on the development of the toll facility.

The Foothill/Eastern Transportation Corridor Agency (F/ETCA) is working in partnership with the California Department of Transportation (Caltrans), OCTA, and the Riverside County Transportation Commission (RCTC) on the 241/91 EC. A Project Study Report/Project Development Support (PSR/PDS) document was developed by F/ETCA and approved by Caltrans in 2012. Cooperative agreements between F/ETCA and Caltrans were executed May 2014 for the preparation of the Project Approval/Environmental Document (PA/ED) and February 2017 for the preparation of construction plans, specifications, estimates and right of way.

Since December 2017, all partner agencies have collaborated on the analysis and coordinated on planned/adjacent projects. The partnership was further solidified when each agency's respective Board formally approved the 241/91 Express Lanes Connector Term Sheet in 2019:

- OCTA's Board of Directors approved the term sheet on October 7, 2019
- F/ETCA's Board of Directors approved the term sheet on October 10, 2019
- RCTC's Board of Commissioners approved the term sheet on November 13, 2019

Additionally, as a partner to the arrangement, Caltrans provided a letter of support on the term sheet on September 26, 2019.

This partnership among OCTA, RCTC, Caltrans, and F/ETCA demonstrates the willingness of all agencies to proactively collaborate to deliver a regionally significant transportation improvement. Partners have agreed to the following division of responsibilities in the Term Sheet:

- F/ETCA to complete final design of the project with Caltrans oversight.
- Caltrans has final design approval of the project.
- F/ETCA will provide OCTA and RCTC ample opportunity to review and concur with all aspects of the final design.
    - Caltrans and F/ETCA shall consider all reasonable comments and requests from OCTA and RCTC, and OCTA and RCTC comments and requests to Caltrans and F/ETCA shall be fair and reasonable.
    - Caltrans District 12 to Advertise, Award, Administer (AAA) construction phase.

F/ETCA will fund the delivery and construction of the 241/91 EC using what amounts to a loan from its unrestricted cash reserves (see Section 2.5.1 for more detail) and operate the 241/91 EC; Caltrans will advertise, award, and administer the construction contract for the 241/91 EC; and OCTA and RCTC will coordinate with F/ETCA on the tolling operations of the connector in conjunction with the 91 Express Lanes system. Agreements associated with these matters are being finalized in a Master Agreement, Operating Agreement, Maintenance Agreement, Toll Facility Agreement, and various cooperative agreements among the agencies. See Section 2.4.2 for more on agreement timelines.

The PSR/PDS, Term Sheet, and Caltrans cooperative agreements are included as attachments to this application.

1.4. Streets and Highways Code Section 149.7 Compliance

4. A discussion of how the proposed toll facility meets the requirements of Streets and Highways Code Section 149.7.

This application for the 241/91 EC was prepared in compliance with the requirements outlined in California Streets and Highways Code Section 149.7 (SHC 149.7). The 241/91 EC meets all eligibility criteria set forth in the guidelines established by the Commission. See Section 2.1 for a detailed description of the 241/91 EC's compliance with each guideline, including how the 241/91 EC will be developed and operated in compliance with other state laws.

F/ETCA has tolling authority for its existing facilities (SR's 133, 261, and 241) and capital improvement projects on these toll roads. This application's supplemental tolling authority is being submitted specifically for the 241/91 EC facility for several reasons:

- Expand opportunities to use excess net toll revenue for projects and programs that would further improve conditions beyond the current ETC system to benefit the wider transportation system that is affected by the 241/91 EC connection
- Increased public transparency and opportunity to hear public input
- Ensuring tolling operations are maintained through a term consistent with the SR-91 Express Lanes

1.5. Project Initiation Document

5. A complete project initiation document for the proposed toll facility.

A PSR/PDS was completed and approved by Caltrans on January 12, 2012, and serves as the Project Initiation Document for the 241/91 EC. A copy is included as an attachment to this application.

1.6. Funding Plan

6. A complete funding plan for development and operation of the toll facility.

F/ETCA will fund the delivery and construction of the 241/91 EC using a loan from its unrestricted cash reserves (see Section 2.5.1 for more detail). The 241/91 EC tolling operations and facility maintenance requirements are to be funded from 241/91 EC toll revenues.

2. SUPPORTING INFORMATION

In evaluating applications, the Commission will consider all provided information to determine whether to approve the proposed toll facility. Accordingly, in conjunction with responding to the statutorily defined minimum criteria, applicants are strongly encouraged to provide more information than necessary to meet the minimum criteria.

2.1. Compliance with State Law

Has the applicant demonstrated that the proposed project is consistent with the established standards, requirements, and limitations that apply to the toll facilities in Section 149.7 of the Streets and Highways Code as well as all other applicable sections of state law?

F/ETCA is submitting this application in compliance with SHC 149.7 of the California Streets and Highways Code. The application's compliance with the minimum requirements for California Transportation Commission (CTC) approval under SHC 149.7(c) is outlined in Section 1.

The 241/91 EC will also be subject to the additional requirements described in SHC 149.7(e) of the Streets and Highways Code, addressed below.

Throughout this application various references are made to the toll facilities that are connected to the 241/91 EC, namely SR-241 toll road and the 91 Express Lanes. It is important to note that this application is specific to the project features and tolling authority of the 241/91 EC. This application has no effect on F/ETCA's existing toll authority and related responsibilities, commitments, agreements, etc. for SR-241 toll road or OCTA and RCTCs separate existing toll authority and related responsibilities, commitments, agreements, etc. for the 91 Express Lanes.

1. **A regional transportation agency sponsoring a toll facility shall enter into an agreement with the Department of the California Highway Patrol (CHP) that addresses all law enforcement matters related to the toll facility, including reimbursement of enforcement costs.**

   CHP is the traffic violation enforcement and incident management lead for SR-241 and SR-91, and CHP enforcement and turnaround areas will be utilized at each end of the 241/91 EC. An incident management plan between F/ETCA, Caltrans, OCTA, RCTC, and CHP will be coordinated and developed with all partners to clearly define the incident management and enforcement responsibilities involving the operations of the 241/91 EC, which includes progressive demand management CHP will make the final decisions on roadway closures due to emergencies and traffic management measures for clearing incidents, in the interest of public safety or investigations. F/ETCA will amend, as needed, its existing agreements with CHP for enforcement on its tolled facilities. See Section 2.4.3 for additional detail.

2. **A regional transportation agency sponsoring a toll facility shall enter into an agreement with Caltrans that addresses all matters related to design, construction, maintenance, and operation of the toll facility, including, but not limited to, liability, financing, repair, rehabilitation, and reconstruction.**

   A PSR/PDS was approved by Caltrans in 2012 initiating the 241/91 EC project. Subsequently, F/ETCA and Caltrans executed cooperative agreements for the planning, design, and right-of-way for the 241/91 EC. In 2019, a Term Sheet was developed and adopted by F/ETCA, OCTA, and RCTC, with a support letter from Caltrans solidifying the partnership between the four agencies and

providing terms for project delivery, funding, construction, maintenance, and operation for the 241/91 EC. The four agencies are currently finalizing a Master Agreement to specify and document each stakeholder's roles and responsibilities for ownership, operations, and ongoing maintenance of the 241/91 EC. Upon tolling authority being granted by the CTC per this application, F/ETCA and Caltrans will enter into a Toll Facility Agreement to capture the ongoing maintenance obligations and toll collection sunset. Upon execution of a Toll Facility Agreement and prior to opening the 241/91 EC to traffic, a separate Express Connector Maintenance Agreement between F/ETCA and Caltrans will detail the limits of 241/91 EC maintenance responsibilities, annual work planning, budgeting, and reimbursement. Additionally, a separate Construction Cooperative Agreement between F/ETCA and Caltrans will detail the responsibilities and reimbursement for the advertisement, award, and administration of the construction phase. See Sections 2.4.3 and 2.4.5 for additional detail.

3. **That the sponsoring agency shall be responsible for activities related to toll collection.**

   F/ETCA will serve as the 241/91 EC operator. This includes operations of the roadside and back-office tolling infrastructure, customer service center, tolling back-office procedures and the overall toll and traffic monitoring system, as well as the maintenance of the toll system that includes the tolling infrastructure, toll collections, and violations processing.

   To ensure optimal regional mobility and maintain performance metrics on the 91 Express Lanes with the operations of the 241/91 EC, F/ETCA is working with OCTA and RCTC to develop and approve an Operating Agreement. The agreement will include the operating requirements for the 241/91 EC including performance metrics and monitoring, progressive demand management details, maintenance of tolling infrastructure, and governance of operations. OCTA and RCTC shall have final approval of the dynamic pricing algorithms, input values, and traffic measurement/monitoring locations as necessary to support demand management measures including dynamic pricing systems and algorithms, toll connector meters, and occupancy restrictions.

4. **That the revenue generated from the operation of the facility will be used to cover direct expenses related to debt issued to construct the toll facility and direct expenses related to the "development, maintenance, repair, rehabilitation, improvement, reconstruction, administration, and operation of the toll facility" and a reserve fund with all remaining funds used in the corridor pursuant to an expenditure plan developed by the sponsoring agency.**

   F/ETCA is committed to managing the 241/91 EC toll revenue in accordance with the requirements of SHC 149.7. The toll revenue generated by the 241/91 EC shall be available to F/ETCA for direct expenses associated with scheduled repayment of F/ETCA's loan for the 241/91 EC, operating and maintenance costs, and the corresponding reserves. Remaining revenue generated by the 241/91 EC (excess revenue) will be used for additional projects and programs in the corridor from which the revenue was generated (see Section 2.5.2 for discussion of revenue-eligible corridors). Use of 241/91 EC toll revenue as described in this paragraph (i.e., the toll revenue "waterfall") and evaluation criteria for projects and programs considered for use of excess revenue will be developed by F/ETCA, with input from Caltrans, OCTA, and RCTC, will be incorporated as part of the F/ETCA Capital Improvement Plan and be adopted annually by the F/ETCA Board of Directors.

As described in Section 1.1, the 241/91 EC is a key connection to the unified ETC and to the interregional freight and commuting corridor of SR-91; the effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and will offer improvements to all users within the high-demand, interregional mobility transportation corridors. Therefore, the use of excess revenue from the 241/91 EC may include investments across the transportation corridors improved by the key connection of the 241/91 EC, including multimodal projects outside of the highway right of way, for projects or programs that maintain or improve the safety, operation, or travel reliability for any transportation mode or provide for improve travel options; all uses of excess revenue within the corridors will be consistent with Streets and Highways Code (SHC) Section 149.7, 23 U.S. Code § 129, and the defined limits as established in the environmental document and supporting technical studies (e.g., Traffic Analysis Report). Evaluation criteria for projects and programs considered for use of excess revenue will be developed by F/ETCA, with input from Caltrans, OCTA, and RCTC, as part of the preparation of the expenditure plan. Revenue-eligible corridors will be defined in accordance with SHC 149.7.

5. **For any project under this section involving the conversion of an existing high-occupancy vehicle lane to a high-occupancy toll lane, the sponsoring agency shall demonstrate that the project will, at a minimum, result in expanded efficiency of the corridor in terms of travel time reliability, passenger throughput, or other efficiency benefit.**

   The 241/91 EC is a new, fully tolled connector between two existing tolled facilities and is not a conversion from an existing high occupancy vehicle facility.

6. **That the sponsoring agency will provide information to the Commission or Legislative Analyst upon request.**

   F/ETCA recognizes that the Commission is obligated by SHC 149.7(h), as amended by AB 194, to report to the State Legislature annually the progress in the development and operation of each toll facility approved under that section. F/ETCA will provide information as requested in support of CTC reporting requirements for the 241/91 EC such as:

   - A progress report for the 241/91 EC project improvements.
   - A comparison of the 241/91 EC project improvements baseline budget and the current or projected budget.
   - A comparison of the current or projected schedule and the baseline schedule.
   - If construction is complete and operations have begun, a discussion of the operations of the facility and how actual performance compares to the 241/91 EC original expected performance.
   - A discussion of any other issues identified, and actions taken to address those issues.

7. **That a regional transportation agency may issue bonds to finance construction and construction-related expenditures but that the bond must not pledge the full faith and credit of the State of California.**

   Per the 2019 Term Sheet agreed to by F/ETCA, Caltrans, OCTA, and RCTC, any of the parties that contribute funds to the 241/91 EC will receive payback including interest. Through the project development process, it was determined that only F/ETCA will fund the delivery and construction of the 241/91 EC using a loan from its unrestricted cash reserves. There will be no use of State

funds or liabilities to the State for the construction, operation or maintenance of the 241/91 EC. See Section 2.5.1 for more detail.

8. **That a regional transportation agency will consult with local transportation authorities and congestion management agencies whose jurisdictions include the toll facility.**

   F/ETCA, and partner agencies Caltrans, OCTA, and RCTC, have met with local jurisdictions, resource agencies, the Federal Highway Administration (FHWA), and councils of government along the SR-241 and SR-91 corridors during the PA/ED and final design processes. Over the past two years, F/ETCA has worked closely with partner agencies at weekly meetings on technical and policy topics for the construction, operation, and maintenance of the 241/91 EC. Coordination will continue throughout further project development and during operations. See Section 2.6.5 for more detail.

9. **Additional supplementary information.**

   Clean Air Vehicle Requirements
   Partner agencies have agreed that municipal transit buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder, will travel toll-free at all times. High-Occupancy Vehicles (HOV) with three or more passengers (3+) will travel toll-free except during weekday peak periods[3] on the 241/91 EC. During peak periods, HOV 3+ will pay full toll to better manage peak period demand in accordance with expected available capacity on the 91 Express Lanes. Electric vehicles and motorcycles will pay full tolls at all times.

   Sections 21655.9 and 5205.5 of the California Vehicle Code provide for use of exclusive or preferential HOV lanes to vehicles displaying stickers issued by the Department of Motor Vehicles for vehicles meeting specified low and zero emissions standard regardless of vehicle occupancy. Both Sections are to be repealed as of January 1, 2027, by their own provisions. Because the 241/91 EC is scheduled to open to traffic in 2028, the referenced California Vehicle Code sections would no longer be applicable: single-occupant vehicles, even those adhering to low and zero emissions standards, will be tolled as single-occupant vehicles.

   Privacy of Personal Account Information
   F/ETCA has operated toll roads within Orange County since the first road segment opened in 1993. The Agency has robust protocols and security for personally identifiable information (PII). Consistent with existing tolling practices and procedures, during operations of the 241/91 EC, F/ETCA and its contractors will process all toll transactions and maintain all accounts. Privacy of personal account information will be strictly maintained and will comply with all applicable state and federal statutes, rules, and regulations consistent with the current F/ETCA tolling procedures.

   Utility Relocation and Right of Way (ROW) Acquisitions
   The 241/91 EC is designed with elements that require ROW acquisitions and utility relocations. These are being completed under the authority and guidance of local, state, and federal law, policies, and procedures. Federal compliance includes adherence to the Uniform Relocation

[3] During peak periods (below, subject to change based on demand), HOV 3+, pay full toll.
EB - Monday through Thursday 2-6 PM; Friday 1-7 PM
WB - Monday through Thursday 5-9 AM; Friday toll-free all day

Assistance and Real Property Acquisition Policies Act (the Uniform Act) and the *Code of Federal Regulations* (CFR) Section 49, Part 24. Any property acquisitions shall also be guided by the Caltrans Right of Way Manual. If legal proceedings are required to retain property rights, the entity responsible for right of way acquisition shall comply with all relevant state and federal constitutional provisions, statutory and case law, including but not limited to the California Code of Civil Procedure Section 1230.010-1273.050 (Eminent Domain Law) as well as any applicable Relocation Assistance requirements.

Caltrans and FHWA Design Criteria
The design of the 241/91 EC is subject to the standards outlined in the Caltrans Highway Design Manual (HDM), the California Manual of Uniform Traffic Control Devices (CA MUTCD), and FHWA design criteria. Design features that deviate from standards defined as boldfaced or underlined standards in these manuals and design criteria will require Caltrans and FHWA approval and a Design Standard Decision Document providing the justification for the deviation will be prepared for approval by Caltrans.

As mentioned previously, cooperative agreements between F/ETCA and Caltrans were executed May 2014 for the preparation of the PA/ED and February 2017 for the preparation of construction plans, specifications, estimates and right of way. Caltrans is reviewing the facility design to ensure compliance with requirements for the State Highway System.

2.2. System Compatibility

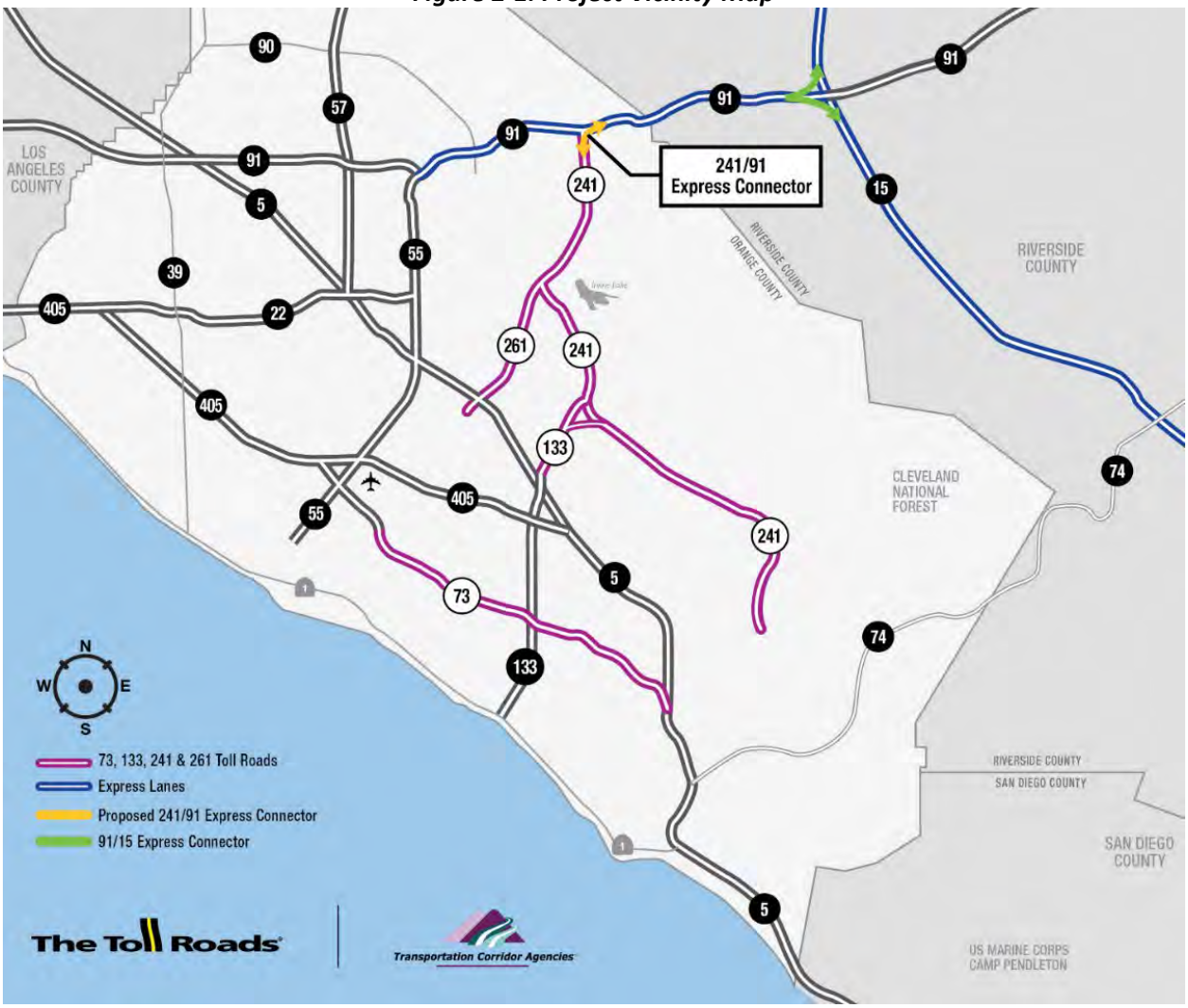
If on the state system, has the applicant demonstrated that the project is consistent with State Highway System requirements? Does this project propose improvements that are compatible with the present and planned transportation system? Does the project provide continuity with existing and planned state and local facilities?

The 241/91 EC is included in the financially constrained portion of the adopted SCAG 2024 RTP/SCS as an Express Lane direct connector. As part of its goals to close gaps and improve highway access and connectivity, the RTP/SCS proposes a regional Express Lanes network that includes the 241/91 EC. The 241/91 EC is included in OCTA's 2022 LRTP, described as adding an express lane connector at 91/241. The 2024 SR-91 Implementation Plan also identifies the 241/91 EC as a means to address several existing deficiencies within the SR-91 corridor.

The 241/91 EC design is aligned with other planned improvements in the area including the Interstate (I) 15/91 Express Lanes Connector and the SR-71/SR-91 Interchange Project. In addition to these improvement projects, the 241/91 EC is designed in coordination with multiple Caltrans maintenance and improvement projects currently in development on both the SR-241 and SR-91 corridors and the 241/91 EC is designed to accommodate future planned improvements to SR-91, including the SR-91 Eastbound Corridor Operations Project (91 ECOP).

The 241/91 EC project vicinity is shown in Figure 2-1.

Figure 2-1. Project Vicinity Map



2.3. Corridor Improvement

AB 194 specified the Legislature's intent that highway tolling should be employed for the purpose of optimizing the performance of the transportation system on a transportation corridor and should not be employed strictly as a revenue generating facility. Has the applicant provided compelling evidence that demonstrates that the proposed toll facility will significantly improve the corridor's performance?

Description of transportation corridors and 241/91 EC

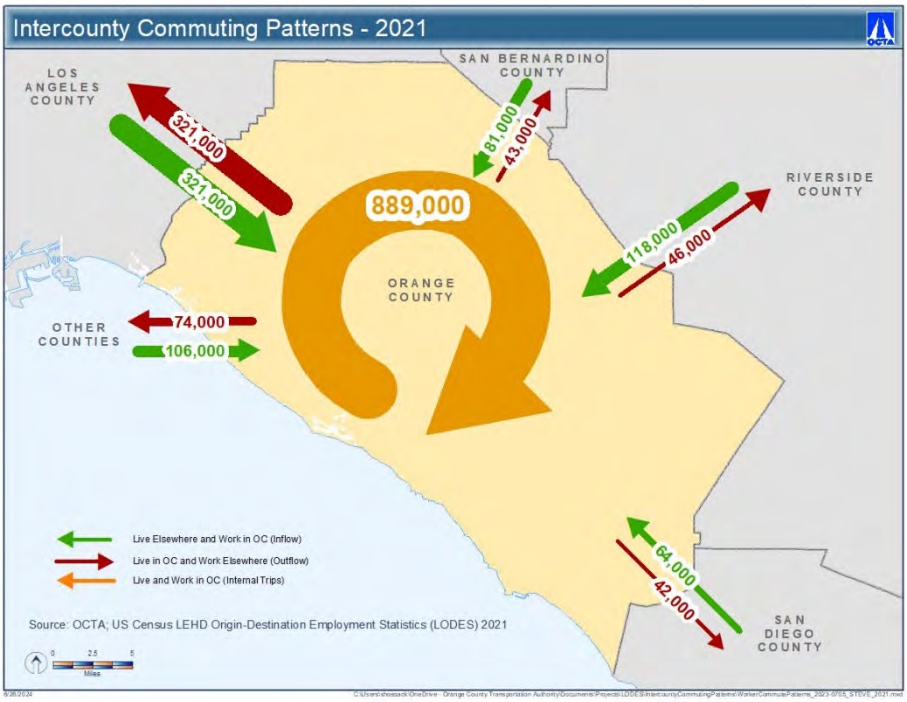
SR-241 was approved and constructed as part of a unified ETC that also includes SR's 133 and 261 as an interconnected, tolled transportation corridor under the ETC environmental document approval in 1992. The initial construction of the ETC included multimodal improvements at local interchanges and the ultimate build-out concept includes accommodation for future carpool and transit facilities. The F/ETCA develops and approves a CIP annually that describes the scope, schedule, and cost of projects of the ETC's ultimate build out. The 91 Express Lanes transportation corridor has been identified and analyzed between SR-55 and I-15 since the 2003 inception of the 91 Implementation Plan, the guiding planning document for the corridor. The 91 Implementation Plan inventories projects across all modes that can contribute to the enhanced freeway capacity and/or improved mobility for SR-91. Both the ETC and 91

Express Lanes transportation corridors are connected by this project, the 241/91 EC, as illustrated in Figure 2-1.

The growing population and relatively affordable housing market in Riverside County and beyond, coupled with increasing employment opportunities in Orange County, have resulted in a continued pattern of large numbers of Riverside County residents commuting to jobs in Orange County each weekday. Based on regional population and employment projections, this commute pattern is expected to continue into the future. SR-91 is the only significant highway corridor that provides the home-to-work connection for Riverside County residents working in Orange County. The average traffic volume on the SR-91 at the Orange-Riverside county line is approximately 328,000 vehicles per day.

Orange County commute inflows and outflows are presented in Figure 2-2.

Figure 2-2. County Inflows and Outflows



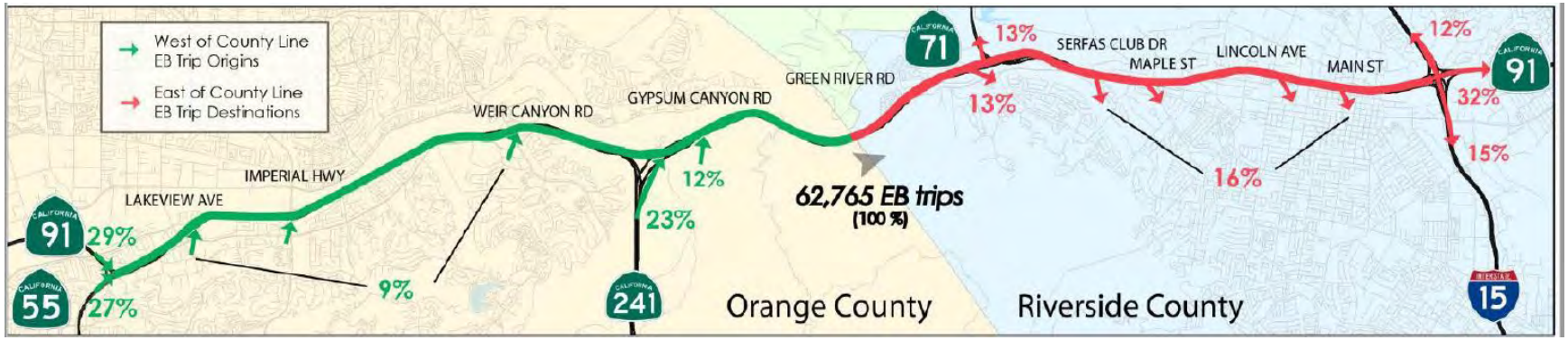
Source: https://ocbc.org/wp-content/uploads/2021/09/2021-OC-Community-Indicators-Report.pdf

An origin-destination study performed for the project indicated that approximately 60% of the observed trips travel beyond the study area limits. Further affirming the interregional nature of the SR-91 transportation corridor. These trip origin-destination study results are illustrated in Figure 2-3.

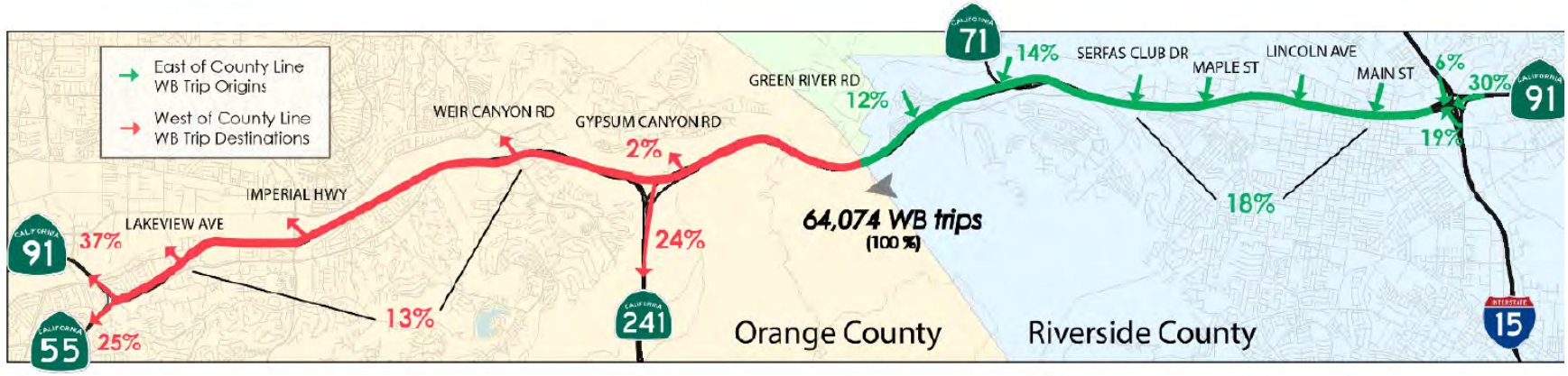
See Section 2.3.1 for additional information on the existing conditions.

Figure 2-3. Trip Origin-Destination Study

Eastbound



Westbound



The 241/91 EC will address operational deficiencies between SR-241 and SR-91 by enhancing the functionality of the existing 241/91 interchange from the WB 91 Express Lanes merging onto SB SR-241 toll road and from NB SR-241 toll road merging onto the EB 91 Express Lanes. SR-241 is a toll road, operated by F/ETCA, and SR-91 is a major regional freeway link with high occupancy tolled express lanes located in the median for both the EB and WB directions (91 Express Lanes). Currently, there is no direct connection from the WB 91 Express Lanes merging onto SB SR-241 toll road or from NB SR-241 toll road merging onto the EB 91 Express Lanes. Without this connection, users must weave across the congested SR-91 GP lanes to transition between the two tolled facilities.

The 241/91 EC is a direct tolled freeway-to-freeway connector with left-side exits and entrances from the NB SR-241 toll road to the EB 91 Express Lanes and from the WB 91 Express Lanes to the SB SR-241 toll road. The 241/91 EC is identified as a project in F/ETCA's CIP and the 91 Implementation Plan. The effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and will offer improvements to all users within the high-demand, interregional mobility transportation corridors. The 241/91 EC will improve regional mobility by increasing customer transportation choices, encouraging increased person throughput at peak demand hours, and increasing travel time savings within the network spanning across two counties. These operational improvements improve system efficiency resulting in more fuel-efficient traffic operations and reduction of carbon dioxide (CO_2) emissions. Additionally, the 241/91 EC reduces friction in the SR-91 general-purpose lanes by reducing existing merging and weaving movements and decreases average queueing for the 241/91 NB connector; these effects improve the overall operations for SR-91 and SR-241 and will help reduce congestion and congestion related collisions such as sideswipe and rear-ends.

Improved operations in the transportation corridors – reduced delays for freight shipments and travelers

The initial traffic study area for the 241/91 EC included SR-91 from west of the Weir Canyon Road interchange in Anaheim Hills to east of the Serfas Club Drive/Auto Center Drive interchange in Corona, SR-241 from north of the Santiago Canyon Road interchange, and SR-71 south of the Butterfield Ranch Road interchange. The study also identified a stretch of SR-91 located between Gypsum Canyon and Green River interchanges as the "mixing bowl," named due to the nature of traffic patterns and the high instances of weaving in the area. A detailed analysis of traffic conditions in and around the mixing bowl area was completed as part of the traffic analyses completed for the approved Final Supplemental EIR/EIS. Prior to project approval, the traffic study area was expanded to include the SR-91 corridor from SR-55 to McKinley St, east of I-15 to verify results of the initial traffic study.

Analysis of existing conditions revealed key travel patterns: WB on SR-91 in the morning (AM) and EB in the afternoon (PM), with SR-241 volumes primarily moving south in the AM and north in the PM. In the AM peak, WB speeds are congested at 25-35 miles per hour (mph) east of the 241/91 interchange but recover to over 55 mph west of the interchange. In the PM peak, EB speeds drop significantly, averaging below 35 mph throughout the area and below 20 mph near the 241/91 interchange. The 241/91 EC contributes to decreased congestion, improved throughput, improved travel speeds and reduced delay, particularly in the WB direction.

The result of the traffic analysis for the 241/91 EC concluded that the project will provide the following operational benefits through the study area:

- Increase in vehicle throughput: +7% in the opening year and +3% in the horizon year
- Increase in travel speeds: +6% in the opening year and +7% in the horizon year
- Reduction in travel delay: -12% in the opening year and -17% in the horizon year
- Reduction in vehicle weaving conflicts
- Improved emissions by reducing congestion caused by merging and lower travel speeds
- Improved overall corridor performance for SR-91 GP lanes and SR-241 tolled facility

As project delivery progressed in final design, operational analyses scenarios were identified to further define the operational parameters and performance metrics necessary for the 241/91 EC operations and quantify network-wide benefits of the 241/91 EC and extracted SR-241 operational improvements. Network-wide, vehicle hours traveled improves for all vehicles traveling in the peak direction in both the ELs and GP lanes in the study area.

- On westbound SR-91, average weekday morning travel time savings between SR-55 and I-15 are anticipated to be about 27 minutes across the peak period.
- On eastbound SR-91, average weekday afternoon travel time savings between SR-55 and I-15 are anticipated to be about 28 minutes across the peak period. On Fridays (and sometimes Thursdays) SR-91 eastbound travel time savings between SR-55 and I-15 are anticipated to be about 3 minutes across the peak period.
- The ingress/egress area for EL traffic near the County Line, described as the "mixing bowl," average travel speeds along SR-91 are anticipated to improve up to 30 mph (from 30 mph to 60 mph) in the Horizon Year during peak periods.
- On SR-241, a 2.5-to-5-mile reduction of north-to-east connector queue is anticipated and travel time savings of 22 to 55 minutes for Express Connector241/91 EC and GP connector users is anticipated.

As a major freight corridor serving seaports and inland ports, these improvements to SR-91 enhance the region's economic vitality and ability to compete in the global markets. As a commuting corridor, these improvements to the SR-91 and SR-241 corridors also serve to connect commuters from the Inland Empire to jobs in Orange County.

See Section 2.3.2 for more detail on how these improvements are distributed.

Since the original traffic analyses were performed as part of the Draft Supplemental EIR/EIS, periodic spot analyses of the traffic conditions in this area have been conducted for opening years in 2020, 2025, and 2028. These analyses determined that the overall change in volume growth in this area is nominal due to the oversaturated existing conditions in the SR-91 GP lanes and have negligible effects on the overall analysis results. Further, altered traffic patterns during the COVID-19 pandemic continue to have an effect on assessing and predicting traffic conditions due to temporary conditions which altered traffic baselines, lack of understanding on long-term changes in travel behavior, and disrupted seasonal variation. There is no validated traffic model currently available to use to update near-term projections[4]. As such, the traffic

[4] The current (2022) countywide Long Range Transportation Plan (LRTP), prepared by OCTA states, "The long-term impacts to travel behavior from the pandemic will take years to fully understand. Adaptations due to the pandemic caused major travel changes for years and some of those adaptations will linger, but the trend has been moving toward pre-pandemic conditions. While this LRTP acknowledges that COVID-19 has had a profound impact over the past few years, the analysis of 2045 conditions is primarily based on pre-pandemic travel trends."

operations results disclosed in the Approved Final Supplement EIR/EIS are determined to still be representative of the opening and horizon year conditions.

Demonstrating improved operations – reducing weaving and potential collisions

While the existing 241/91 interchange connects the SR-241 toll road to the non-tolled general-purpose lanes of SR-91, there is currently no direct connection between the SR-241 toll road and the 91 Express Lanes. The lack of connectivity between the SR-241 toll road and the 91 Express Lanes requires weaving across five SR-91 general-purpose lanes for users to transition between tolled facilities. This weaving of over 350 vehicles during the peak hour adversely affects operations for all users by worsening the already congested SR-91 corridor during peak hours and further degrading regional movement of people, goods, and services in the high-demand SR-91 corridor.

The 241/91 EC collision analysis indicates that, within the project area, there are five segments on SR-91 and five segments on SR-241 with greater than average statewide collision rates. The highest percentage of reported types of collisions for the segments are rear end and sideswipe collisions. 32% of collisions in these areas were rear end collisions and 19% of collisions were side swipe collisions during congested peak hours (6 AM to 9 AM and 3PM to 6PM), suggesting congestion may have been a primary reason for these collisions.

Sideswipe collisions are attributed to lane weaving in congested areas, which are exacerbated in the Project area due to steep downhill topography in areas like the NB SR-241 that require braking while weaving. These conditions can also lead to rear end collisions if drivers engage in queue jumping and cutting off others during congested times. Reducing congestion on the downhill grade of SR-241 will reduce queue jumping behavior and blocked through lanes caused by congestion-delayed merging.

The 241/91 EC project need identifies existing weaving operations between the GP connectors and the median Express Lanes as a concern because the weaving contributes to sideswipe collisions, and also because the weaving degrades the level of service (LOS) due to increased density. The approved 241/91 EC project purpose affirms that direct access between toll facilities, provided by the 241/91 EC, will improve traffic flow and operations by reducing weaving across multiple SR-91 GP lanes between the SR-91 Express Lanes and the SR-241 GP lane connectors. The occurrence of sideswipe and rear end collisions may be mitigated by these improvements.

The 241/91 EC will provide a direct median-to-median connection between the SR-241 toll road and the 91 Express Lanes as well as a separation between the GP connectors. This will reduce the friction caused by weaving, improve traffic operations, and reduce the number of lane change maneuvers, which will help reduce congestion and congestion related collisions such as sideswipes and rear-ends and thereby produce a safety benefit in this high-volume corridor. The 241/91 EC creates a tolled option that has long been envisioned as part of this system interchange.

2.3.1. Existing Conditions

The 241/91 EC is located at the junction of SR-241 and SR-91 within the Cities of Anaheim and Yorba Linda in the County of Orange, the City of Corona in the County of Riverside, and unincorporated Orange and Riverside counties.

SR-241 is a tolled facility starting at the Oso Parkway interchange in south Orange County to its terminus at SR-91 in the City of Anaheim. Within the 241/91 EC project improvement limits, SB SR-241 has five lanes and NB SR-241 has four lanes. At the SR-91 interchange, NB SR-241 lanes split with two lanes diverging to the NB SR-241/EB SR-91 connector and two lanes diverging to the NB SR-241/WB SR-91 connector.

Approaching the SR-91 interchange, enhanced striping, channelizers, and advanced signing have been installed on NB SR-241 to enhance safety and operations by minimizing the potential for the queue-jumping maneuvers that have been observed between traffic accessing the EB connectors.

SR-91 is a major east-west freeway facility used for commuting, goods movement, and interregional travel, and provides vital connections to Los Angeles County to the west and Riverside County to the east. Within the 241/91 EC project improvement limits, EB SR-91 has five lanes and WB SR-91 has six lanes. Located within the median of SR-91, the 91 Express Lanes is a four-lane tolled facility (two lanes in each direction) which extends from State Route 55 (SR-55) to Interstate 15 (I-15) in Riverside County. In each direction, the 91 Express Lanes are separated from the GP lanes by surface-mounted channelizers with points of ingress and egress at the SR-55 interchange, the Orange-Riverside County Line just west of Green River Road interchange, and the I-15 interchange. The 241/91 EC project improvement limits also encompass the Gypsum Canyon Road local street interchange and the Coal Canyon decommissioned undercrossing on SR-91.

The existing SR-241/SR-91 interchange connects the NB and SB SR-241 toll road to the non-tolled, GP lanes of EB and WB SR-91. SR-241 and SR-91 are State Highway System facilities owned and operated by Caltrans. There is currently no direct connection between the SR-241 Toll Road and the 91 Express Lanes.

SR-91 carries approximately 273,000 vehicles per day in the GP lanes near the project area and the SR-241 toll road carries approximately 55,000 vehicles per day in the vicinity of SR-91. The 91 Express Lanes carry approximately 61,500 vehicles per day within the Orange County segment operated by OCTA, and 45,000 vehicles per day within the Riverside County segment operated by RCTC.

These high volumes result in significant operational breakdown along both corridors in the vicinity of the 241/91 interchange. The most severe operational concern occurs on WB SR-91 during the AM peak period, and on EB SR-91 during the PM peak period. These conditions along SR-91 significantly impact operations on the SR-91 corridor, and transitioning movements to and from SR-241 at the 241/91 interchange. The operational condition is worsened by the high number of users that weave across GP lanes to access the 91 Express Lanes from the SR-241 and vice versa. The lack of a direct connection between the SR-241 toll road and the 91 Express Lanes negatively affects operations, worsens an already congested SR-91 during peak hours, and results in a long queue for users on NB SR-241 accessing EB SR-91 during the PM peak (Figure 2-4).

The traffic analyses completed for the Approved Final Supplemental EIR/EIS indicated that the primary directions of travel include WB on SR-91 in the AM and EB SR-91 in the PM, with the majority of SR-241 volumes traveling south in the AM and north in the PM. WB GP lane speeds in the AM peak period are congested east of the 241/91 interchange, averaging between 25 to 35 miles per hour near Serfas Club Drive in the early AM period. However, WB average speeds are shown to recover to near free-flow conditions (greater than 55 miles per hour) west of the 241/91 interchange. EB operational deficiency is much more severe in the PM, with average speeds below 35 miles per hour throughout the whole area, and below 20 miles per hour in the vicinity of the 241/91 interchange during the PM period.

Figure 2-4 Queue During PM Peak Period

Looking East

Looking South

2.3.2. Anticipated Impacts

The 241/91 EC provides an additional connection between the NB SR-241 and the EB SR-91 and from the WB SR-91 to the SB SR-241, which allows direct access between the SR-241 toll road and the 91 Express Lanes. This provides traffic performance, mobility, and economic benefits, and reduces vehicle weaving conflicts along the key regional corridors of SR-91 and SR-241 by reducing the impacts of an existing bottleneck, enhancing the 241/91 interchange, and providing a new choice to the traveling public. The 241/91 EC will strengthen a critical link in the regional transportation system by increasing throughput, velocity, and providing a direct connection. These outputs help to reduce strain on the road systems and improve their longevity. The encouraged use of toll facilities will generate revenue that, after covering necessary project expenses, can be used to further enhance options for the movement of people, goods, and services more effectively and efficiently throughout the system and transportation corridors. Alternative modes of transportation help distribute passenger loading and support sustainable infrastructure. See Section 2.5.2 for more information on potential uses of 241/91 EC toll revenue.

F/ETCA has completed the following efforts to demonstrate how the 241/91 EC will benefit and improve transportation system performance:

- **Traffic Analysis Related to the Draft and Final Supplemental EIR/EIS (2015 Traffic Analysis Report and 2019 Traffic Analysis):** These two interrelated traffic analysis reports document the traffic analysis performed for environmental review compliance (CEQA/NEPA), interagency planning coordination, public and stakeholder engagement support, and establishment of baseline conditions for future phases.
    - **The 2015 Traffic Analysis Report** was undertaken to support the 241/91 EC Draft Supplemental EIR/EIS. The study area included SR-91 from west of the Weir Canyon Road interchange in Anaheim Hills to east of the Serfas Club Drive/Auto Center Drive interchange in Corona. The network also included SR-241 from north of the Santiago Canyon Road interchange and SR-71 south of the Butterfield Ranch Road interchange. During the review process for the draft document, OCTA requested that F/ETCA revise the 241/91 EC traffic analysis to incorporate results from the SR-91 Corridor Improvement Project. In support of this request, F/ETCA paused development of the Final Supplemental EIR/EIS to complete analysis.
    - **The 2019 Traffic Analysis** is an updated analysis based on comments received during the circulation of the Draft Supplemental EIR/EIS. F/ETCA worked collaboratively with OCTA, and RCTC on analysis methodology, baseline conditions, and expansion of the model boundaries to include the entire SR-91 corridor from SR-55 to McKinley St, east of I-15, generally consistent with the 91 Implementation Plan study area, to account for effects beyond the physical project limits through the broader, interregional transportation corridors. While this traffic analysis report updated several aspects of the original study, including opening year, it supported the findings of the 2015 Traffic Analysis report: that the 241/91 EC would increase throughput, decrease average delay, and increase average speed compared to the no build alternative.
- **Traffic Operations Review to Confirm Traffic Demand Management (TDM) Approach (2020-2025):** As the 241/91 EC operational concept was refined, a traffic operations review, using data from the approved Supplemental EIR/EIS, was completed to confirm feasibility of progressive demand management, which is inclusive of dynamic pricing, to be used as a TDM approach for 241/91 EC. The traffic operations review also served to confirm that traffic growth rates have remained nominal due to saturated conditions, supporting the concept that analysis results continue to be valid for the revised opening year.

More detail on the results from each effort is provided in the sections below.

Final Supplemental EIR/EIS Traffic Results

The Final Supplemental EIR/EIS describes that the 241/91 EC has been shown to improve traffic operational performance of the study corridor, by contributing to the achievement of the following objectives:

- *GP Lane Improvements*
  - WB SR-91 (AM Peak):
    - Opening Year (2019 Traffic Analysis)
      - Vehicle throughput will increase by approximately 4.8% averaged across all lanes.
      - Average Speeds are expected to improve to 28 mph (+9 mph) on mainline segments
      - Average delay per vehicle decreases from 4 to 3 minutes
      - Total travel time (VHT) is expected to decrease by 31%.
      - Reduction of approximately one mile in queue length between Serfas Club Drive and Lincoln Avenue
    - Horizon Year
      - Volume served will increase by 1% east of the interchange and decrease by approximately 9% west of the interchange due to shifts in demand volume and changing travel patterns. Increased efficiency on the direct connector ramp accommodates this shift.
      - Speeds are expected to stay the same, except for improvements on certain segments:
        - Between Express Lane Ingress and Gypsum Canyon Road: from 30-40 mph to 60 mph.
        - East of the Serfas Club Drive/Auto Center Drive interchange: from 30 mph to 60 mph.
      - Average speed per vehicle increases from 34 mph to 38 mph.
      - Average delay per vehicle decreases from 7.0 to 5.6 minutes.
      - Between major O-D points, travel times are expected to stay the same or decrease by up to 4.7 minutes.
        - Additionally, travel time between SR-71 SB to SR-91 EB will decrease by up to 11.9 minutes.
  - EB SR-91 (PM Peak):
    - Opening Year (2019 Traffic Analysis)
      - Vehicle throughput will increase by approximately 4.4% averaged across all lanes.
      - Average speeds are expected to improve to 35 mph (+13.6 mph).
      - Average delay per vehicle decreases from 7 to 4 minutes.
      - Total travel time (VHT) is expected to decrease by 34%.
    - Horizon Year
      - Volume served will increase slightly by about 300 vehicles in the PM peak period despite demand remaining the same when comparing No Build to Build. This is due to a shift of approximately 800 peak hour trips over the connector, lowering demand in GP lanes.
      - Speeds are expected to stay the same, except for improvements in the area between the SR-241 On Ramp and the Green River Road Interchange.
      - Average speed per vehicle increases from 45 to 46 mph.

    - Average delay per vehicle decreases from 3.4 to 3.1 minutes.
    - Between major O-D points, travel times are expected to stay the same or decrease by up to 2 minutes.
- *Regional Connectivity and Mobility Improvements*:
    - Analysis of SR-241 transactions shows that of 19 million transactions in Fiscal Year 23, 41% originated from account holders in Riverside and San Bernardino counties, indicating the 241/91 EC's high utility for regional connectivity.
    - Improve the regional transportation system and help achieve regional mobility and operational efficiency goals by improving the bottleneck area at the interchange of SR-91 and SR-241.
    - Reduce weaving across multiple GP lanes between the 91 Express Lanes and the existing SR-241 GP connectors, which may lower the risk of collisions during merging, reducing stops/starts, and improving the health of commuters by reducing travel time. Guardrail upgrades and extended separation points from general traffic will also contribute to improved safety.
- *Freight Movement*: Increase average travel speed along SR-91 in the WB direction (horizon year) by 4 mph (12%), and as much as 30 miles per hour in certain segments. As a major freight corridor that serves seaports and inland ports, improvements to the SR-91 corridor will enhance the region's economic vitality and ability to compete in the global markets.
- *Health*: Operational improvements reduce emissions from transportation sources.

Generally, traffic analysis of horizon year conditions has demonstrated that the 241/91 EC will improve operational efficiency in the area of the 241/91 interchange. Average speed improvements demonstrate that the 241/91 EC can improve conditions in the vicinity of the 241/91 interchange by reducing the limits and duration of the WB AM bottleneck at the Countyline, compared to horizon year conditions without the 241/91 EC in place.

As described in Section 2.3.1, the existing operational condition in the EB direction in the PM period is severely saturated and much more severe than WB AM conditions. Traffic analysis of the horizon year conditions show that operational conditions cannot be completely resolved by this 241/91 EC in the EB direction during the PM. However, GP lane speeds along EB SR-91 between the SR-241 GP connector and the SR-71 off-ramp are anticipated to be approximately 5 miles per hour higher, additionally adding an increase in throughput of approximately 300 vehicles during the PM peak period.

Traffic Operations Review to Confirm TDM Approach (2020-2025)

To better inform and confirm the operations of the 241/91 EC, traffic operations review efforts were completed to determine how dynamic pricing and progressive demand management could be applied as the appropriate TDM approach for the 241/91 EC. This effort was completed in collaboration with OCTA and RCTC to determine how dynamic pricing and progressive demand management could be applied during peak period travel times to maintain the defined performance metrics. This traffic operations review has been performed to model the forecasted dynamic toll rates and expected progressive demand management strategies to be used to balance demand on the interconnected toll facilities for the best performance of the transportation system. The results listed below confirmed network-wide improvements on SR-91, SR-241, and SR-55 well beyond the physical project improvement limits offering improvements to all users within the high-demand, interregional mobility transportation corridors; quantified project benefits on SR-241; and confirmed progressive demand management strategies will adequately regulate demand within the defined performance metrics.

- *Predicted Network-Wide Congestion Improvements on SR-91, SR-241, and SR-55:*
  - Network-wide vehicle hours traveled (VHT) also improved for all vehicles in the model traveling in the peak direction in the ELs and GP lanes on SR-91, SR-241, and SR-55.
  - Depending on the day, time, and direction of travel, travel time savings will vary.
  - Westbound average weekday morning VHT is expected to improve by 11,500 hours (over 6 minutes shorter per vehicle).
  - 91 westbound average weekday morning travel time savings between SR-55 and I-15 averages about 27 minutes across the peak period.
  - Eastbound VHT is expected to improve by about 18,800 hours (over 8 minutes shorter per vehicle) on an average weekday and by about 3,600 hours (1.3 minutes shorter per vehicle) on an average Friday.
  - 91 eastbound average weekday afternoon travel time savings between SR-55 and I-15 averages about 28 minutes across the peak period.
  - On Fridays (and sometimes Thursdays) eastbound travel time savings between SR-55 and I-15 averages about 3 minutes across the peak period.
- *Quantified NB SR-241 Benefits from TDM Approach:*
  - Reduction of north-to-east connector queue by at least 2.5 miles and up to five miles.
  - Travel time savings from 22-55 minutes for 241/91 EC and GP connector users
  - Volumes on the 241/91 EC may be limited to approximately 370 vehicles per hour in the highest demand hour to balance demand of upstream and downstream toll facilities to optimize performance of the SR-91 corridor beyond the physical project improvement limits. Studies identified that 241/91 EC volumes affect upstream conditions at the 55/91 interchange and downstream conditions at the terminus of the 91 Express Lanes at McKinley Avenue.
- *Identified Opportunities for System Efficiency*:
  - Improve person throughput with toll-free travel for municipal transit buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder.
  - Prioritize carpools and vanpools with progressive demand management at peak hours.
  - Improve transit facilities and services with projects and programs eligible to use the excess toll revenues generated by the 241/91 EC to improve multimodal transportation, pending the establishment of an expenditure plan consistent with SHC 149.7.
- *Defined 241/91 EC Performance Metric Measures[5]:*
  - Speeds to be maintained at 60 miles per hour or more in the 91 Express Lanes critical zones
  - Volumes not to exceed 1,500 vehicles per hour on the 241/91 EC in either direction (north-to-east or west-to south)
  - Volumes not to exceed 200 vehicles per hour at the EB County Line egress
  - Queue length not to exceed 100 vehicle storage at the Toll Connector Meter
  - Identified the highest demand periods as generally Thursday and Friday afternoons
  - Identified need to monitor performance of EB 91 Express Lanes East End conditions if north-to-east 241/91 EC volumes are greater than 370 vehicles per hour during East End super-peak conditions[6]

[5] F/ETCA, OCTA, and RCTC will monitor and, if needed, update performance metric measures in accordance with a governance structure to be developed for operations.

[6] East end super-peak conditions are defined as:

- *TDM Approach - Progressive Demand Management Strategies*[7]
  - Dynamic pricing
  - Toll Connector Meter
  - HOV-Only Mode
  - Bus/Registered Vanpool only mode

Additional description of the progressive demand management modes, including dynamic pricing, anticipated application of each mode, and volumes served by the 241/91 EC during various operational periods are described in Section 2.4.3.

2.4. Technical Feasibility

2.4.1. Project Definition

Has the applicant described the proposed facility in sufficient detail to determine the type and size of the project, the location, all proposed interconnections with other transportation facilities, the communities that may be affected, and alternatives that may need to be evaluated?

The 241/91 EC project is focused on improving access between SR-241 and SR-91 by constructing a direct tolled freeway-to-freeway connector with left-side exits and entrances from the NB SR-241 toll road to the EB 91 Express Lanes and from the WB 91 Express Lanes to the SB SR-241 toll road. It is important to note that this application is specific to tolling authority on the 241/91 EC. This application has no effect on F/ETCA existing toll authority and related responsibilities, commitments, agreements, etc. to the SR-241 toll road.

Tolled facilities are a critical component of an improved transportation system that offer positive community and environmental benefits. This 241/91 EC project seamlessly integrates the existing tolled facilities to gain operational and system efficiencies that reduce travel times and vehicle conflicts and provide health benefits through reduced emissions. The 241/91 EC project will enhance a key regional connection between SR-241, SR-91, and the 91 Express Lanes, improving access for the traveling public between Orange, Riverside, and Los Angeles counties. A diagram of the project area is shown in Figure 2-5**.**

The 241/91 EC project as analyzed in the 2020 Final EIR/EIS is described as a tolled facility with a total project length of approximately 8.7 miles, including 5.9 miles of improvements and 2.8 miles of advanced signage. A California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) revalidation is currently being conducted as part of the Final Design Phase in order to revalidate the Final Supplemental EIR/EIS to include a revised project length total of approximately 9.1 miles of improvements within the cities of Anaheim, Yorba Linda, and unincorporated Orange and Riverside Counties, from just north of the Santiago Creek Bridge on SR-241 to Coal Canyon Undercrossing on SR-91. Approximately 2.9 additional miles of temporary advanced signage are also included in the revalidation of the final design.

i. Eastbound McKinley Toll Rate is 25% above pre-241/91 EC baseline;
ii. Density across 2-lanes at the RCTC EB 91 Express Lanes mainline toll gantry is 23 vehicles per mile per lane or greater; and
iii. Average speed across multiple sensors is below 65 miles per hour or queues observed at any location between ingress (approximately at Green River) and terminus (approximately at I-15) is longer than 0.5 miles.

[7] OCTA and RCTC will have final approval of the dynamic pricing algorithm and dynamic pricing input values, including changes. Initial Progressive Demand Management systems inputs and future changes are subject to executive committee decision.

Current and proposed toll related infrastructure in the vicinity of the 241/91 EC is shown in Figure 2-6. Other major elements of the 241/91 EC are described later in this section.

Figure 2-55. Project Area

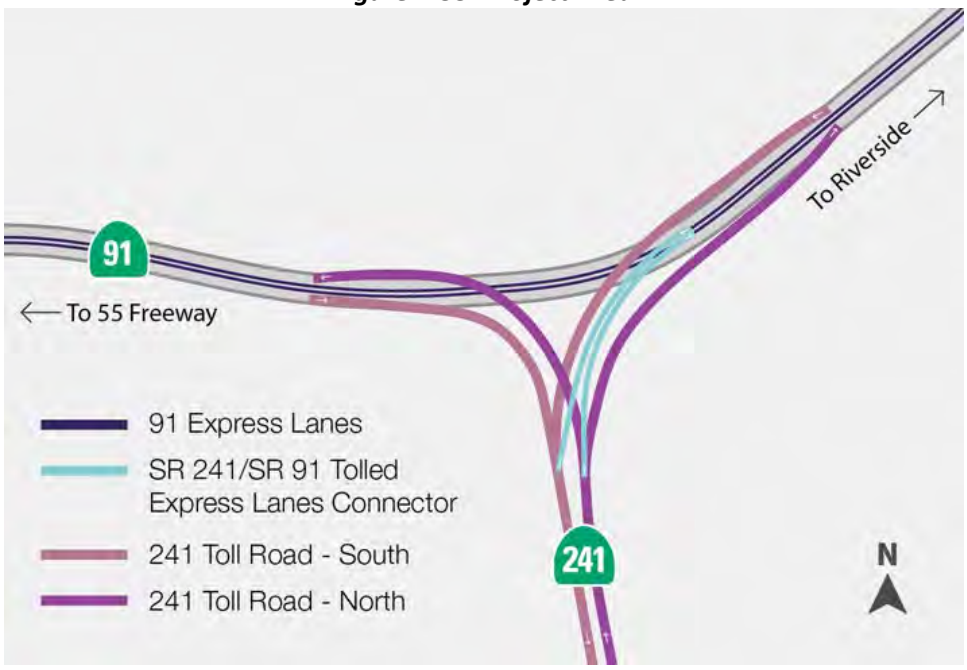
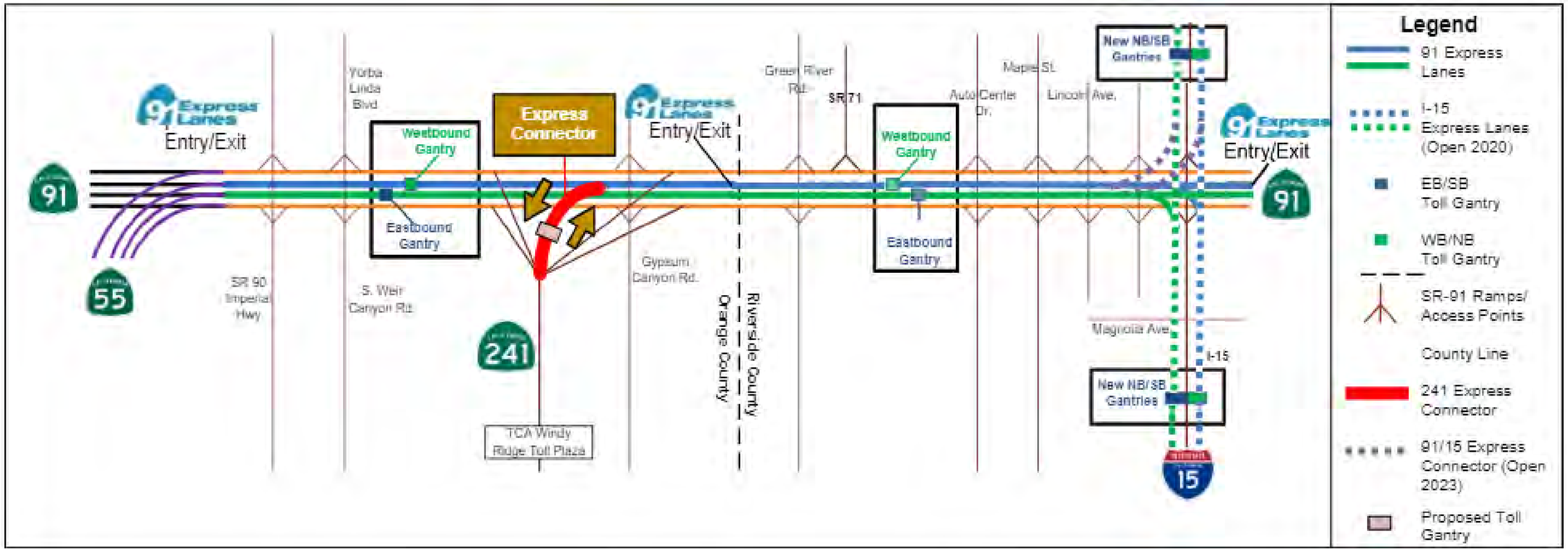


Figure 2-6 6. Current and Proposed Toll Facilities Diagram



Roadway Improvements

- *Direct Express Connector:* The main feature of the 241/91 EC is the direct-connect structure, which will accommodate two lanes: a single express lane connecting NB SR-241 toll road to EB 91 Express Lanes, and a single express lane connecting WB 91 Express Lanes to SB SR-241 toll road. Both lanes will be accessed from the left-side of the respective freeways utilizing the median area to achieve touchdown of the bridge structures. A single overhead toll gantry will be placed along the directional connector to facilitate toll collection.
- *SR-241:* On SB SR-241, an additional lane and reconstructed shoulder would be provided by widening into the existing median from the SR-91 interchange to just north of Windy Ridge Wildlife Undercrossing for approximately 2.5 miles. On NB SR-241, an additional lane and reconstructed shoulder would be added from 0.3 miles north of the Santiago Creek bridge to the Windy Ridge Mainline Toll Plaza by widening into the existing highway median for approximately five miles. The 241/91 EC project would also shift the NB SR-241 diverge point (the location where the NB SR-241 traffic must choose either the EB GP, WB GP, or EB tolled connector to SR-91) to the Windy Ridge Toll Plaza. The 241/91 EC (NB and SB lanes) would begin in the existing SR-241 median on fill. The 241/91 EC then spans over the existing NB SR-241-to-WB SR-91 GP connector and the SR-91/Gypsum Canyon Road interchange on two new bridge structures to merge into the median of SR-91.
- *SR-91:* EB SR-91 lanes would be realigned to the south from east of the Gypsum Canyon interchange to west of the Coal Canyon Undercrossing to accommodate space in the median for the 241/91 EC. The NB-to-EB 241/91 EC lane would create a new 241/91 EC auxiliary lane that continues along EB SR-91, merging just west of the Coal Canyon Undercrossing. In addition, the existing EB egress auxiliary express lane would be extended within the 91 Express Lanes. 241/91 EC users will be allowed to egress at the Orange/Riverside County Line. The WB-to-SB 241/91 EC lane would include a new WB 241/91 EC auxiliary lane as well as an additional auxiliary express lane merge west of the Coal Canyon Undercrossing. These improvements would accommodate users seeking to ingress or egress at the Orange/Riverside County Line. The number of existing SR-91 GP lanes would be maintained within the project limits.

Other Improvements

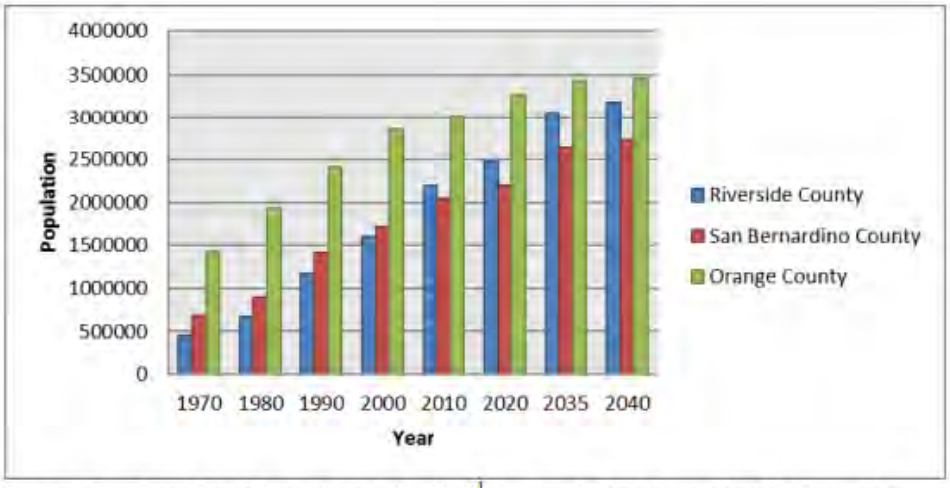
In addition to the improvements described above, the 241/91 EC project will also include the following elements:

- *Bridge Widenings:* Four undercrossings will be widened, including the SCE Wildlife crossing and the Oak Canyon Wildlife crossing under NB SR-241, the Gypsum Canyon crossing under EB SR-91, and WB SR-91 over Coal Canyon.
- *Retaining Walls:* Due to the topography in the project area, up to 17 retaining walls will be constructed. Retaining walls are related to individual project needs, including CHP enforcement areas and embankments.
- *Advanced Signage:* On NB SR-241 at the southern approach to the 241/91 EC, signage would be modified beginning approximately 800 ft south of the Santiago Creek bridge. On SR-91, signage improvements would be made on WB SR-91 beginning at Green River Road and on EB SR-91 west of SR-241.
- *Gypsum Canyon Road:* Reconstruction of the EB interchange ramps and minor widening of Gypsum Canyon Road to accommodate construction of the 241/91 EC, as well as a new SB bike lane and sidewalk on Gypsum Canyon Road.
- *Right* of Way: Improvements would be constructed mostly within existing Caltrans right of way. A permanent footing easement from the City of Anaheim for a portion of the 241/91 EC structure footing is required.

Affected Communities

Based on projections from SCAG, between 2012 and the 2040, the population of Riverside County will grow approximately 42 percent, the population of San Bernardino County will grow approximately 32 percent, and the population of Orange County will grow approximately 13 percent (Figure 2-7). As a result, demand on SR-91 and SR-241 during peak periods is projected to increase by approximately 45 percent in the AM peak period (from 82,377 to 119,605 vehicles) and approximately 50 percent during the PM peak period (from 111,837 to 168,494 vehicles) between 2012 and 2040. This increase in demand would result in degraded operational conditions and increased travel times under existing conditions. These projections for growing population in the communities surrounding the 241/91 interchange, in addition to the associated increase in traffic volumes, further emphasizes the importance of the 241/91 EC to relieve a known bottleneck in the corridors and improve mobility for both local and regional trips throughout these communities.

Figure 2-7. County Population Growth Patterns - 1970 to 2040



Sources: United States Census Bureau (Years 1990–2010)[1]; Southern California Association of Governments (Years 2020–2040).

SR-241 and SR-91 serve as major transportation routes within Orange and Riverside Counties and thus are critical evacuation routes for the surrounding communities. The communities near these state routes experience wildfires and floods almost annually. In the event of an evacuation, the surrounding cities and the County of Orange have recognized SR-241 and SR-91 as the best means to safety. Additionally, the Cities of Corona, Eastvale, and County of Riverside rely on SR-91 as a critical transportation corridor in the event of an evacuation. SR-91 provides access to many entry points for firefighters if there is a wildfire. During the recent Bond and Blue Ridge Fires, surrounding communities were impacted, and SR-241 and SR-91 were the primary means for people and animals to evacuate. The 2021 and 2022 rainstorms caused daily evacuations in Silverado, Modjeska, and Williams Canyons. Improvements to these vital corridors ensure that first responders, residents, workers, and visitors can continue to have a reliable evacuation route in the event of an emergency.

SR-91 is the primary route between more affordable housing in Riverside County and many job centers in Orange County, and hundreds of thousands of commuters rely on SR-91 daily. As jobs and populations grow and shift in the region, so will the number of commuters on the road. The 241/91 EC supports disadvantaged and low-income communities by improving this vital connection for commuters from their homes to their jobs by reducing travel times and improving the system operations which makes the route

a safer commute and improves the health and wellness of the travelers and their communities. Though the 241/91 EC will connect the SR-241 to the 91 Express Lanes, the benefits of the 241/91 EC will be to all corridor users, including GP lanes, high-occupancy vehicles, and truck traffic.

Other benefits include reduced weaving, merging, and lane changes which will help reduce congestion and congestion related collisions such as rear-end and sideswipe collisions. Additionally, with improved operations, the 241/91 EC will decrease GHGs and other harmful emissions, providing better air quality for surrounding communities.

SR-91 also supports freight traffic, providing an import link between the movement of goods from seaports in Los Angeles and Long Beach into inland ports in Riverside and San Bernardino. This supports the economic vitality of the region, state, and nation.

Alternatives

Two project alternatives were evaluated in the PA/ED phase:

- No-Build Alternative that would maintain existing conditions and no work would be conducted to improve corridor operations; and
- Build Alternative 1 (241/91 EC project improvements as described herein).

OCTA prepared the 91 Express Lanes Extension and SR-241 Connector Feasibility Study in March 2009. Initially, six Build Alternatives were studied in the feasibility study, and three of these were rejected (Alternative Concepts 2, 5, and 6) during the screening process. The remaining three Alternative Concepts (Alternative Concepts 1, 3, and 4) were carried forward for more detailed evaluation in the PSR/PDS phase. During preparation of the PSR/PDS, the remaining three Build Alternatives were evaluated, Alternative Concepts 3 and 4 were rejected, and Alternative Concept 1 was carried forward for further evaluation. The following provides a summary of the rejected alternative concepts:

- Alternative Concept 2 - Four-lane toll median-to-median connector between SR-241 and the existing 91 Express Lanes. The additional traffic added to the 91 Express Lanes would result in potential capacity deficiencies. In addition, this alternative would have resulted in additional impacts to coastal sage scrub (CSS) habitat compared to Alternative Concept 1. Therefore, this alternative concept was rejected in favor of Alternative Concept 4.
- Alternative Concept 3 - Reversible two-lane toll connector. While the connector could be built, it would not have addressed the project objective of reducing traffic congestion. Therefore, Alternative Concept 3 was dropped from further consideration.
- Alternative Concept 4 - Four-lane toll connector that addressed the operational issues of the additional traffic in the 91 Express Lanes by widening the 91 Express Lanes to three lanes in each direction to approximately the SR-71 interchange but the concept would have substantially higher costs and was not consistent with the ETC EIR/EIS. In addition, this alternative would have resulted in additional impacts to coastal sage scrub habitat, drainages, and the Coal Canyon Undercrossing compared to Alternative Concept 1. Therefore, Alternative Concept 4 was dropped from further consideration.
- Alternative Concept 5 - Four-lane toll connector to the 91 Express Lanes. Alternative Concept 5 is similar to Alternative Concept 4, except that the third express lane would extend to I-15. Adding a third Express Lane would result in significant right-of-way impacts in the City of Corona. In addition, this alternative would have resulted in additional impacts to coastal sage scrub habitat, drainages, and the Coal Canyon Undercrossing compared to Alternative Concept 1. The physical constraints were considered a fatal flaw to the feasibility of Alternative Concept 5. Therefore, Alternative Concept 5 was not recommended for further consideration.

- Alternative Concept 6 - SR-241/SR-71 direct toll connector for SR-241 and SR-71 traffic. This would have been a relatively high-cost concept and only focused on a specific part of the travel demand between SR-241 and SR-71. In addition, this alternative would have resulted in additional impacts to coastal sage scrub habitat compared to Alternative Concept 1. Given the physical challenges and cost of this concept, the other alternatives were viewed as more feasible. Therefore, Alternative Concept 6 was not recommended for further consideration.

2.4.2. Proposed Project Timeline

Is the time frame for project completion clearly outlined? Is the proposed schedule reasonable given the scope and complexity of the project? Does the proposal contain adequate assurances that the project will be completed on time?

The proposed project schedule is provided in Table 2-1. A Term Sheet among major stakeholders has been completed and Master, Operating, and Cooperative Agreements are being finalized to specify and document project roles and responsibilities. The 241/91 EC project is now in the final design and environmental revalidation process, scheduled for completion in late 2025. Construction is scheduled to begin in early 2026, with the 241/91 EC open to traffic in late 2029.

Table 2-1: Proposed Project Timeline

Project Activity	Timeline
Term Sheet	Q3 2019
Environmental Document Approval (Final Supplemental EIR/EIS)	Q1 2020
Environmental Revalidation	Q2 2025
Master and Operating Agreements Executions and Partner Agency Support Letters	Q3 2025
CTC Supplemental Tolling Authority Consideration	Q4 2025
Caltrans-F/ETCA Toll Facility Agreement, Construction Cooperative Agreement, and Maintenance Agreement Executions	Q4 2025
Project Plans, Specifications, and Estimates (PS&E) Approval (Ready-To-List)	Q4 2025
Construction Advertisement	Q4 2025
Construction Notice to Proceed (NTP)	Q1 2026
Substantial Completion (Open to Traffic)	Q1 2029
Project Complete	Q3 2029

A number of methods will be used to ensure that the design and construction phases are completed on time, including regular project reports and status meetings as described below.

Project Reporting

Reports will be prepared to assess status and track progress on costs, budgets, schedules, quality, environmental mitigation status, safety, labor compliance, and many other items related to the project. These reports will cover periods ranging from one week to as long as one year. Additionally, special reports concerning a particular topic will be prepared, when necessary or requested.

A formal cost, schedule, and status report will be produced and reviewed monthly with agency management from F/ETCA and Caltrans. A status meeting will be held quarterly with major project stakeholders, or more frequently, upon request. Major project stakeholders consist of the four agencies partnering to deliver the 241/91 EC: F/ETCA, Caltrans (District 8 & District 12), OCTA, and RCTC.

Monthly Status Meeting
Senior representatives from F/ETCA, Caltrans, OCTA, and RCTC will attend periodic status meetings during project construction and operations, with the purpose of discussing costs, schedules, quality issues, compliance with Federal and State requirements, and other status items in sufficient detail to allow all involved parties to be fully aware of the significant issues and actions planned to mitigate any adverse impacts. F/ETCA will prepare a status report for discussion, which will include but not be limited to activities and deliverables, action items, schedule adherence, cost adherence, quality adherence, and safety performance.

Weekly Status Meeting
Throughout the final design and construction phases, a weekly progress meeting will be held among F/ETCA, Caltrans, design consultants, construction contractors, and other stakeholders as needed until project completion. The purpose of these meetings will be to review schedule and status, address issues, and provide an opportunity for coordination and dialogue. Another purpose of these meetings will be to identify key issues that need to be elevated to F/ETCA and Caltrans senior management. Immediate communication of progress and identification of issues will help to mitigate problems quickly and ensure that the project is delivered on time.

Risk Register:
Project Risk Management (PRM), as outlined in Caltrans Deputy Directive (PD-09), is applied throughout the project's various phases. The Project Development Team (PDT) has been engaged in planning for, identifying, analyzing, communicating, managing, and responding to project risks throughout project delivery. A risk register, prepared for the 241/91 EC project improvements, lists all identified risks, risk owners, and agreed-upon risk response strategies.

Additionally, the Proposed Project Timeline above is closely linked to the planned execution of several documents between F/ETCA, Caltrans, OCTA, RCTC, and other stakeholders. Table 2-2 lists these documents, their purpose, parties, status, and timeline.

Table 2-2: Historical and Future Agreement Timeline

Document	Purpose	Parties	Status	Timeline
OCTA-Caltrans 91 Express Lanes Joint Agreement	Two-party agreement between Caltrans and operator	OCTA, Caltrans	Complete	2002
OCTA-RCTC 91 Express Lanes Joint Agreement	Two-party agreement between Caltrans and operator	OCTA, RCTC	Complete	2011
Project Study Report/Project Development Support (PSR/PDS)	Project Approval	F/ETCA, Caltrans	Complete	2012
RCTC-Caltrans 91 Express Lanes Joint Agreement	Two-party agreement between Caltrans and operator	RCTC, Caltrans	Complete	2012
Cooperative Agreement (PA/ED)	Caltrans Participation in PA/ED	F/ETCA, Caltrans	Complete	2014
Cooperative Agreement (PS&E/ROW)	Caltrans Participation in PS&E/ROW	F/ETCA, Caltrans	Complete	2017
241/91 Express Lanes Connector Term Sheet	241/91 EC delivery and operation framework	F/ETCA, OCTA, RCTC, Caltrans	Complete	2019

Document	Purpose	Parties	Status	Timeline
April 4, 2024 Letter to CTC Executive re: Transportation Corridor Agencies' Ability to Utilize AB 194 and Reply (May 2024)	Confirms F/ETCA's eligibility to apply for supplemental tolling authority for the 241/91 EC	F/ETCA, CTC	Complete	2024
Master Agreement	Four-party agreement for project delivery, high-level operation, and revenue use	F/ETCA, OCTA, RCTC, Caltrans	In Process	September 2025
Operations Agreement	Three-party agreement among toll operators	F/ETCA, OCTA, RCTC	In Process	September 2025
OCTA Support Letter	CTC requirement	OCTA	In Process	September 2025
RCTC Support Letter	CTC recommendation	RCTC	In Process	September 2025
Cooperative Agreement (CON)	Caltrans Participation in CON (AAA)	F/ETCA, Caltrans	In Process	October 2025
Toll Facility Agreement	Incorporate the Connector into the State Highway System, capture ongoing maintenance obligations and toll collection sunset	F/ETCA, Caltrans	In Process	December 2025
Maintenance Agreement	Caltrans participation in M&R	F/ETCA, Caltrans (KLA)	In Process	December 2025
91 Express Lanes Traffic Operations Center (TOC) Amendment	Add F/ETCA to 91 EL TOC program	F/ETCA, OCTA, RCTC	In Development	Before Open to Traffic (2028)
Existing Enforcement Agreement Amendment	Add EC to F/ETCA's CHP enforcement program	F/ETCA, CHP	In Process	Before Open to Traffic (2028)
Incident Management Plan	Roles and responsibilities for monitoring, identification, and response to incidents (living document)	F/ETCA, Caltrans, OCTA, RCTC, and CHP	In Process	Before Open to Traffic (2028)

2.4.3. Operation

Has the applicant presented a reasonable statement setting forth plans for operation of the facility?

F/ETCA will operate the 241/91 EC, including the operation of the tolling equipment and traffic management system, the collection and processing of toll payments, and the provision of a Customer Service Center.

F/ETCA, in coordination with OCTA and RCTC, has developed the framework for the operational conditions of the 241/91 EC. The main components are described below:

- *Toll Points*: The 241/91 EC will have one single toll point in each direction.
- *Pricing*: The 241/91 EC will be dynamically priced in accordance with pre-defined performance metrics that preserve free-flow (60 mph) conditions in the 91 Express Lanes; limit 241/91 EC volume to 1,500 vehicles per hour and County Line egress volumes to 200 vehicles per hour; and limit queue length for the Connector to 100 vehicles. F/ETCA, OCTA, and RCTC will monitor the performance metrics weekly to determine if adjustments to pricing calculations are needed.
- *Pricing Information:* 241/91 EC pricing information will be displayed on-road in compliance with the CA MUTCD. The WB-to-SB trip will have one destination and associated price to the SR-241 toll road. The NB-to-EB movement will have one destination and associated price to the Orange-Riverside County Line.
- *Express Connector Meter:* Metering will be implemented on the 241/91 EC for the NB SR-241 to the EB SR-91 movement. If predetermined performance metrics in the 91 Express Lanes are exceeded, the toll connector meter located at the toll point would automatically be activated to restrict the inflow from the 241/91 EC to the 91 Express Lanes. An overhead changeable message sign prior to the Windy Ridge toll plaza and a series of five connector meter signs spaced approximately 1,000 feet apart leading up to the toll point would alert drivers to the toll connector meter activation.
- *Progressive Demand Management:* The north-to-east direction of the 241/91 EC will be capable of deploying progressive demand management (PDM) which will allow the facility to operate in four modes of control - dynamic pricing, toll connector meter, HOV-only mode, and Bus/Registered Vanpool-only mode - to effectively manage demand such that the expected performance metrics are achieved. These four modes may be used individually, in combination, and/or in sequence to manage demand and maximize system performance. When demand is at its peak, HOV-only and Bus/Registered Vanpool modes prioritize carpools and transit when the system would most benefit from increased person throughput.
    - Dynamic Pricing - the price to use the north-to-east 241/91 EC will be tethered to the density in the EB 91 Express Lanes critical zone. This is the main control in managing demand on the 241/91 EC.
    - Toll Connector Meter (TCM) - similar to an on-ramp meter, the TCM signal will cycle at variable discharge rate to release cars from the 241/91 EC into the 91 Express Lanes.
    - HOV-only Mode - access to the 241/91 EC is restricted to HOVs. The TCM will be active during this mode.
    - Bus/Registered Vanpool Mode – This is the most restrictive and final level of control to be imposed. The TCM will be active during this mode.
    - Except as adopted in the toll policy (e.g., municipal transit buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder), 241/91 EC customers will be required to pay the posted toll price during all progressive demand management modes.
    - Advanced static and changeable message signs will be located in the project area to provide drivers with notice of the price and operational mode of the 241/91 EC in compliance with highway design guidelines and manuals.

      Anticipated application of progressive demand management strategies and volumes served by the 241/91 EC are shown in Table 2-3.

Table 2-3: Anticipated Application of Progressive Demand Management in Opening Scenario

North-to-East[8] Operating Period	Anticipated PDM Mode[9]	Anticipated 241/1 EC Volume[10]
Super-Peak Thursday 2-3 pm and Friday 1-3 pm	HOV-Only Mode	370 vehicles per hour
Peak Monday-Wednesday 2-6 pm Thursday 3-6 pm and Friday 3-7 pm	Dynamic Pricing	310 to 770 vehicles per hour
Off-Peak All other days/times not listed above	Dynamic Pricing	Up to 1500 vehicles per hour

- *Incident Management/CHP Enforcement Areas*: Enforcement areas will generally be located in the vicinity of each exit point (NB SR-241 and WB SR-91) from the 241/91 EC.

Toll Rate Setting

Toll rates for the 241/91 EC will be established via dynamic pricing, which is adjusted in real-time based on real-time facility conditions. The demand to use the NB-to-EB 241/91 EC movement is anticipated to be high during portions of the PM peak hours, and therefore a real-time pricing method will help maintain acceptable performance on the 241/91 EC and adjacent 91 Express Lanes. The use of dynamic pricing for this movement allows for the optimal flexibility and ability to maintain traffic volume continuity within the 91 Express Lanes. Toll rates will be determined based on the speed and volume performance metrics in the Express Lanes and other factors consistent with the dynamic pricing principles to optimize throughput within the system while balancing demand with available capacity. The actual dynamic pricing algorithm will be developed in collaboration between F/ETCA, OCTA and RCTC. Real-time conditions will be monitored for pre-established operational performance metrics to initiate toll rate adjustments and to trigger automated toll connector metering operations as needed for the NB to EB connector.

Toll Exemptions & Discounts

Partner agencies have agreed that municipal transit buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder, will travel toll-free at all times on the 241/91 EC. High-Occupancy Vehicles (HOV) with three or more passengers (3+) will travel toll-free except during weekday peak periods[11]. During peak periods, HOV 3+ will pay full toll to better manage peak period demand in accordance with expected available capacity on the 91 Express Lanes. Electric vehicles and motorcycles will pay full tolls at all times.

[8] Progressive demand management is only deployed in the north-to-east direction. Dynamic pricing will be applied in the west-to-south direction at all times. Indicated operating periods may be changed based on results of baseline analysis prior to opening of the 241/91EC.

[9] This represents the potential progressive demand management mode and will be determined by the governance team. Additional strategies may be applied in each operational period if continuous critical zone monitoring determines further demand management is needed.

[10] Indicated volumes are based on traffic estimated during 2024 modeling. During the operating period, 241/91 EC volumes will be limited to available capacity in the EB 91 Express Lanes using real-time monitoring data.

[11] During peak periods (below, subject to change based on demand), HOV 3+, pay full toll.
EB - Monday through Thursday 2-6 PM; Friday 1-7 PM
WB - Monday through Thursday 5-9 AM; Friday toll-free all day

Methods of Toll Collection

F/ETCA will build transactions, collect revenue, and process violations for the 241/91 EC. F/ETCA has an established process of toll collection, transaction processing, billing and violation processing, and customer service. If a driver is a non-account holder with F/ETCA and has a valid account with another California toll agency, tolls will be processed through the existing interoperable processes. Tolls will be collected for each motorist travelling between SR-241 and the 91 Express Lanes in the NB-to-EB and WB-to-SB directions. The 241/91 EC will use electronic toll collection to collect tolls. 241/91 EC signage will require customers to have a valid transponder. Tolls for FasTrak® transponder transactions will be processed to their respective accounts. All other transactions (i.e., no valid FasTrak® account) will be processed as a toll evasion violation. Transponders will be required to use the 241/91 EC.

Toll Enforcement/HOV Occupancy Non-Compliance

At all times, CHP enforcement, supplemented by automated enforcement technologies, will be used to provide additional deterrents to toll evasion and HOV occupancy non-compliance. TCA will amend its agreement with CHP and coordinate accordingly to ensure that adequate CHP resources can be provided to provide enforcement during Connector operations. CHP enforcement and turnaround areas will be utilized at each end of the 241/91 EC to provide CHP officers with direct line-of-sight to the connector diverge area to monitor aggressive driving, visual HOV occupancy compliance, and other traffic violations.

Toll violation collection will follow current F/ETCA practices. Enforcement of toll violations is technology based and supported by account matching and California Department of Motor Vehicles (DMV) lookup capabilities. This includes a combination of radio frequency identification (RFID) readers and cameras at the tolling point, along with image processing technology and human review, to form a toll transaction based on license plate image captures for vehicles with no transponder or non-valid transponders. This will be done to initiate a toll transaction or eventually a violation if necessary.

Traffic Management Center & Back Office

F/ETCA operations of the 241/91 EC will be integrated into the existing SR-241 toll road operations center in Irvine. F/ETCA will operate the roadside and back-office tolling infrastructure, customer service center, tolling back-office procedures, and the overall toll and traffic monitoring system. All equipment will communicate back to the existing F/ETCA Back Office in Irvine. In addition, F/ECTA, OCTA, and RCTC are currently discussing the interfacing of traffic monitoring equipment with the existing 91 Express Lanes Traffic Operations Center in Anaheim for incident monitoring and management.

F/ETCA will also be responsible for the maintenance of the toll system that includes the tolling infrastructure, toll collections, and violations processing. This would include routine lifecycle and emergency maintenance responsibilities of this infrastructure.

Successor Operator

The Term of the Master Agreement for the 241/91 EC is defined to be in alignment with 91 Express Lanes Toll Facility Agreement (currently set to expire in 2067) so that performance metrics for the 241/91 EC remain in effect for the duration of the 91 Express Lanes operation to ensure seamless operations and minimize disruption to the traveling public. F/ETCA's current tolling authority on its existing system (SRs 133, 241, and 261) is set to expire in 2053. For planning purposes, partner agencies have agreed to include language in the Master Agreement to identify OCTA as the successor operator if F/ETCA were to dissolve prior to the end of the Term to ensure continued operations and maintenance within the terms of the agreements in place at that time, provided that the following items are met:

- OCTA obtains the necessary legal authority to operate the 241/91 EC, which may include AB 194 or other legal requirements applicable at the time;
- OCTA will be responsible for the F/ETCA obligations and commitments to the operation and maintenance of the 241/91 EC consistent with the terms of the Master Agreement and the Operating Agreement including continued tolling and;
- OCTA will continue repayment of any 241/91 EC debt.

If OCTA does not become the successor operator, parties can identify another successor operator that has obtained the necessary legal authority, and, if no other successor operator is identified, then Caltrans will become the successor operator. If Caltrans' is the successor operator, then

- Any responsibility to pay 241/91 EC debt will be released and Caltrans will receive the 241/91 EC free and clear of all obligations;
- Caltrans would have to obtain the necessary legal authority to operate the 241/91 EC, which may include AB 194 or other legal requirements applicable at the time; and
- Will operate the 241/91 EC until the end of term in accordance with the Traffic Operations Metrics defined in the Master Agreement.

OCTA, RCTC, and Caltrans will meet and confer no later than five (5) years before such dissolution to confirm the successor operator can obtain the necessary legal authority to operate the 241/91 EC and facilitate the assignment and transfer of F/ETCA property, obligations, reserve accounts, and related items to the successor operator.

2.4.4. Federal Involvement

Is the project outside the purview of federal oversight, or will it require some level of federal involvement due to its location on the National Highway System or Federal Interstate System or because federal permits are required? If so, has the applicant provided a reasonable plan for addressing all federal responsibilities?

The 241/91 EC is a distinct facility, separate from the existing SR-91 and SR-241. The project is not located on the National Highway System, the Federal Interstate System or the Federal-aid highway system.

No federal funds will be used for the construction, operation or maintenance of the 241/91 EC. This new facility will be constructed using available F/ETCA funds and maintained and operated using the toll revenues collected on the 241/91 EC. The separation of the 241/91 EC from the adjoining SR-91 and SR-241 is clear and further evidenced by the fact that the 241/91 EC is pursuing tolling authority via this application process through the California Transportation Commission (CTC) and the 241/91 EC will have different business rules and toll policies from the 241 Toll Road and the 91 Express Lanes.

Federal involvement in the Project is limited to obtaining an air quality conformity analysis determination as not a project of air quality concern (POAQC), a Clean Water Action Section 404 permit for impacts to Waters of the United States and consultation with United States Fish and Wildlife Service for compliance with Section 7 of the Federal Endangered Species Act. To meet NEPA requirements to obtain these permits, F/ETCA worked with Caltrans District 12, the NEPA lead agency (as delegated by FHWA) to develop and approve the Final Supplemental EIR/EIS and Record of Decision. These NEPA documents were completed in 2020. F/ETCA received determination that the project is not a POAQC in October 2020, Section 404 permit in December 2024, and the Section 7 Amended Biological Opinion in March 2025.

As part of the multi-agency coordination effort in developing the project and proposed operations for the 241/91 EC, a concept of operations working group was convened. FHWA participated in this working group and provided input on the draft concept of operations that has since evolved into terms, processes,

and obligations required of the F/ETCA to manage and operate the 241/91 EC with partner agencies. FHWA approvals are not required for any 241/91 EC approvals because the 241/91 EC is not located on the Interstate System and will not use Federal funds; should federal funding ever be used on the facility, 23 U.S. Code § 129 shall apply.

2.4.5. Maintenance

Is there a process in place to clearly define assumptions and responsibilities during the operational phase including law enforcement, toll collection, and maintenance?

Maintenance roles, responsibilities, and expectations were defined by 241/91 EC stakeholders in the 2019 Term Sheet and will be further defined in a Maintenance Agreement currently being drafted. Caltrans, under contract to F/ETCA, will be responsible for all roadway maintenance related to the 241/91 EC including pavement and structures. Roadway maintenance will be performed on a reimbursement basis paid from revenue generated by the 241/91 EC. As the operator of the 241/91 EC, F/ETCA will be responsible for maintenance of the toll equipment, payment and enforcement infrastructure, and day-to-day operations of the tolling. F/ETCA will also establish (or amend existing) contracts with CHP for enforcement and with the Freeway Service Patrol for dedicated emergency management services for the 241/91 EC. All repair, maintenance, rehabilitation, and reconstruction costs for improvements constructed as part of this project will be covered using toll revenue from the 241/91 Express Connector. This includes, but is not limited to, structures, any new pavement added on SR-241 and SR-91, signage, traffic safety devices, TMS elements, and other related features with the exception of improvements constructed for the sole purpose and benefit of the general-purpose lanes.

2.5. Financial Feasibility

2.5.1. Funding Plan

Is the funding plan built on a reasonable basis for funding project development and operations? For example, are the assumptions on which the plan is based well defined and reasonable in nature? Are the plan's risk factors identified and dealt with sufficiently? Are the planned sources of funding and financing realistic? Has the applicant demonstrated evidence of its ability to obtain the necessary financing? Does the applicant have the ability to fund shortfalls if revenues do not meet projections?

<u>Toll Revenue Waterfall</u>

F/ETCA understands that, according to SHC 149.7, the revenue generated from the operation of the toll facility shall be available to the sponsoring agency for the direct expenses related to the following:

A. Debt issued to construct, repair, rehabilitate, or reconstruct any portion of the toll facility, payment of debt service, and satisfaction of other covenants and obligations related to indebtedness of the toll facility.
B. The development, maintenance, repair, rehabilitation, improvement, reconstruction, administration, and operation of the toll facility, including toll collection and enforcement.
C. Reserves for the purposes specified in subparagraphs (A) and (B).

All remaining revenue generated by the toll facility shall be used in the corridor from which the revenue was generated pursuant to an expenditure plan developed by the sponsoring agency.

F/ETCA is committed to managing the 241/941 EC toll revenue in accordance with the requirements of SHC 149.7. The revenue generated by the 241/91 EC shall be available to the F/ETCA for the direct expenses related to scheduled repayment of F/ETCA's loan for the 241/91 EC (item A above), the operating and maintenance costs and the corresponding reserves (items B and C above). Remaining revenue generated by the 241/91 EC (excess revenue) will be used for additional projects and programs

in the corridor from which the revenue was generated and included in an expenditure plan (see Section 2.5.2 for discussion of revenue-eligible corridors). Use of 241/91 EC toll revenue as described in this paragraph (i.e., the toll revenue "waterfall") and evaluation criteria for projects and programs in corridors considered for use of excess revenue will be developed as part of the expenditure plan by F/ETCA, with input from Caltrans, OCTA, and RCTC, and will be incorporated as part of the F/ETCA Capital Improvement Plan to be adopted annually by the F/ETCA Board of Directors.

241/91 EC toll revenues shall be available to fund all direct costs associated with the debt repayment operation, and maintenance of the 241/91 EC. There is no expectation of use of State funds or liabilities to the State for any project debt, or the operation or maintenance of the 241/91 EC.

Loan and Repayment

Per the 2019 Term Sheet agreed to by F/ETCA, Caltrans, OCTA, and RCTC, any of the parties that contribute funds to the 241/91 EC will receive payback including interest. Through the project development process, it was determined that only F/ETCA will fund the delivery and construction of the Project using a loan from its unrestricted cash reserves. Other than the 241/91 EC, F/ETCA has no existing near-term obligations requiring these funds. However, F/ETCA expects to utilize the repayment of its 241/91 EC contribution to replenish these reserves so that the funds will be available to F/ETCA for uses under its existing legal authority such as early bond principal repayment or future capital projects outside of the 241/91 EC revenue-eligible corridors.

Unlike facilities with traditional third-party loans, the F/ETCA Board of Directors (Board) has discretion on the flexibility of debt repayment terms since it is an internal loan. As such, the F/ETCA Board has the flexibility to forego a portion of the loan repayment to fund a near-term set aside for projects and programs and decrease the outstanding loan balance by an amount equal to the set aside. The intention of this flexibility in the loan repayment is to free toll revenue to provide near-term funding for critical mobility improvements in the revenue-eligible corridors; all uses of excess revenue within the corridors will be consistent with Streets and Highways Code (SHC) Section 149.7, 23 U.S. Code § 129, and the defined limits as established in the environmental document and supporting technical studies (e.g., Traffic Analysis Report). F/ETCA recognizes the 241/91 EC is a critical component of a broader regional network in which mobility improvements of individual components of that network stand to generate wider system operations improvements. The 241/91 EC excess revenues offer an opportunity for investing strategically in improvements throughout the transportation corridors it serves.

A loan amortization schedule example has been developed for the 241/91 EC loan based on current assumptions and forecasting that reflects how debt will be paid and excess revenue for projects and programs will be funded through the term of operations. This schedule example shows the loan to be paid off prior to the end of the Master Agreement term (currently 2067) based on the projected traffic, revenue, and operating requirements. Prior to or upon revenue commencement of the 241/91 EC, an updated loan amortization schedule will be developed that uses the most recent inputs, forecasts, and modeling to confirm that debt can be paid off and if any excess revenues will be available through term.

As the 241/91 EC sponsor and facility operator, F/ETCA is fully responsible for the 241/91 EC costs and, if F/ETCA dissolves prior to the end of the Master Agreement term, all 241/91 EC cost responsibilities will be imposed on a successor agency other than Caltrans. When Caltrans become the operator of the 241/91 EC (either as successor agency or at the end of the term), responsibility to repay any remaining 241/91 EC debt will be released by F/ETCA.

Capital Funding

F/ETCA will fund the delivery and construction of the 241/91 EC using a loan from its unrestricted cash reserves. Table 2-4 reflects project costs that will be repaid from toll revenues from the 241/91 EC.

Table 2-4: Project Cost and Identified Funding Sources

Fund Status	Fund Type	Source	Project Component ($1000)						Total
			PA&ED	PS&E	ROW Support	CON Support	ROW Capital	CON Capital	
Committed	Local	Private (F/ETCA Cash Reserves)	$7,991	$45,340	$10	$91,389	$30	$371,450	**$516,210**

Toll Revenues, Operations, and Maintenance

Table 2-5 outlines the expected average annual revenue, expected average annual operations and maintenance (O&M) cost, expected average annual O&M reserve deposits, and net operating toll revenue, demonstrating that the 241/91 EC is expected to generate enough revenue to cover operations and revenue leakage.

Table 2-5: Estimated Average (2029-2067) Annual Net Operating Toll Revenue (Year of Expenditure Dollars, $1,000,000)

Operations Summary	Average Annual Total[12]
Average Annual Revenue[13]	$30.7
Average Annual O&M Cost[14]	$3.7
Average Annual O&M Reserve Deposits[15]	$3.5
Net Operating Toll Revenue	$23.5

Administrative expenses related to the operation of the 241/91 EC will not exceed 3 percent of the toll revenues.

2.5.2. Expenditure Plan for Excess Revenues

If an expenditure plan for excess revenues has not yet been adopted by the appropriate governing entity, has the applicant included a discussion of its intentions for revenues collected beyond those necessary for any debt service, operations, and reserved as defined in AB 194?

Per SHC 149.7, all remaining revenue generated by the toll facility shall be used in the corridor from which the revenue was generated pursuant to an expenditure plan developed by the sponsoring agency. In partnership with OCTA, RCTC, and Caltrans, F/ETCA will coordinate and prioritize the use of all remaining revenue generated by the 241/91 EC in the corridors from which the revenue was generated. The expenditure plan shall be incorporated as part of the F/ETCA Capital Improvement Plan (CIP) and be adopted annually by the F/ETCA Board of Directors. F/ETCA shall submit the CIP to OCTA for consistency review with the Regional Transportation Plan and related programs. Planned expenditures for the identified projects or programs shall be approved through the appropriate planning document for F/ETCA, Caltrans, OCTA or RCTC. Projects within the 91 Corridor will also be included in the 91 Implementation Plan by that project's sponsor.

[12] Average calculated over 38-year analysis period (2029-2067).
[13] Includes violation revenues and estimated leakage.
[14] Includes toll systems equipment maintenance, including spare parts.
[15] Includes civil infrastructure (roadway, structures, signs, etc.) maintenance

Revenue-Eligible Corridors

As described in Section 1.1 and 2.3, the 241/91 EC is a key connection to the unified ETC and to the interregional freight and commuting corridor of SR-91; the effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and will offer improvements to all users within the high-demand, interregional mobility transportation corridor. Therefore, the use of excess revenue from the 241/91 EC may include investments across the transportation corridors improved by the key connection of the 241/91 EC, including multimodal projects outside of the highway right of way, for projects or programs that maintain or improve the safety, operation, or travel reliability for any transportation mode or provide or improve travel options; all uses of excess revenue within the corridors will be consistent with Streets and Highways Code (SHC) Section 149.7, 23 U.S. Code § 129, and the defined limits as established in the environmental document and supporting technical studies (e.g., Traffic Analysis Report). Evaluation criteria for projects and programs considered for use of excess revenue will be developed by F/ETCA, with input from Caltrans, OCTA, and RCTC, as part of the preparation of the expenditure plan. Revenue-eligible corridors will be defined in accordance with SHC 149.7.

2.6. Regional Transportation Plan & Community Support

2.6.1. Consistency with Existing Plans

Is the project consistent with the regional transportation plan and affected city and county comprehensive plans? If not, does the applicant discuss strategies that may help achieve consistency with such plans when possible or practicable?

The 241/91 EC is consistent with city, county, and regional plans, and is connected to ongoing planning efforts. The 241/91 EC is programmed in the financially constrained portion of the adopted SCAG 2024 RTP/SCS as an Express Lane direct connector. The OCTA 2022 LRTP also identifies the 241/91 EC in the Preferred Plan. In addition, the 241/91 EC is included in the 2023 Federal Transportation Improvement Program (FTIP) Amendment #25-00 as FTIP ID ORA111207 and is programmed for construction in Fiscal Year 2026/2027.

The 241/91 EC is stand-alone and not part of a larger phased project. However, the 241/91 EC is part of the SR-91 Implementation Plan and the State Route 91 Comprehensive Multimodal Corridor Plan (CMCP), each of which includes improvements across Orange and Riverside counties. The CMCP, completed in 2022, is a multi-modal assessment that expands on projects and programs included in the OCTA LRTP. The plan defines characteristics of the corridor including demographics, economic data, disadvantaged and low-income communities, employment, existing facilities, and land uses. The purpose of the plan is to establish current conditions and needs along the corridor and identify a range of improvements. The Plan is intended to provide transportation choices for residents, commuters, and visitors to the area of the corridor. The SR-91 Implementation Plan, in compliance with AB 1010 and Senate Bill 1316, establishes a program of potential improvements to improve operations in the SR-91 corridor. The 241/91 EC has been included in the SR-91 Implementation Plan since the plan's inception in 2003.

In addition to these regional and countywide plans, the CEQA/NEPA Supplemental Final EIR/EIS was completed in early 2020. The EIR/EIS process included preliminary engineering, detailed alternatives, and impact analysis, as well as substantial agency outreach with the local municipalities of Anaheim and Yorba Linda.

The 241/91 EC is consistent with recommendations in State-level planning documents. The 241/91 EC enables "Travelers to opt Out of Congestion" on SR-241 which is consistent with Key Action S1.1 in the State's Climate Action Plan for Infrastructure (CAPTI, July 2021). The 241/91 EC also aligns with California Transportation Plan

(CTP, February 2021) goal 10) "price roadways to improve efficiency of auto travel" by using behavioral pricing policy of dynamic pricing and by improving GP lane conditions for those who choose not to use the priced facilities on SR-91.

2.6.2. Considerations of Impacts

Does the applicant explicitly consider the potential diversions of vehicles onto adjacent routes that could lead to congestion, safety problems, and infrastructure damage due to the imposition of tolls on particular facilities?

The 241/91 EC Final Supplemental EIR/EIS and Traffic Analysis Report considered and evaluated potential impacts related to the diversion of vehicles onto adjacent routes with the 241/91 EC being a tolled facility. The 241/91 EC will be a direct connection to two existing tolled facilities, the SR 241 and the SR 91 Express Lanes. In addition to providing a seamless connection for drivers that choose to use the toll facilities, it is expected that the project will reduce the existing queue experienced on the 241/91 general purpose connector and reduce congestion in the SR 91 GP lanes. The 241/91 EC is expected to decrease overall lane density and therefore improve corridor performance in the GP lanes in the vicinity of the 91 Express Lanes ingress/egress areas. These operational improvements to the transportation corridors are anticipated to reduce diversion from the highway to adjacent routes. The 241/91 EC will redirect a portion of the vehicle volumes from general purpose lanes onto the tolled facilities whose infrastructure maintenance and repair is funded by toll revenue; existing infrastructure will not incur increased damage with the implementation of the project.

241/91 EC operations coordination has been developed among partner agencies to commit to maintaining 91 Express Lanes performance. The Operations Term Sheet outlines the following goals:

- EB: Utilize available EB 91 Express Lanes capacities without negatively impacting its operations beyond established capacity thresholds.
- Dynamic Pricing Algorithm: The algorithm and input values will be developed in partnership between F/ETCA, OCTA, and RCTC based on the operational parameters. OCTA and RCTC shall have final approval for the dynamic pricing algorithms and input values. F/ETCA, OCTA, and RCTC shall work jointly to calibrate the dynamic pricing algorithm and dynamic pricing input values. OCTA and RCTC shall have final approval for changes to the dynamic pricing algorithm and input values.
- Metering: Connector metering shall be developed to facilitate the operation of the 241/91 EC. The 241/91 EC may be metered based on established capacity threshold values due to excessive congestion in the 91 Express Lanes.
- HOV Modes: On-road messaging will display access restrictions for single-occupant vehicles during the highest demand periods to reduce and manage volumes to meet performance metrics in the 91 Express Lanes.
- Bus/Registered Vanpool-Only Mode: On-road messaging will display access restrictions for vehicles except for Bus/Registered Vanpool vehicles during highest demand periods that further reduce volumes to meet performance metrics in the 91 Express Lanes.

Closure of the 241/91 EC will only be allowed for incidents, emergencies, and maintenance and will require approval by Caltrans.

Generally, travel times on EB SR-91 are also expected to improve. This decrease in travel time is due to changes in regional travel patterns which shift NB SR-241 trips from the SR-91 EB GP ramp to the 241/91 EC. This lowers the GP lane demand in the 91 Express Lanes ingress/egress area. Additionally, the 241/91 EC would be able to serve more users in the WB direction of SR-91 and more users along SR-241 SB, which represents an overall improvement in the efficiency of the system. These operational improvements to

the transportation corridors are anticipated to reduce diversion from the highway to adjacent routes. The 241/91 EC will redirect a portion of the vehicle volumes from GP lanes onto the tolled facilities whose infrastructure maintenance and repair is funded by toll revenue; existing infrastructure will not incur increased damage with the implementation of the project.

2.6.3. Fulfilling Policies and Goals

In what ways does the proposed project help achieve performance, safety, mobility, economic, or transportation demand management goals?

The 241/91 EC will achieve significant performance, mobility, economic, and transportation management improvements and reduce vehicle conflicts. The 241/91 EC will strengthen a critical link in the regional transportation system by increasing throughput and velocity. These outputs help to reduce strain on the road systems and improve their longevity. The encouraged use of toll facilities will generate revenue to further improve transportation facilities and multimodal options. Alternative modes of transportation help distribute passenger loading and support sustainable infrastructure. The Final Supplemental EIR/EIS and Traffic Analysis Report thoroughly evaluated the performance of the 241/91 EC compared to existing conditions and horizon year conditions without the project improvements, separating out anticipated effects by year, direction, and time of day. See Section 2.3 for a more detailed description of how anticipated impacts fulfil policy goals.

2.6.4. Environmental Considerations

Is the proposed project consistent with applicable state and federal environmental statutes and regulations? Does the proposal adequately address or improve air quality and other environmental concerns?

The 241/91 EC is consistent with applicable state and federal environmental statutes and regulations. The 241/91 EC is included in the 2024 SCAG RTP/SCS financially constrained list of projects and thereby meets the requirements for regional air quality conformity. The environmental process of the 241/91 EC was completed in January 2020 with Caltrans approval of the joint CEQA/NEPA Final Supplemental EIR/EIS, which identified potential environmental impacts associated with the 241/91 EC project improvements. The Final Supplemental EIR/EIS established all the mitigations to be implemented in response to significant environmental impacts of the 241/91 EC project improvements identified during the CEQA/NEPA process. A copy of the Final Supplemental EIR/EIS is attached to this application. By letter dated May 3, 2017, FHWA has agreed that the 241/91 EC meets project level conformity and localized Particulate Matter 2.5 and Particulate Matter 10 requirements. Additionally, the 241/91 EC is included in Amendment #25-00 to the 2025 FTIP, which was found to be conforming by the FHWA/Federal Transit Administration (FTA) on December 16, 2024.

Based on the data presented in the Final Supplemental EIR/EIS, the 241/91 EC is expected to contribute to a nearly 19 percent decrease in CO_2 emissions in the horizon year, compared to existing conditions (Table 2-6). This is possible due to the decrease in average delay and increased average speed, contributing to more fuel-efficient traffic operations and improved system efficiency, which would result in fewer emissions. This reduction from existing levels demonstrates progress toward meeting statewide greenhouse gas (GHG) reduction goals.

Table 2-6: Modeled Regional GHG Emissions

Year and Condition	CO_2 Emissions (metric tons/year)	CH_4 Emissions (metric tons/year)	CO_{2e} Emissions (metric tons/year)	Percent Reduction from Existing CO_{2e} Emissions
2013 Existing Conditions	1,444,221	43	1,445,287	-
2040 With Project	1,176,806	33	1,177,627	-18.53%

Source: EMFAC (2014) emissions compiled by LSA Associates, Inc. (2017).

2.6.5. Community and Stakeholder Support

What is the extent of support or opposition for the project? Does the project proposal demonstrate an understanding of the national and regional transportation issues and needs, as well as the impacts this project may have on those needs? Is there a demonstrated ability to work with the affected communities?

Agency consultation and public participation for this project has been accomplished through a variety of formal and informal methods, including PDT meetings, interagency coordination/consultation meetings, and public announcements. A PDT was identified during the PSR/PDS phase in January 2011 to ensure collaborative communication among the stakeholders, including representatives from Caltrans, F/ETCA, OCTA, and RCTC. With the completion of the PSR/PDS phase in January 2012 and initiation of the PA/ED phase in February 2013, the PDT conducted monthly meetings to discuss project-specific issues and work together to ensure that the Proposed Project meets the Purpose and Need.

A 30-day scoping period was initiated for the Final Supplemental EIR/EIS on March 13, 2015, and ended on April 13, 2015. A public notice, Notice of Preparation (NOP) and Notice of Intent (NOI), was prepared and distributed to federal, state, regional, county, and local agencies; elected officials; special districts; groups and organizations; and businesses and property owners within 0.25 miles of the project footprint in order to inform the public of the preparation of the Final Supplemental EIR/EIS. Ten written comment letters were received on the NOP and NOI from federal, state, regional, and local agencies. No comment letters were received from the public and no comments were received requesting a Public Information Meeting.

The Draft Supplemental EIR/EIS was circulated for public review and comment between November 7, 2016, and January 9, 2017. An Open House Public Hearing was held on November 29, 2016. English and Spanish public notices were posted in newspapers on November 7 and November 21, 2016. The English and Spanish published notices were also mailed to the distribution list of the Draft Supplemental EIR/EIS, as well as to property owners and occupants of all addresses within a 0.25-mile radius of the project limits. Most of the comments received at the Public Hearing expressed support for the 241/91 EC and urged the timely completion of the 241/91 EC.

In fall 2019, a Term Sheet was developed and adopted by the governing boards of F/ETCA, OCTA, and RCTC, and supported by Caltrans District 12, solidifying the partnership between the four agencies (including Caltrans), and providing terms for project delivery, funding, construction, maintenance, and operation for the 241/91 EC. Caltrans also provided a support letter for the Term Sheet subsequent to the Board adoptions. Caltrans approved the Final Supplemental EIR/EIS in January 2020, completing the project environmental process. In addition, a Caltrans Project Report (PR) was approved for the 241/91 EC in February 2020.

The PDT will continue to convene and meet with stakeholders to receive input and resolve issues through the design and construction phases of the 241/91 EC project improvements. The PDT will deliver regular

241/91 EC project improvements updates at public Board and Committee meetings to keep the community informed, engaged, and to provide an accessible platform for input. The project website will also be kept current to give community members opportunities to learn about project details and its progress, as well as submit feedback.

F/ETCA is committed to communicating with stakeholders, particularly the public, throughout the construction phase of the project. A public communications team will be procured by F/ETCA to interact with stakeholders and the public prior to and through the construction phase to educate and inform the public regarding construction activities and operational characteristics of the facility upon completion.

2.7. Supplementary Topics

This section provides supplementary information not specifically requested in the Commission's "Guidelines for Toll Facility Applications." Additional items in this section provide the Commission with a more robust understanding of the Project.

2.7.1. Commission Annual Report to the Legislature

See Section 2.1, Item 6 for information on F/ETCA's commitment to providing information or data requested by the Commission or Legislative Analyst.

2.7.2. Performance Assessment

F/ETCA, in coordination with OCTA and RCTC, will define and monitor the 241/91 EC performance measures in a comprehensive manner consistent with regional and state requirements. The performance measures will provide criteria for evaluating the 241/91 EC and the effects of pricing, eligibility, and congestion management.

Performance measures currently collected for other similar express lanes include:

- Number of trips
- Trip types
- Traffic speeds
- Tolls generated
- Trip length and distribution
- CHP enforcement activity

2.7.3. Procurement Approach

The 241/91 EC civil infrastructure construction will follow the traditional design-bid-build model. Final design is anticipated to be completed in 2025. The construction contract will be advertised, awarded, and administered (AAA) by Caltrans. Construction advertisement is anticipated in late-2025/early 2026.

The 241/91 EC roadside toll systems equipment installation and modification will be performed by the existing toll systems providers (TSPs) for F/ETCA, OCTA, and RCTC. The new 241/91 EC toll point will be added to F/ETCA's existing system for back office and customer service functions.

F/ETCA, OCTA, and RCTC are currently discussing how to utilize the existing OCTA-RCTC 91 Express Lanes joint agreement for incident monitoring and management and Freeway Service Patrol (FSP) located at the 91 Express Lanes Traffic Operations Center (TOC) in Anaheim, CA.

2.7.4. Cost Estimates

Is the estimated cost of the facility reasonable in relation to the cost of similar projects?

While median-to-median connectors are common, the 241/91 EC mix of improvements and existing conditions are unique – connection between a toll road and express lanes in a location where three tolling agencies and two Caltrans Districts converge. There are no directly analogous projects to which costs could be effectively compared. The 241/91 EC cost estimate has been updated through the project delivery process using the most recent and relevant construction cost data. All parties agree that the 241/91 EC is reasonable and deliverable.

The closest comparison available is the recently completed 15/91 Express Lanes Connector (ELC) delivered by RCTC for $270 million. Similar to the 241/91 EC, the 15/91 ELC project connects existing express lanes facilities and is part of a phased ultimate system build out. The current cost comparison of major project expenditures are shown in Table 2-7.

Table 2-7: Project Cost Comparison

	241/91 EC	15/91 EC
PE	$53,331	$19,000
ROW	$40	$10,000
CON	$462,839	$241,000
Total	**$516,210**	**$270,000**

**amounts in $1,000's*

When the 241/91 EC project restarted in 2020 the project costs was estimated at $250 million. As the 241/91 project progressed through final engineering and operations development new project elements have been added, scope increased, and construction costs have dramatically risen at historic rates. Consequently, the engineer's estimate for construction of the 241/91 EC has doubled since the project re-start in 2020. Additional complexity related to engineering, design, and administrative items has resulted in a higher cost of the 241/91 EC when compared to the 15/91 ELC, which, includes the following:

- Additional scope and larger project area than the 15/91 EC
- Increased costs of engineering and design to incorporate new design standards and
- Additional consultant contract rates upon restarting the project after the 2019 Term Sheet agreement,
- Two environmental revalidation efforts with two different Caltrans District offices,
- Three separate toll systems providers contracts required during construction at this confluence of three toll systems,
- Significant toll systems design effort to implement the innovative progressive demand management strategies,
- Separate construction management contract administration for the civil construction (by Caltrans) and toll systems installation (by F/ETCA),
- Legal support for complex and protracted drafting and review of project-related agreements.

Also, the 15/91 ELC project had cost-saving elements that are not available to the 241/91 EC project, including connecting express lanes facilities that are owned and operated by the same entity in a single county, coordinating reviews and approvals within a single Caltrans District office, and delivering using design-build contracting.

2.7.5. Equity

F/ETCA recognizes that equity is a guiding principle in the development and operation of transportation infrastructure in the State with the goal to be inclusive and beneficial to all communities, particularly underserved and disadvantaged communities.

The current 241/91 EC already addresses several key equity considerations. These include:

- Measures to improve traffic flow and reduce congestion, which will benefit all commuters by providing faster and more reliable access to job centers and provide this benefit for free to buses and registered vanpool modes. F/ETCA will also adopt a discount policy in which HOV 3+ will be able to use the 241/91 EC for free during off-peak periods.
- Public and stakeholder engagement efforts to date have sought input from a diverse array of stakeholders as part of the environmental process, regular opportunity for comment at recent project-related public meetings, and neighborhood meetings requested by TCA member cities, such as the City of Anaheim. In addition to 241/91 EC information posted on The Toll Roads website, TCA's community engagement staff provides a 241/91 EC fact sheet at each public event it participates in throughout the year. In 2024, TCA had a booth at 47 events, with a total attendance of 240,000 people from various areas throughout the Southern California region.
- Flexible payment options include unbanked solutions like PayNearMe to ensure users can replenish FasTrak® accounts and resolve violations regardless of banking status.
- Additionally, one of the reasons F/ETCA is pursuing supplemental tolling authority is to expand opportunities to use excess net toll revenue for projects and programs that would further improve conditions beyond the current ETC system to benefit the wider transportation system that is affected by the 241/91 EC connection.

F/ETCA is committed to working with the CTC and partner agencies to confirm that the 241/91 EC is meeting equity considerations and will make adjustments as necessary, prior to and during operations.

3. SUPPLEMENTAL INFORMATION

3.1. Term Sheet and Caltrans Support Letter (2019)

3.2. Project Study Report / Project Development Support (PSR/PDS) (2012)

3.3. Executed Project Cooperative Agreements (Caltrans) – PA/ED (2014), PS&E and Right of Way (2017)

3.4. Summary of Final Supplemental Environmental Impact Report/Environmental Impact Statement (2020)

3.5. 241/91 Express Lanes Connector Traffic Analysis Report (2015)

3.6. Letter of Consent (OCTA) (anticipated September 2025)

SR-241 / 91 Express Connector Term Sheet

Program of Projects

- 91 Corridor program of projects and sequencing[1]
  - 15/91 EB/NB Express Lanes Connector (ELC)
  - SR-91 WB Corridor Operations Project (COP)
  - SR-91/SR-71 EB/NB Connector[2]
  - SR-241/91 Express Connector (EC)

- All parties agree to work together to resolve geometric and operations issues between 91 COP, SR-241 / 91 EC, and future 6th Lane with the mutual goal of minimizing cost, scope, schedule and construction impacts to all projects.
  - The SR-91 COP schedule will not be delayed.

Project Approval / Environmental Documentation (PA/ED)

- TCA to deliver the SR-241/91 EC PA/ED. TCA and Caltrans will update the environmental document with consideration of the comments received.

- Caltrans shall not finalize / approve PA/ED until RCTC and OCTA have had a 30-day opportunity to review response to comments. Caltrans shall not sign the Notice of Determination or Record of Decision any sooner than January 2, 2020.

- OCTA to process the Federal Transportation Improvement Program (FTIP) amendment for SR-241/91 EC for Right-of-Way (ROW) and Construction phases immediately following RCTC and OCTA having had a 30-day opportunity to review response to comments.

Project Delivery

- TCA to complete final design of SR-241/91 EC with Caltrans oversight.
- Caltrans has final design approval of SR-241/91 EC.

---

[1] See Appendix A for SR-91 Projects Sequencing Priorities dated September 12, 2019.
[2] SR-241/91 EC is not dependent upon completion of SR-71/SR-91 Interchange Improvements.

- TCA will provide OCTA and RCTC ample opportunity to review and concur with all aspects of the final design. OCTA and RCTC shall focus on the interface of the SR-241/91 EC with the existing 91 Express Lanes facility and agreed upon projects in the attached SR-91 Projects Sequencing Priorities.
    - Caltrans and TCA shall consider all reasonable comments and requests from OCTA and RCTC, and OCTA and RCTC comments and requests to Caltrans and TCA shall be fair and reasonable.
- Caltrans District 12 to Advertise, Award, Administer (AAA) construction phase.

SR-241/91 EC Capital and Support Funding

- TCA to fund 100% of Plan, Specification and Estimate (PS&E), ROW, and Construction including tolling infrastructure.
- Project will not be financed.
- OCTA, RCTC, TCA and Caltrans to seek eligible funds from external discretionary and/or competitive non-TCA funds (i.e. SB1).
    - TCA funds to be reduced by receipt of any external discretionary and/or competitive non-TCA funds.
    - Attempts to seek external discretionary and/or competitive non-TCA funds would not delay the project.

Roadway Maintenance Responsibility

- Caltrans to be responsible for performing maintenance of all improvements constructed as part of SR-241/91 EC (roadway, structures, etc.).
- Maintenance requirements to be funded from SR-241/91 EC toll revenues.

Toll Revenues

- Parties to receive toll revenue from SR-241/91 EC equal to percentage of capital and support funding provided (e.g., 100% of capital and support funding = 100% EC toll revenue, 80% of capital and support funding = 80% EC toll revenue).

- Term of tolling shall be consistent with latest sunset date for existing 91 Express Lanes, TCA agreements or any subsequent amendments in the future.

- 91 Express Lanes to be paid/reimbursed for any 91 Express Lanes operating cost or maintenance cost incurred, if any.

- Use of toll revenues shall be consistent with AB 194, modified as follows:

    A. Repayment of funds with interest, excluding external discretionary funds, used to construct the SR-241/91 EC. Interest rate will be based upon the Surplus

Money Investment Fund rate as defined in the California Streets and Highway Code.

B. The development, maintenance, repair, rehabilitation, improvement, reconstruction, administration, and operation of improvements constructed as part of SR-241/91 EC, including toll collection and enforcement.

C. Reserves for the purposes specified in subparagraph (B).

D. All remaining revenue generated by the toll facility shall be used in the corridors from which the revenue was generated pursuant to an expenditure plan developed by the sponsoring agency.

E. The expenditure plan shall be incorporated as part of the TCA Capital Improvement Plan (CIP) and be adopted annually by the TCA Board of Directors. TCA shall submit the CIP to OCTA for consistency review with the Regional Transportation Plan and related programs.

F. The administrative expenses related to operation of SR-241/91 EC facility shall not exceed 3 percent of the toll revenues.

241 / 91 EC Operations

- OCTA/RCTC to operate the SR-241/91 EC including calculating and posting dynamic pricing, traffic/incident monitoring via CCTV in the Traffic Operations Center, management of SR-241/91 EC closures, dispatch of CHP and tow trucks for incidents, creation and processing of toll transactions, revenue collection, violation processing, etc.

- Additional operations terms will be included in an operations term sheet and will also be memorialized in a future operating agreement between TCA, OCTA, and RCTC.

APPENDIX A

SR 91 PROJECTS SEQUENCING PRIORITIES

1. **15/91 Express Lanes Connector**
   - Design-Build Request for Proposals (RFP) Due – November 2019
   - Design-Build Contract – March 2020
   - Design-Build Notice to Proceed – Spring 2020
   - Open to Traffic – End of 2022

2. **SR-91 Corridor Operations Project**
   - PA/ED – October 2019
   - Construction Advertisement – March 2020
   - Open to Traffic – End of 2021

3. **SR-71/SR-91 Interchange Improvements**
   - Environmental Document and Re-evaluation – Completed
   - Ready to List Target – 2021 Design update needed due to new structures standards
   - Open to Traffic – Early 2023

3. **SR-241 / SR-91 Express Connector**
   - PA/ED – November 2019
   - Construction – Notice to Proceed for construction in early 2023, or sooner if mutually agreed to based on a technical review of construction staging, traffic handling / lane closure for SR-241/91 EC and 15/91 ELC. This effort will not impact the delivery of the 15/91 ELC which is the priority.

Related Project Responsibilities

- Caltrans District 8 to be the lead Caltrans district for all RCTC-led projects.
  - District 12 coordinates through District 8 on all issues related to Geometric Approval Drawings (GAD), operations, etc.
- Caltrans District 12 to be lead Caltrans district for all OCTA-led and TCA-led projects.
  - District 8 coordinates through District 12 on all issues related to GAD, operations, etc.

Other Items

- Team will continue to work together to evaluate the Westbound Third Express Lane and if determined to be necessary, implementation will be jointly developed.
- SR-71/SR-91 Interchange Improvements and SR-241/91 EC are not contingent upon each other. Specifically, completion of the SR-71/SR-91 Interchange Improvements are not required prior to the SR-241/ 91 EC going to construction.
- 6th General Purpose Lane Addition (SR-241 to SR-71)
  - Team would work together to investigate the feasibility of the addition, including the potential of an interim option.

DEPARTMENT OF TRANSPORTATION
District 8 and 12
PHONE (657) 328-6000
FAX (657) 328-6522
TTY 711

Making Conservation a California Way of Life.

September 26, 2019

Mr. Darrell Johnson, Chief Executive Officer
Orange County Transportation Authority
550 South Main Street
Orange, CA 92863

Mr. Michael A. Kraman, Chief Executive Officer
Transportation Corridor Agencies
125 Pacifica, Suite 100
Irvine, CA 92618

Ms. Anne Mayer, Executive Director
Riverside County Transportation Commission
P.O. Box 12008
Riverside, CA 92502

Dear Mr. Johnson, Mr. Kraman, and Ms. Mayer:

The California Department of Transportation (Caltrans), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC) and Transportation Corridor Agencies (TCA), have collaborated on drafting a term sheet for the SR-241/91 Express Connector project and other State Route 91 project sequencing of near-term projects, with the mutual goal of minimizing cost, scope, schedule and construction impacts to all projects.

Caltrans Districts 8 and 12 agree with and support the items included in the term sheet, dated September 12, 2019.

Caltrans looks forward to continuing to partner and collaborate with OCTA, RCTC, and TCA in efficiently implementing these crucial projects on State Route 241 and 91.

If you have any questions or concerns, please contact me at (657) 328-6000, Director Beauchamp at (909)-383-6914, or Adnan Maiah, Deputy District Director, District 12 Capital Outlay Program, at (657) 328-6307 or by e-mail sent to <adnan_maiah@dot.ca.gov>

Sincerely,

RYAN CHAMBERLAIN
District 12 Director

Sincerely,

MICHAEL BEAUCHAMP
District 8 Director

Enclosures

c: Jim Beil, OCTA
David Thomas, RCTC
Adnan Maiah, Caltrans
Syed Raza, Caltrans
Roger Yoh, Caltrans

241 / 91 Express Connector
Operations Term Sheet
October 4, 2019

All agencies to provide input to the design of signage, traffic measurement/monitoring locations and considerations for toll collection system data. OCTA and RCTC to have final approval for the traffic measurement/monitoring locations.
241 / 91 EC to be dynamically priced with no price cap.
Traffic utilizing the 241 / 91 EC eastbound shall be required to continue using the 91 Express Lanes all the way to I-15 unless otherwise directed by OCTA/RCTC in consultation with Caltrans. The agencies will jointly develop the technical mechanisms to ensure vehicles stay in the 91 Express Lanes to the eastern terminus. Pricing may be used as a mechanism.
241 / 91 EC dynamic pricing operational parameters to be negotiated and memorialized in an operating agreement between TCA, OCTA, RCTC. • Operational parameters shall be based on existing operating policies where they exist. 91 Express Lanes operating policies shall govern where there is a conflict with other agencies operating policies. • Eastbound – Goal is to utilize available EB 91 Express Lanes capacities without negatively impacting its operations beyond established capacity thresholds.
The dynamic pricing algorithm and input values to be developed in partnership between TCA, OCTA, and RCTC based on the operational parameters. • OCTA and RCTC shall have final approval for the dynamic pricing algorithms and input values.
TCA, OCTA, and RCTC shall work jointly to calibrate the dynamic pricing algorithm and dynamic pricing input values. OCTA and RCTC shall have final approval for changes to the dynamic pricing algorithm and dynamic pricing input values. TCA may request changes to the dynamic pricing algorithm and input values. OCTA and RCTC shall reasonably assess a request and respond to the TCA timely.

241 / 91 Express Connector
Operations Term Sheet
October 4, 2019

A 241 / 91 EC operational and performance data report shall be published monthly. If desired, Parties shall be provided access to an operational performance data portal. OCTA and RCTC shall present a Quarterly Operational and Performance Report to the Foothill / Eastern Transportation Corridor Agency Board of Directors.
OCTA and RCTC shall have control of all of the dynamic pricing systems.
Separate FSP-type services and CHP required for the 241 / 91 EC
Ramp metering and physical closure capabilities shall be developed to facilitate operation of the 241 / 91 EC. • The 241 / 91 EC may be metered based on established capacity threshold values due to excessive congestion in the 91 Express Lanes. • The 241 / 91 EC can be closed to traffic at the request of Caltrans, OCTA, RCTC or TCA due to: - Planned or unplanned closures of the 91 Express Lanes or SB 241; - Incidents and emergency situations; or - Excessive congestion.
All agencies agree to develop an interfacility incident management plan.

12-ORA-241-PM36.10/91-PM14.7-PM17.9
EA 0K970K
Project ID: 1200020097
January 2012

PROJECT STUDY REPORT – PROJECT DEVELOPMENT STUDY (PSR-PDS)

TO

Request Programming for Capital Support (Project Approval and Environmental Document Phase)

On Route SR-241 and SR-91

Between SR-241 Windy Ridge Toll Plaza

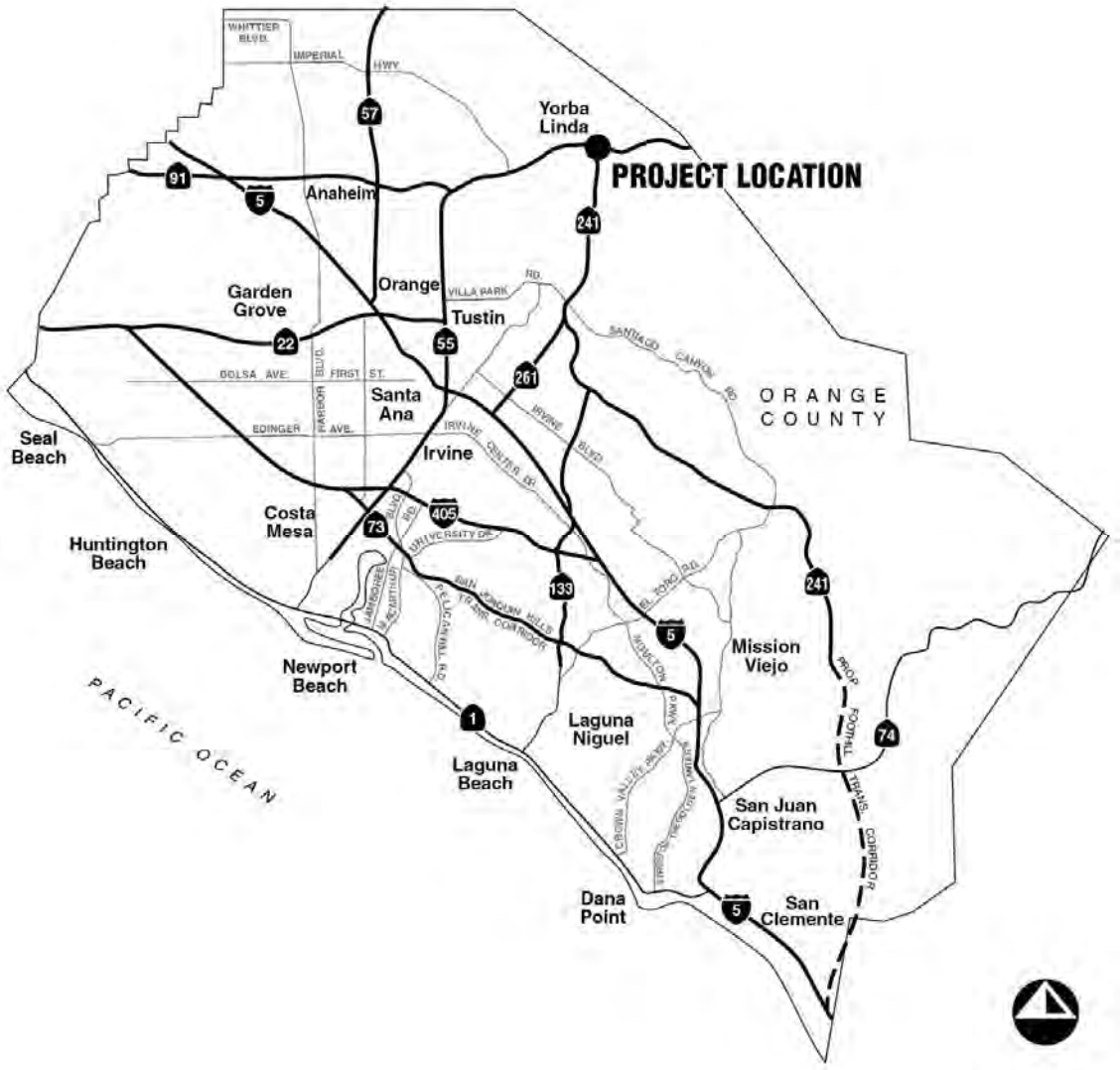
And SR-91/Coal Canyon Road

APPROVAL RECOMMENDED: _____
Lisa Ramsey, PE Project Manager

AM APPROVED: _____ 1-17-12
Cindy Quon, PE District Director Date

12-ORA-241-PM36.10/91-PM14.7-PM17.9
EA 0K970K
Project ID: 1200020097
January 2012

Vicinity Map



On Route SR-241 and SR-91

Between SR-241 Windy Ridge Toll Plaza

And SR-91/Coal Canyon Road

12-ORA-241-PM36.10/91-PM14.7-PM17.9
EA 0K970K
Project ID: 1200020097
January 2012

This Project Study Report (PDS) has been prepared under the direction of the following Registered Engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Alan Su, Registered Civil Engineer

1/5/12
Date

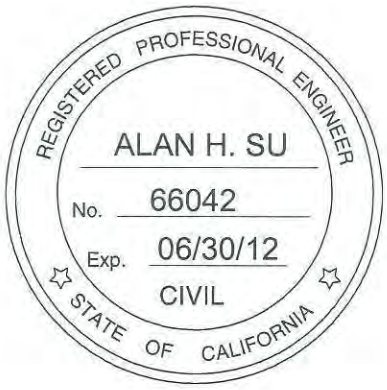


Table of Contents

	Section	Page
1.	Introduction	1
2.	Background	1
3.	Purpose and Need Statement	2
4.	Deficiencies	3
5.	Corridor and System Coordination	6
6.	Alternatives	7
7.	Community Involvement	9
8.	Environmental Determination/Document	9
9.	Funding	10
9A	Capital Cost	10
9B	Capital Support Estimate for the Programmable Alternative (2011 STIP)	10
10.	Schedule	10
11.	FHWA Coordination	11
12.	District/Project Contacts	11
13.	Project Reviews	11
14.	Attachments	11

Alternative Concepts 1 through 6

Alternative 1 Preliminary Plans

Right of Way Data Sheet (Alternative 1)

PSR-PDS Comment Response Matrix

Preliminary Environmental Analysis Report

Draft Cooperative Agreement

Final Feasibility Study Report (provided under separate cover)

Storm Water Data Report (provided under separate cover)

1. INTRODUCTION

The Foothill/Eastern Transportation Corridor Agency (F/ETCA) proposes to construct a new median to median connector ramp from State Route 241 (SR-241) to State Route 91 (SR-91) in the City of Anaheim. The proposed connector ramp would provide additional access to SR-91 east of SR-241. The proposed median to median ramp that will connect SR-241 and the SR-91 Express Lanes, which are tolled facilities, is also proposed to be a tolled facility.

Six alternative ramp connection concepts have been considered in addition to the "no-build" alternative. Alternative 1 is the recommended alternative as it best meets the purpose and need of the project. Alternatives 2 through 6 were rejected as described in Section 6 – Alternatives.

The Project Development Category is 4B as it will not require right of way and will not substantially increase traffic capacity.

Project Limits Dist., Co., Rte., PM	**12-ORA-241-36.10/91-17.95**
Number of Alternatives:	**1 build and no-build (five rejected)**
Capital Outlay Support for PA/ED	**$2 million**
Capital Construction Cost Range (excluding "no build").	**$135 million to $150 million**
Right of Way Cost Range (excluding "no build").	**$0**
Funding Source:	**Local and Possible Federal Funding**
Type of Facility (conventional, expressway, freeway):	**Freeway**
Number of Structures:	**Four**
Anticipated Environmental Determination of Document:	**Revalidation/Re-evaluation and Addendum to previously approved EIS/EIR**
Legal Description	**Anaheim, Orange County, CA**
Project Category	**4B**

The remaining support, right of way and construction components of the project are preliminary estimates and are not suitable for programming purposes. A Project Report will serve as the programming document for the remaining support and capital components of the project. A Project Report will serve as approval of the selected alternative.

2. BACKGROUND

SR-241 is a toll-only facility, starting at the Oso Parkway interchange in south Orange County, to its terminus at State Route 91 (SR-91). The 91 Express Lanes is a two-lane toll facility on SR-91 in each direction from State Route 55 (SR-55) to the Orange/Riverside County line (east of the SR-241 interchange). SR-91 and SR-241 are publicly owned facilities. Currently, there is no connection between the SR-241 toll lanes and the SR-91 Express Lanes.

In March 2009, the 91 Express Lanes Extension and State Route 241 Connector Feasibility Study was prepared with the following objectives:

- Develop and evaluate concepts for a median-to-median connection between State Route 241 (SR-241) and the 91 Express Lanes;
- Identify where to drop and start the added lanes merging to and from SR-241; and
- Propose how an extension of the new median-to-median connection could be integrated into planned freeway improvements in Orange County and Riverside County.

The study activities included a review of current plans and programs, identification of issues, development of a range of project alternative concepts, and conducting conceptual engineering and evaluation of six alternative concepts (ACs). The evaluation included environmental, traffic, geotechnical, right-of-way, utilities and consideration. Financial feasibility was not considered as a part of that study, however, toll revenue impacts were considered in a parallel study and summarized in the conclusion of the feasibility study.

Stakeholders that were identified and included preparation of the Feasibility Study included:

- Orange County Transportation Authority (OCTA)
- Caltrans District 8 and District 12
- Riverside County Transportation Commission (RCTC)
- F/ETCA
- City of Anaheim
- City of Corona

3. PURPOSE AND NEED STATEMENT

NEED:
The need for the project arises from the lack of connectivity between SR-241 and SR-91 Express Lanes, which results in a variety of deficiencies that negatively affect traffic flow and worsen an already congested SR-91 during peak hours. These deficiencies are described below.

- Northbound vehicles on SR-241 cannot access the eastbound SR-91 Express Lanes. Northbound vehicles PM peak period on SR-241 backup prior to entering eastbound SR-91 mainline. Access from northbound SR-241 to eastbound SR-91 is provided by means of a two-lane connector that merges with the SR-91 general-purpose lanes.
- Northbound SR-241 motorists that want to use the eastbound SR-91 high-occupancy vehicle (HOV) lanes must weave across four lanes to access them.
- Westbound SR-91 Express Lanes cannot access southbound SR-241. Access from westbound SR-91 to southbound SR-241 is provided by means of a two-lane connector that diverges from the general-purpose lanes. The limitations of the existing interchange connections require that vehicles using the westbound SR-91 high-occupancy vehicle (HOV) lane weave across four lanes to access the southbound SR-241 connector ramp.

PURPOSE:
The purpose of the Project is to implement the buildout of the ETC as approved in 1994, be compatible with the proposed SR-91 Corridor Improvement Project (CIP), while minimizing

environmental and financial impacts. The study area includes the SR-241 from the SR-91/SR-241 interchange to 12,600 feet south of the interchange and SR-91 from the SR-91/SR-241 interchange to the Coal Canyon/SR-91 Undercrossing.

The median to median connector (Project) was previously evaluated in the ETC Final EIR/EIS. As stated in the Final EIR/EIS, the overall objective of the proposed ETC project was to accommodate traffic growth associated with planned and approved development in Orange County. Specifically, the ETC project was proposed to meet the following objectives:

- To provide relief for existing freeways.
- To help achieve the Regional Mobility Plan goals of reducing emissions from transportation sources.
- To improve traffic flow on the regional transportation system.
- To reduce current and projected congestion and air pollution along portions of SR-91, Costa Mesa Freeway (SR-55) and I-5 by providing an alternative travel route in northeast Orange County.
- To service existing and planned development consistent with the General Plans of the County and the cities in areas that will benefit from the project.
- To employ advanced transportation technology for the maximum operational and design efficiency and automatic vehicle monitoring for toll collections.
- To implement the County of Orange Master Plan of Arterial Highways.

4. DEFICIENCIES

Currently, northbound SR-241 vehicles cannot access the eastbound SR-91 Express Lanes. Access from northbound SR-241 to eastbound SR-91 is provided by means of a two lane connector that merges with the SR-91 general purpose lanes. Westbound SR-91 Express Lanes cannot access southbound SR-241. Access from westbound SR-91 is provided by means of a two lane connector that diverges from the general purpose lanes. The limitations of the existing interchange connections require that vehicles using the westbound SR-91 HOV lane weave across four lanes to access the southbound SR-241 connector ramp. Northbound SR-241 vehicles that want to use the eastbound SR-91 HOV lanes must weave across four lanes to access them. The existing deficiency that results from the lack of a median connector between the two freeway facilities will be exacerbated with the construction of the SR-91 CIP which proposes to extend the existing Express SR-91 Lanes to I-15.

Hourly Speed Trends
Weekday speed data were extracted from PeMS at specific locations along SR-91 and SR-241. Tables 4-1 and 4-2 are lists of the locations reported.

Table 4-1

Speed Data Locations on SR-91

No.	EB Locations	WB Locations
1	West of Gypsum Canyon	West of Coal Canyon
2	Gypsum Canyon 1 (before SB on-ramp)	East of Gypsum Canyon
3	Gypsum Canyon 2 (before NB on-ramp)	Gypsum Canyon (before Gypsum on-ramp)
4	East of Gypsum Canyon (0.44 miles from Gypsum 2)	West of Gypsum Canyon

Table 4-2

Speed Data Locations on SR-241

Approach	Location
NB SR-241	500 ft South of NB 241 to EB 91 off-ramp
SB SR-241	1800 ft South of EB 91 to SB 241 on-ramp

Hourly speed trends are shown in Figures 4-3, 4-4 and 4-5 for eastbound SR-91, westbound SR-91, and SR-241. The figures illustrate significant reductions in the eastbound SR-91 speeds and northbound SR-241 speeds in the vicinity of the SR-241/SR-91 interchange that occur in the evening peak hour period between 3:00 pm and 6:00 pm. The significant speed reductions are consistent with the weaving volumes and congestion in the interchange area.

Figure 4-3

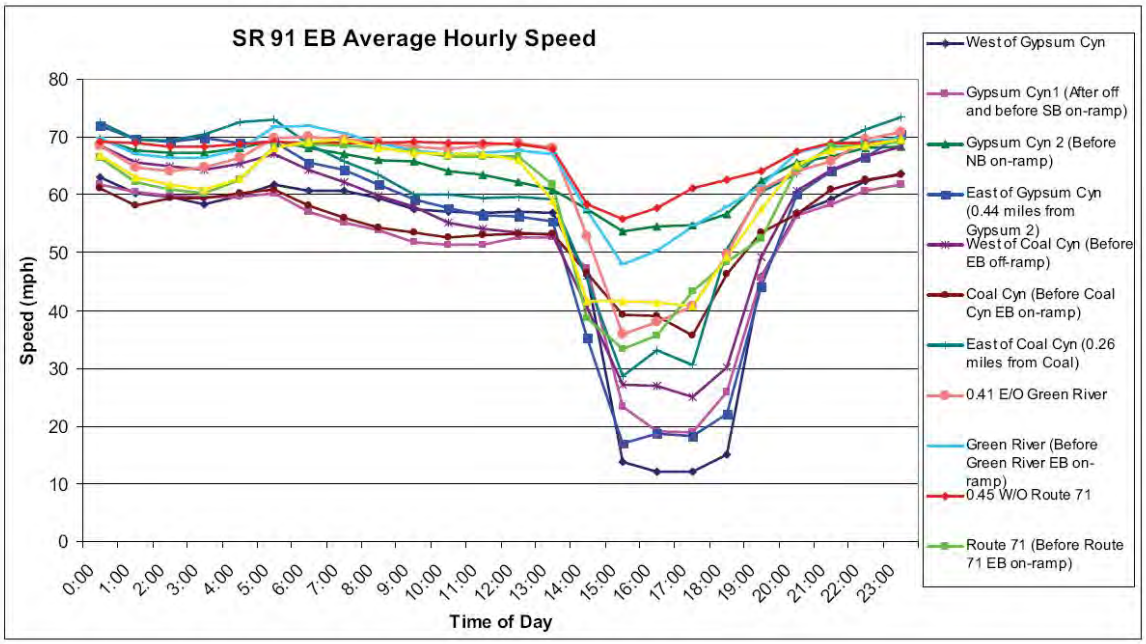


Figure 4-4

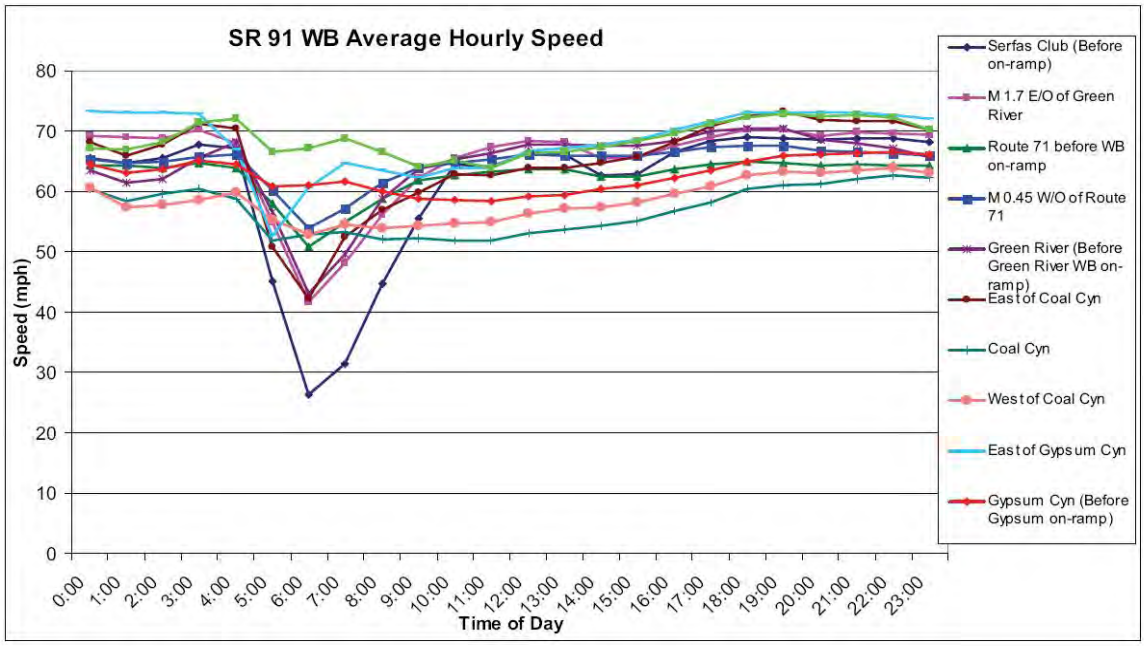
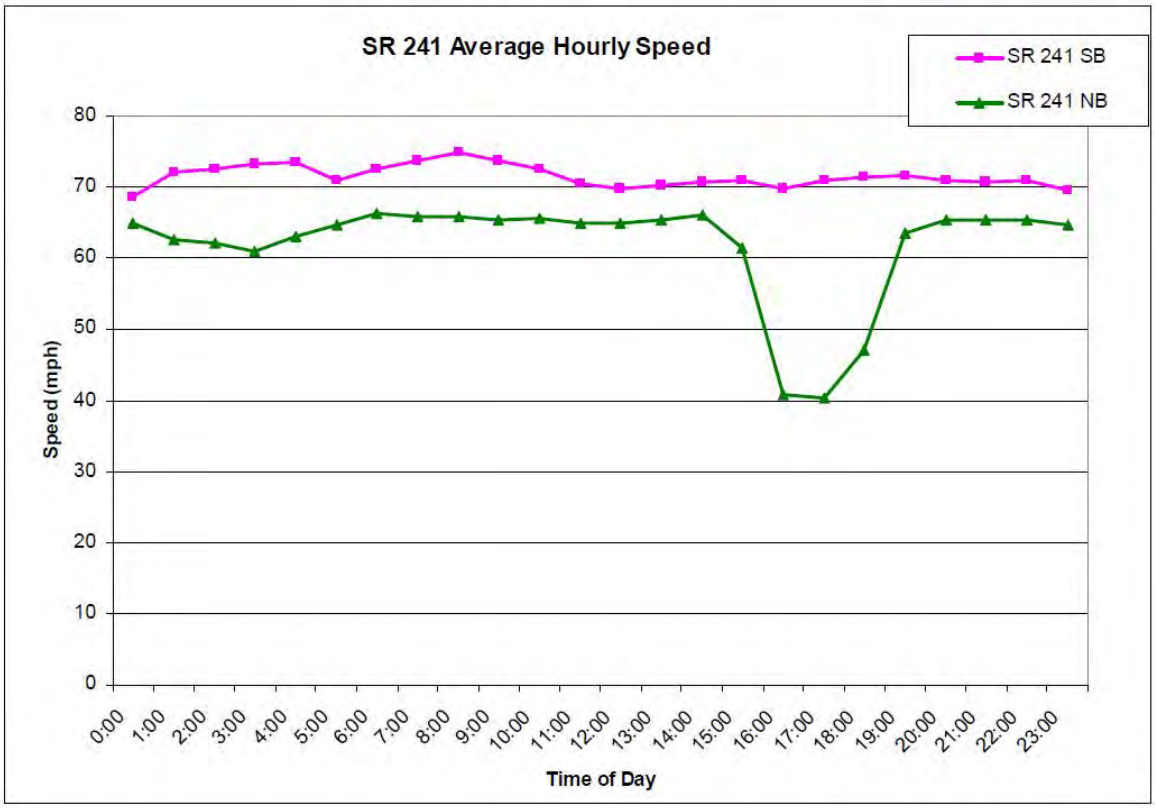


Figure 4-5



Accident Analysis

Caltrans provided Traffic Accident surveillance and Analysis System (TASAS) accident data for SR-241 and SR-91 mainline and ramps for the period of July 1, 2003 through June 30, 2006. Table 4-6 is a summary of the accident data for the mainline. The locations where the actual accident rates are higher than the state average rate are highlighted. The rates are particularly high in the eastbound and westbound sections of SR-91 immediately east of SR-241. These higher accident rates are consistent with the weaving volumes and congestion in these sections.

Table 4-6

TASAS Data on Mainline SR-91 and SR-241

				Actual Rates			Average Rates		
Route	PM	Location	Total	Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total
SR-241	32.640/ 39.078	SR-241 Southbound	44	0.012	0.11	0.27	0.005	0.18	0.54
SR-241	32.640/ 39.078	SR-241 Northbound	83	0.012	0.11	0.52	0.005	0.18	0.54
SR-91	14.430/ 15.140	SR-91 Eastbound (Weir Canyon to SR-241) – 0.71 miles	235	0.000	0.66	2.26	0.004	0.26	0.84
SR-91	15.164/ 18.904	SR-91 Eastbound (SR-241-County line) – 3.74 miles	643	0.006	0.37	1.34	0.006	0.39	1.23
SR-91	0.000/ 7.450	SR-91 Eastbound (County line to I-15) – 7.45 miles	1283	0.004	0.33	1.21	0.006	0.37	1.15
SR-91	7.450/ 0.000	SR-91 Westbound (I-15 to County line) – 7.45 miles	1486	0.005	0.40	1.38	0.006	0.37	1.15
SR-91	18.904/ 15.164	SR-91 Westbound (County line – SR-241) – 3.74 miles	65	0.008	0.28	0.99	0.006	0.39	1.23
SR-91	14.681/ 14.430	SR-91 Westbound (SR-241 to Weir Canyon) – 0.35 miles	480	0.000	0.60	1.82	0.004	0.27	0.86

Note: Accident Rates expressed as number of accidents / million vehicle miles

5. CORRIDOR AND SYSTEM COORDINATION

The project is consistent with statewide, regional and local planning. It is included in the SR-91 Implementation Plan and is planned for construction after the SR-91 CIP is completed.

6. ALTERNATIVES

Six alternative build concepts were developed for a new median to median connector ramp from SR-241 to SR-91. Each of the alternatives was evaluated with respect to the project's purpose and need. Evaluation criteria included:

- Freeway Traffic Operations
- Local Impacts
- Toll Revenue
- Design/Safety
- Physical and Environmental Constraints
- Planning Consistency
- Construction Staging and Traffic Handling
- Cost

The following traffic analysis will be developed during the PA/ED phase of the project:

- Traffic operation analysis within the project area,
- Traffic weaving analysis within the project area,
- Traffic accident analysis

The project traffic operation analysis does not include a tolling/revenue component to test the sensitivity of the proposed toll mitigation on the Direct Connector. A copy of the PSR-PDS comment response matrix is included in the attachment section of this report.

Following is a description of the no-build alternative and six alternative build concepts that have been evaluated. Figures illustrating the concepts, features, potential benefits and issues are included in the report attachments. The Final Feasibility Study Report dated March 2009 is an attachment to this report and is provided under separate cover.

No Build Alternative
Under this alternative, no direct connector would be constructed between SR-241 and SR-91. This alternative would not close the toll connector gap between the SR-241 and the SR-91 and would not meet the project purpose and need.

Alternative Concept 1
Alternative 1 allows for tolled vehicles and HOVs to bypass congestion via a two-lane median-to-median connection between SR-241 and SR-91. The connection to the existing Express Lanes would be done with standard HOV tapers, which would not require extensive widening of SR-91. The physical footprint of the concept would be compatible with potential future improvements to SR-91. Also, it is consistent with the original environmental document prepared by TCA for the SR-241 project. The length of the two-lane connector exceeds the Highway Design Manual (HDM) Advisory Design Standard 504.3(5) that stipulates a maximum 1,000 of length for a single lane ramp. This nonstandard design feature will require approval of an Advisory Design Exception Fact Sheet in the Project Approval/Environmental Document (PA/ED) phase of the project. This alternative can also be operated as a High Occupancy Toll (HOT) facility.

A total of four (4) structures will be improved/constructed as part of the proposed project. The following is a list of the bridge structures, with approximate cost estimate from the project Feasibility Study Report, within the project area:

- Construct a new SR-241/SR-91 Direct Connector Bridge Structure, approximately $29.1 million
- Construct a new SR-241/SR-91 NW Direct Connector Undercrossing Bridge Structure, approximately $8.4 million
- Widen an existing eastbound SR-91 Gypsum Canyon Road Undercrossing Bridge Structure (55-0506), approximately $2.4 million
- Widen an existing SR-241 Wildlife Undercrossing Bridge Structure (55-0724L), approximately $1.7 million

Alternative 1 is the recommended build alternative.

REJECTED ALTERNATIVES

Alternative Concept 2

The concept is a four-lane High Occupancy Toll (HOT) connector to existing 91 Express Lanes. This alternative is similar to Alternative Concept 4 except that no additional capacity would be added to the 91 Express Lanes. The additional traffic added to the Express Lanes would result in potential capacity deficiencies (whether or not the Express Lanes were extended) and weaving issues (if the Express Lanes were not extended). This concept would have environmental impacts beyond those identified in the original EIR/EIS and is not recommended for further consideration.

Alternative Concept 3

This concept is a reversible two-lane connector. Although the concept of a reversible connector was feasible from a design consideration, the additional traffic associated with a tolled connector would be an issue for the Express Lanes, and not the connector itself. The two-lane connector provides sufficient capacity, but the concept would not include any additional capacity on the critical section of the Express Lanes east of SR-241. While the connector could be built, it would not address the project objective of improving traffic congestion. This concept would have environmental impacts beyond those identified in the original EIR/EIS and is not recommended for further consideration.

Alternative Concept 4

This concept provides a standard four-lane connector and addresses the operational issues of the additional traffic in the Express Lanes by widening the Express Lanes to three lanes in each direction to approximately the SR-71 interchange. It provides a median-to-median connection, addresses issues of congestion relief and complies with the HDM Advisory Design Standard 504.3(5), but the concept would have significantly higher costs and environmental impacts beyond those identified in the original EIR/EIS and is not recommended for further consideration.

Alternative Concept 5

This concept is a four-Lane Toll Connector to Extended 91 Express Lanes (to I-15). Alternative 5 is similar to Alternative 4, except that the third Express Lane extends to I-15. The section of SR-91 between SR-71 and I-15 is constrained, and adding a third Express Lane would result in significant right-of-way impacts in the City of Corona. The physical constraints were considered a fatal flaw to the feasibility of Alternative 5.

Alternative Concept 6
This concept would provide a SR-241/SR-71 Direct Toll Connector for SR-241 and SR-71 traffic. This would be a relatively high-cost concept, and only focused on a specific portion of the travel demand between SR-241 and SR-71. Given the physical challenges and cost of this concept, the other alternatives were viewed as more feasible. It is not recommended for further consideration.

7. COMMUNITY INVOLVEMENT

The recommended build alternative was evaluated in the original EIR/EIS which included a process for public involvement. The proposed project will require the continued involvement of stakeholders throughout the project development process.

8. ENVIRONMENTAL DETERMINATION/DOCUMENT

A Revalidation/Re-evaluation and Addendum document is anticipated for CEQA and NEPA compliance for the proposed project, and are estimated to be completed in 10 months. The findings of the environmental technical studies to be prepared during the PA/ED phase for the proposed project may change this conclusion to require preparation of a new Environmental Document.

The proposed project:

- Should add express lanes in the existing median with minimal outside widening and median barrier replacement;
- Would not require additional right-of-way;
- Would not involve large cuts and/or fills;
- Would not result in displacements;
- Would not generate a need for additional public utilities;
- Would not result in changes to access control and local traffic patterns;
- Would result in temporary construction impacts;
- May impact sensitive biological resources.

To address potential impacts of the proposed project, the following studies will be required: Traffic Study, Air Quality Analysis, HPSR, ASR, Natural Environmental Study (NES), Noise Analysis, Water Quality Assessment Report, Hazardous Waste Initial Site Assessment (ISA), Paleontology Memorandum, Preliminary Geotechnical Report, Water Quality Report and Visual Impact Memorandum.

The limits of the proposed project are within the jurisdiction of the Santa Ana Regional Water Quality Control Board (RWQCB). This project must conform to all applicable water quality regulations and/or permit requirements of the State Water Resources Control Board (SWRCB) and any applicable local Regional Water Quality Control Board(s) (RWQCB), including, but not limited to the Caltrans Statewide NPDES Permit (Order No. 99-06-DWQ, NPDES No. CAS000003), the Statewide General NPDES Permit for Construction Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002), and the Caltrans Storm Water Management Plan (May 2003), and any subsequent revision and/or additional requirements at the time of construction. A

Storm Water Data Report (SWDR) will be prepared at PID, PA/ED, and PS&E phases. Caltrans-approved Treatment BMPs will be considered during planning and design phases.

9. FUNDING

9A. CAPITAL COST

Capital Cost Estimate for the Alternative Identified for Programming

	Range of Total Cost	STIP Funds	Fund Source
Alternative 1	$135M to $150M	N/A	Transportation Corridor Agencies – Toll Revenue Fund and Possible Federal Fund

The level of detail available to develop this capital cost estimate is only accurate to within the above ranges and are useful for long-range planning purposes only. The capital costs should not be used to program or commit capital funds. The Project Report will serve as the appropriate document from which the remaining support and capital components of the project will be programmed.

A specific federal funding program has not been identified for the proposed project currently. However, it is anticipated that a federal funding program will be part of the project funding source, most likely from 91 corridor related funding.

See attached "ready to sign" cooperative agreement for cooperative features.

9B. CAPITAL SUPPORT ESTIMATE FOR THE PROGRAMMABLE ALTERNATIVE

	PROJECT SUPPORT COMPONENTS			
	PA&ED (Caltrans) 0 Phase		**PA&ED (TCA) 0 Phase**	**Total**
	Dist	**DES**	**TCA - Consultant**	
Estimated PY's	**2.6**	**0.21**	**Consultant**	**2.81 (Caltrans Only)**
Estimated PS $'s	**460,000**	**35,000**	**2,153,400**	**2,648,400**
Estimated PYE $'s ($1000's)	**0**	**0**		**0**
Total $'s	**460,000**	**35,000**	**2,153,400**	**2,648,400**

10. SCHEDULE

HQ Milestones	Delivery Date (Month, Day, Year)
Begin Environmental	06/01/11
Notice of Intent (NOI)	N/A
Circulate DED	N/A
PA&ED	1/9/13

Regular Right of Way	1/9/13
Project PS&E	4/01/14
Right of Way Certification	4/01/14
Ready to List	10/01/14
Approve Contract	1/02/15
Contract Acceptance	1/02/17
End Project	7/01/17

11. FHWA COORDINATION

No FHWA action is anticipated for this project at this time.

12. DISTRICT/PROJECT CONTACTS

Caltrans

Lisa Ramsey	(949) 724-2102
Constantino Stamation	(949) 724-2249
Ferdinand Agbayani	(949) 724-2694
Charles Baker	(949) 724-2252
Bahar Heydari	(949) 724-2703
Gary Slater	(949) 756-7685
Bassem Barsoum	(949) 724-2331
Karl Dreher	(916) 653-4937
Robert Enriquez	(949) 724-2406

Transportation Corridor Agency

Thomas Wheeler	(949) 754-3430
Romi Archer	(949) 553-0666

LSA

Lisa Williams	(949) 553-0666

RBF

Mike Chesney	(949) 855-5792
Alan Su	(949) 855-5788
Gary Warkentin	(949) 855-3625

13. PROJECT REVIEWS

Field Review: _____ Date: 4/21/11

HQ Design Coordinator:_____ Date: 9/14/11

14. ATTACHMENTS

Alternative Concepts 1 through 6
Alternative 1 Preliminary Plans
Right of Way Data Sheet (Alternative 1)
PSR-PDS Comment Response Matrix
Preliminary Environmental Analysis Report

Draft Cooperative Agreement
Final Feasibility Study Report (provided under separate cover)
Storm Water Data Report (provided under separate cover)

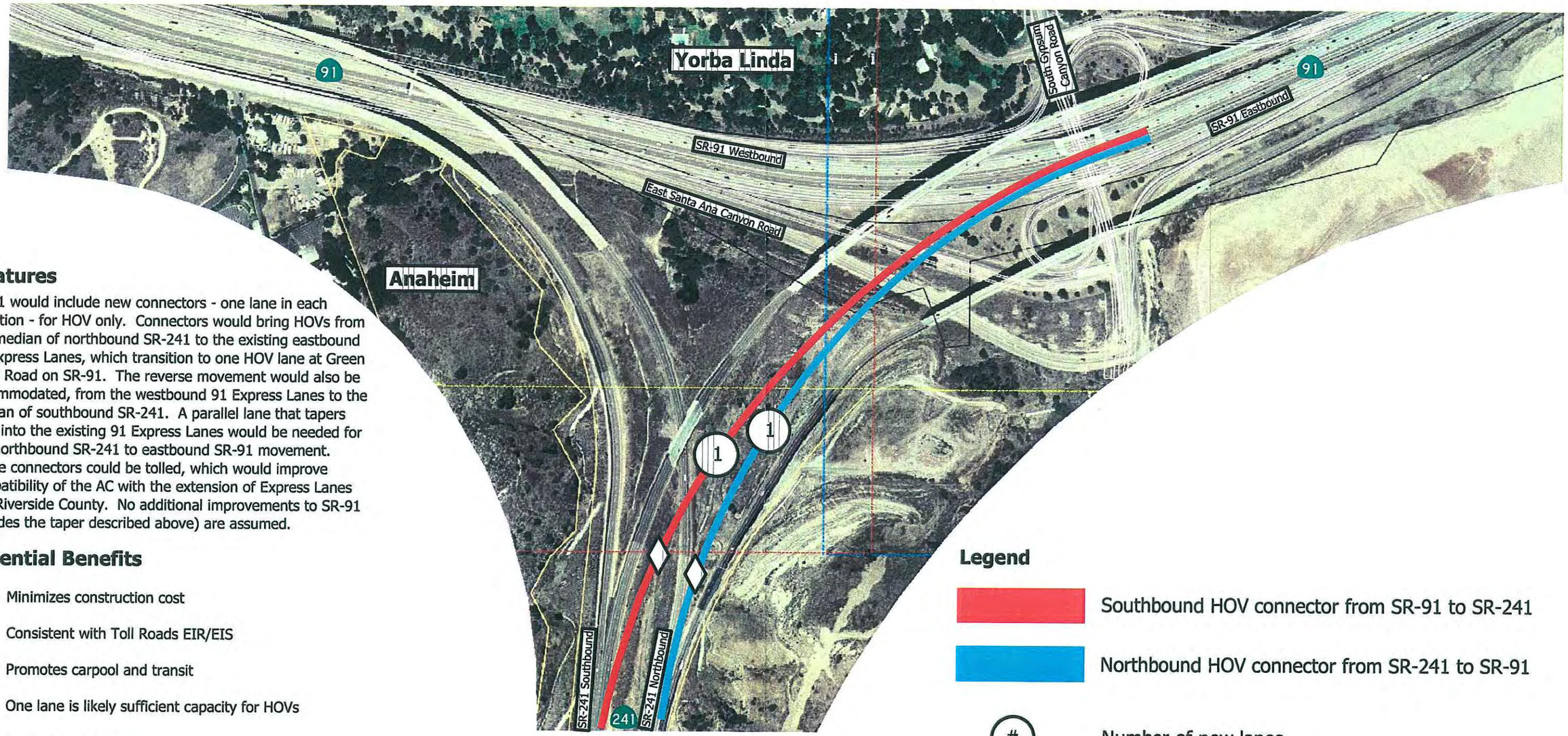
Alternative Concepts 1 through 6

91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #1

TWO-LANE HOV CONNECTOR TO EXISTING 91 EXPRESS LANES



Features

AC#1 would include new connectors - one lane in each direction - for HOV only. Connectors would bring HOVs from the median of northbound SR-241 to the existing eastbound 91 Express Lanes, which transition to one HOV lane at Green River Road on SR-91. The reverse movement would also be accommodated, from the westbound 91 Express Lanes to the median of southbound SR-241. A parallel lane that tapers back into the existing 91 Express Lanes would be needed for the northbound SR-241 to eastbound SR-91 movement. These connectors could be tolled, which would improve compatibility of the AC with the extension of Express Lanes into Riverside County. No additional improvements to SR-91 (besides the taper described above) are assumed.

Potential Benefits

- Minimizes construction cost
- Consistent with Toll Roads EIR/EIS
- Promotes carpool and transit
- One lane is likely sufficient capacity for HOVs

Potential Issues

- Not consistent with future SR-91 projects to extend the toll lanes, because it wouldn't be logical to connect toll facilities with an HOV connector
- Minimal operations benefits

Legend

- Southbound HOV connector from SR-91 to SR-241
- Northbound HOV connector from SR-241 to SR-91
- (#) Number of new lanes
- Carpool lanes

CH2MHILL

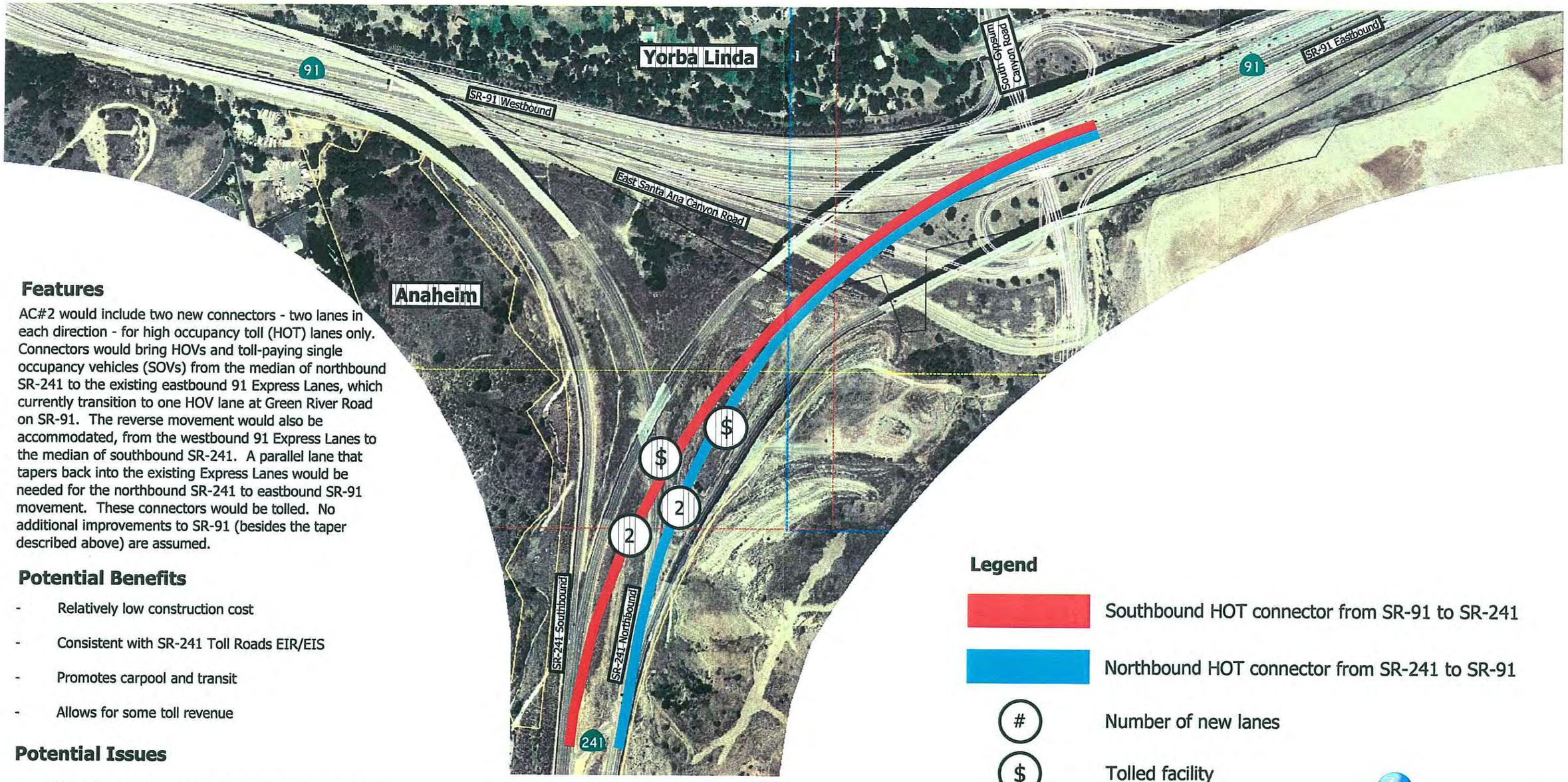
FIGURE #1

91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT#2

FOUR-LANE HOT CONNECTOR TO EXISTING 91 EXPRESS LANES



Features

AC#2 would include two new connectors - two lanes in each direction - for high occupancy toll (HOT) lanes only. Connectors would bring HOVs and toll-paying single occupancy vehicles (SOVs) from the median of northbound SR-241 to the existing eastbound 91 Express Lanes, which currently transition to one HOV lane at Green River Road on SR-91. The reverse movement would also be accommodated, from the westbound 91 Express Lanes to the median of southbound SR-241. A parallel lane that tapers back into the existing Express Lanes would be needed for the northbound SR-241 to eastbound SR-91 movement. These connectors would be tolled. No additional improvements to SR-91 (besides the taper described above) are assumed.

Potential Benefits

- Relatively low construction cost
- Consistent with SR-241 Toll Roads EIR/EIS
- Promotes carpool and transit
- Allows for some toll revenue

Potential Issues

- Potential operations issue if Express Lanes extension is not built - additional traffic added to Express Lanes/HOV transition at County line.

Legend

- Southbound HOT connector from SR-91 to SR-241
- Northbound HOT connector from SR-241 to SR-91
- (#) Number of new lanes
- ($) Tolled facility

CH2MHILL

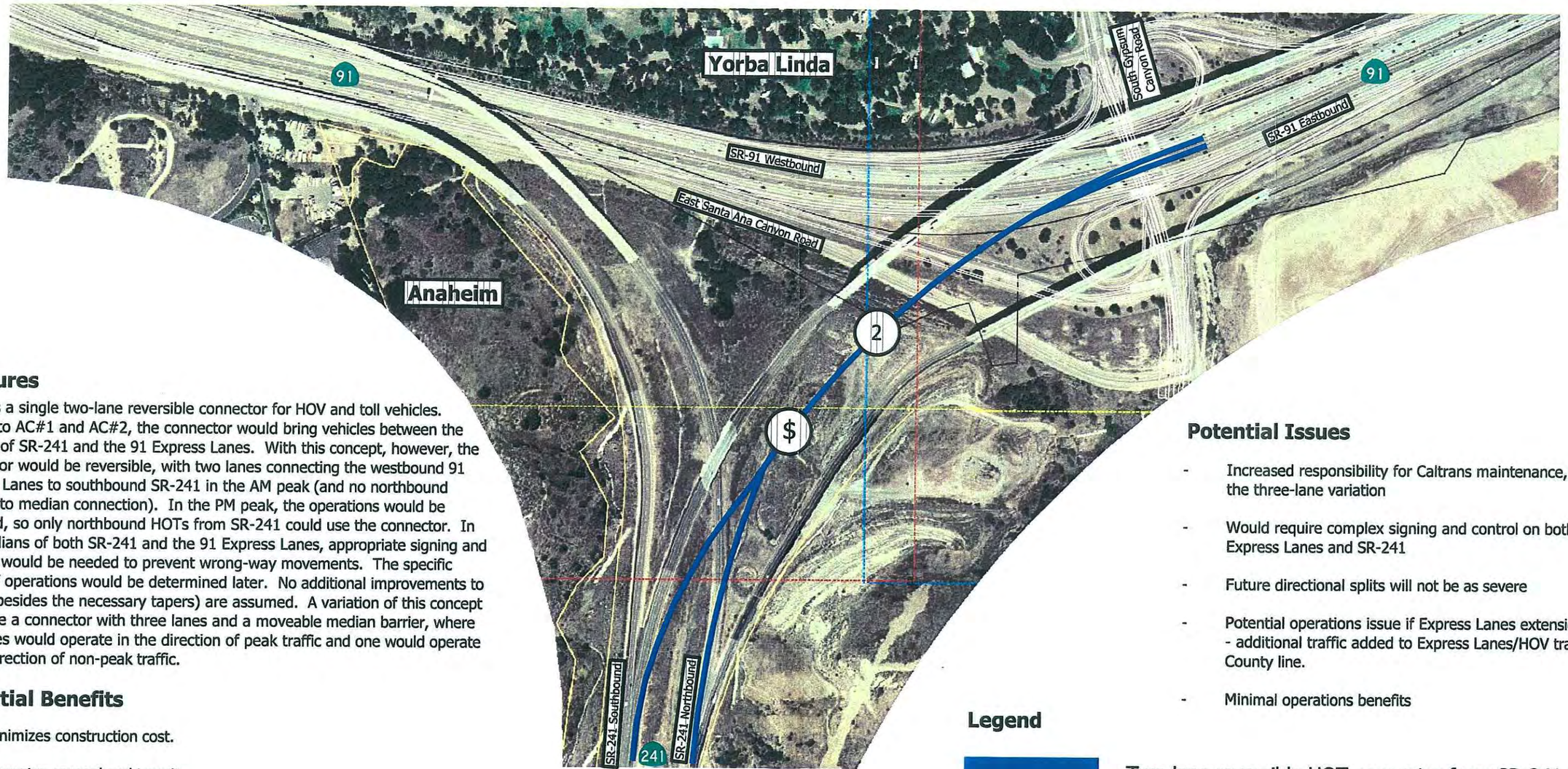
FIGURE #2

91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #3

TWO-LANE REVERSIBLE HOT CONNECTOR TO EXISTING 91 EXPRESS LANES



Features

AC#3 is a single two-lane reversible connector for HOV and toll vehicles. Similar to AC#1 and AC#2, the connector would bring vehicles between the median of SR-241 and the 91 Express Lanes. With this concept, however, the connector would be reversible, with two lanes connecting the westbound 91 Express Lanes to southbound SR-241 in the AM peak (and no northbound median to median connection). In the PM peak, the operations would be reversed, so only northbound HOTs from SR-241 could use the connector. In the medians of both SR-241 and the 91 Express Lanes, appropriate signing and barriers would be needed to prevent wrong-way movements. The specific times of operations would be determined later. No additional improvements to SR-91 (besides the necessary tapers) are assumed. A variation of this concept would be a connector with three lanes and a moveable median barrier, where two lanes would operate in the direction of peak traffic and one would operate in the direction of non-peak traffic.

Potential Benefits

- Minimizes construction cost.
- Promotes carpool and transit
- Focuses on critical operations
- Allows for some toll revenue

Potential Issues

- Increased responsibility for Caltrans maintenance, especially with the three-lane variation
- Would require complex signing and control on both the 91 Express Lanes and SR-241
- Future directional splits will not be as severe
- Potential operations issue if Express Lanes extension is not built - additional traffic added to Express Lanes/HOV transition at County line.
- Minimal operations benefits

Legend

Two-lane reversible HOT connector from SR-241 to SR-91

\# Number of new lanes

$ Tolled facility

CH2MHILL

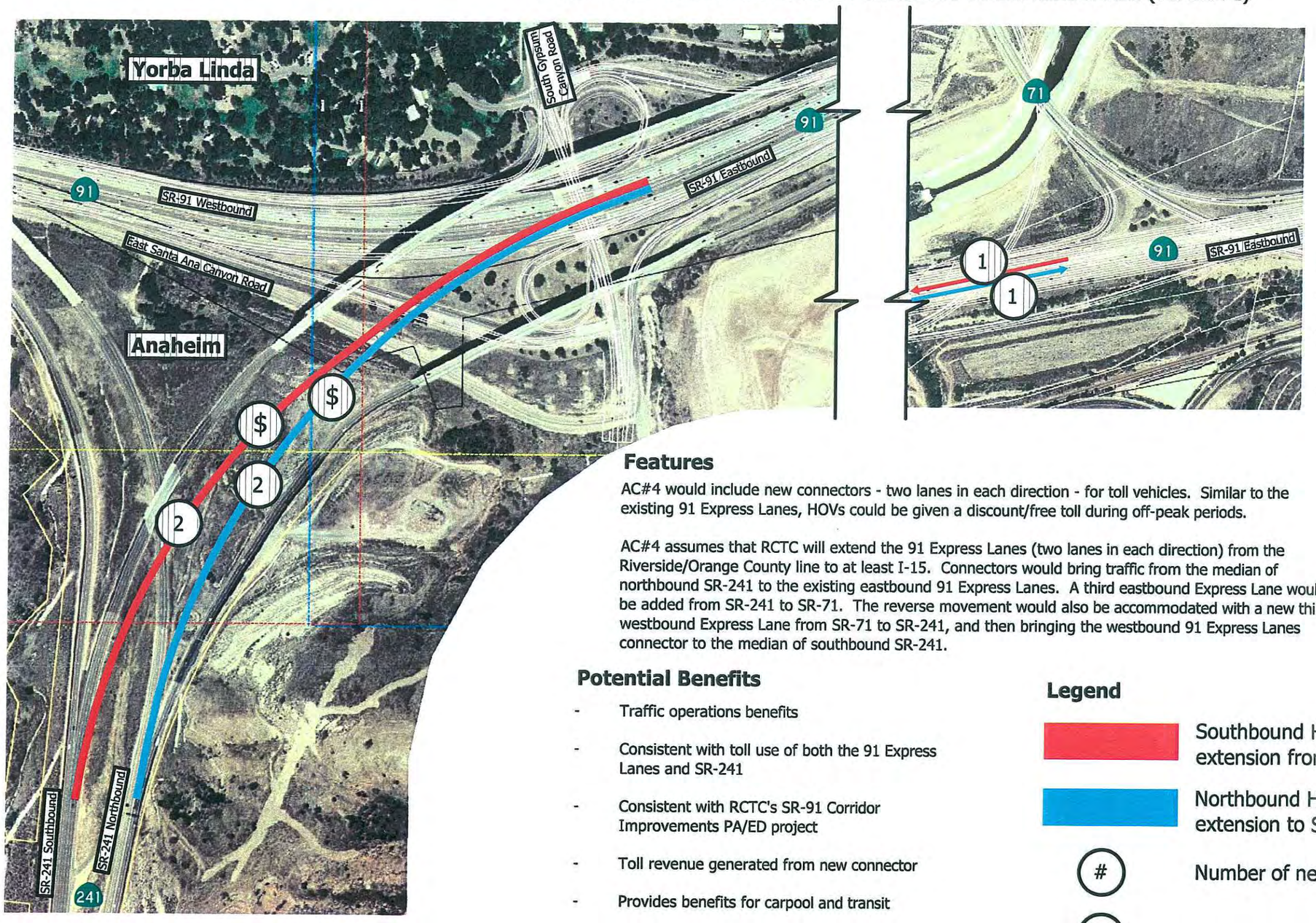
FIGURE #3

91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #4

FOUR-LANE TOLL CONNECTOR TO EXTENDED 91 EXPRESS LANES (TO SR-71)



Features

AC#4 would include new connectors - two lanes in each direction - for toll vehicles. Similar to the existing 91 Express Lanes, HOVs could be given a discount/free toll during off-peak periods.

AC#4 assumes that RCTC will extend the 91 Express Lanes (two lanes in each direction) from the Riverside/Orange County line to at least I-15. Connectors would bring traffic from the median of northbound SR-241 to the existing eastbound 91 Express Lanes. A third eastbound Express Lane would be added from SR-241 to SR-71. The reverse movement would also be accommodated with a new third westbound Express Lane from SR-71 to SR-241, and then bringing the westbound 91 Express Lanes connector to the median of southbound SR-241.

Potential Benefits

- Traffic operations benefits
- Consistent with toll use of both the 91 Express Lanes and SR-241
- Consistent with RCTC's SR-91 Corridor Improvements PA/ED project
- Toll revenue generated from new connector
- Provides benefits for carpool and transit
- Focuses on critical operations

Potential Issues

- Relatively high cost, especially along SR-91
- Requires coordination with RCTC's SR-91 Improvements PA/ED project
- SR-71 may not be the most logical location to terminate the new third Express Lane

Legend

- Southbound HOT connector from SR-91 to SR-241 and extension from SR-71
- Northbound HOT connector from SR-241 to SR-91 and extension to SR-71
- (#) Number of new lanes
- ($) Tolled facility

CH2MHILL

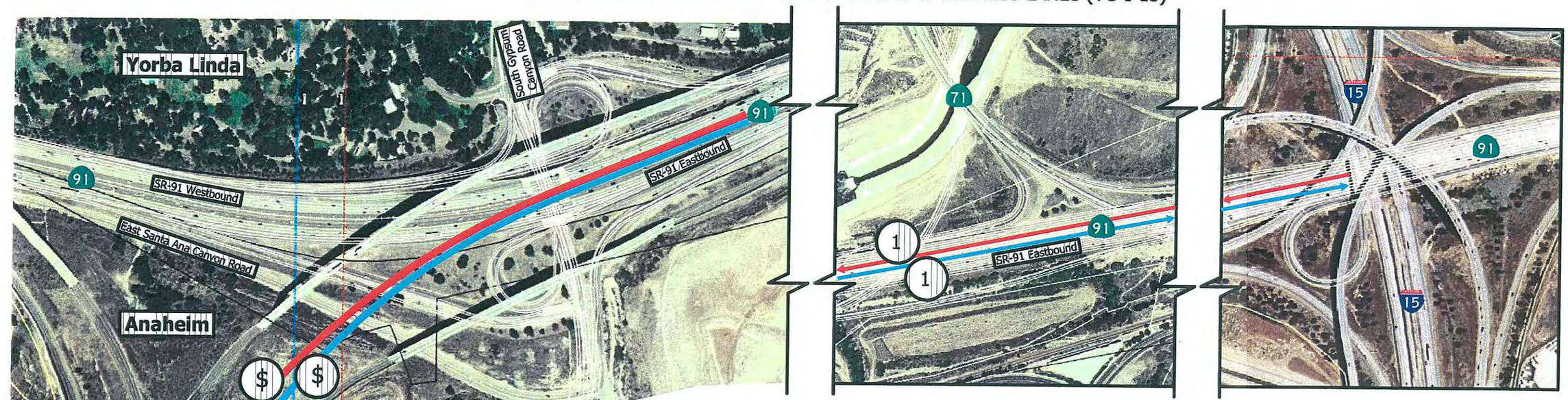
FIGURE #4

91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #5

FOUR-LANE TOLL CONNECTOR TO EXTEND 91 EXPRESS LANES (TO I-15)



Features

AC#5 would include new connectors - two lanes in each direction - for toll vehicles. Similar to the existing 91 Express Lanes, HOVs could be given a discount.

AC#5 assumes that RCTC will extend the Express Lanes (two lanes in each direction) from the Riverside/Orange County line to at least I-15. Connectors would bring traffic from the median of northbound SR-241 to the existing eastbound 91 Express Lanes. A third lane would be added to the 91 Express Lanes from SR-241 to I-15. The reverse movement would also be accommodated with a new third Express Lane from I-15 to SR-241, and then bringing the westbound 91 Express Lane connector to the median of southbound SR-241.

Potential Issues

- Highest cost, especially along SR-91
- Requires coordination with RCTC's SR-91 Improvements PA/ED project
- Physical challenges of building a third Express Lane east of SR-91

Potential Benefits

- Traffic operations benefits
- Consistent with toll use of both the 91 Express Lanes and SR-241
- Consistent with RCTC's SR-91 Corridor Improvements PA/ED project
- Toll revenue generated from new connector
- Provides benefits for carpool and transit
- Focuses on critical operations
- Carries a third 91 Express Lane through to I-15, providing relief to the most heavily congested portion of the SR-91

Legend

- Southbound HOT connector from SR-91 to SR-241 and extension from I-15
- Northbound HOT connector from SR-241 to SR-91 and extension to I-15
- (#) Number of new lanes
- ($) Tolled facility

CH2MHILL

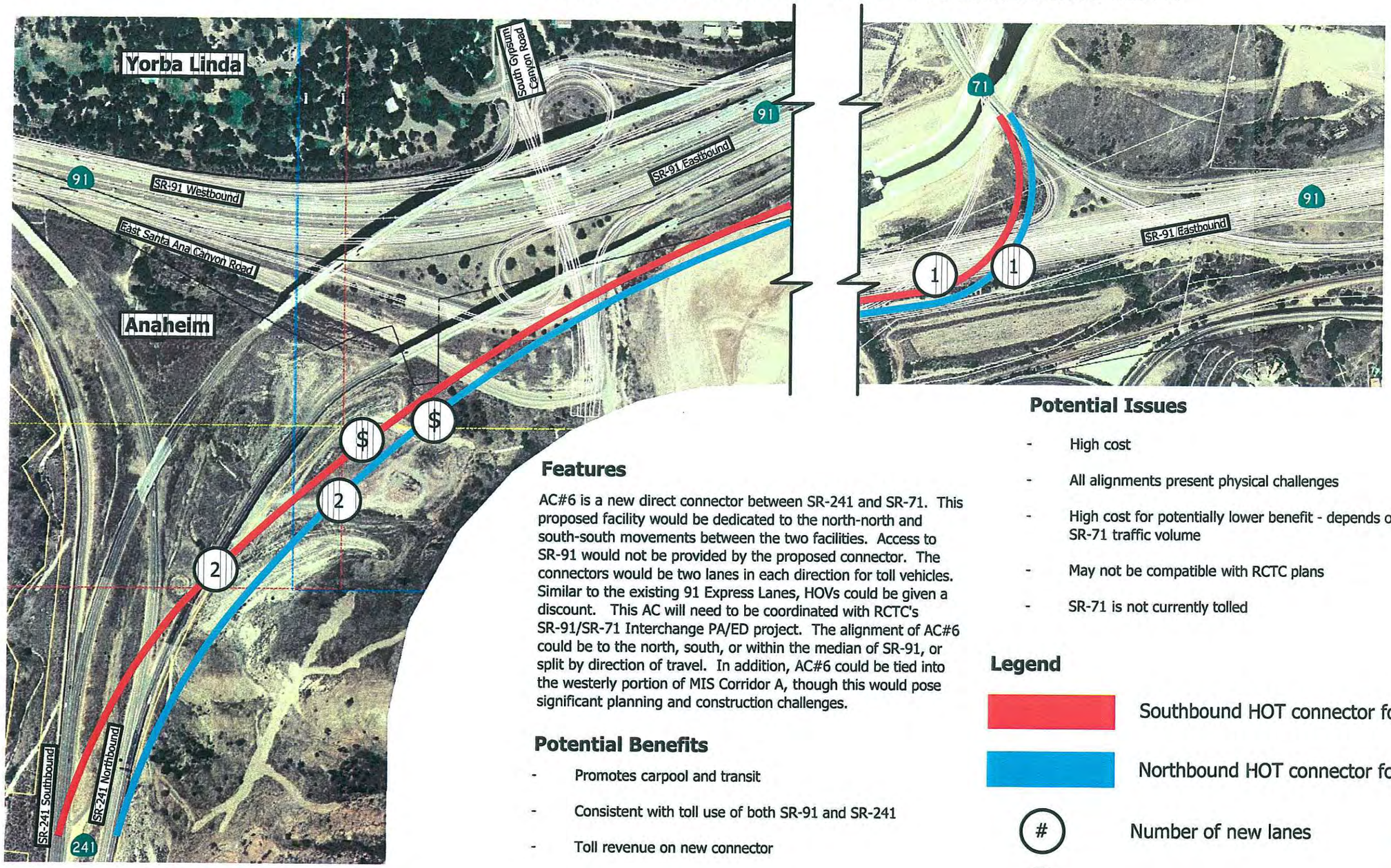
FIGURE #5

91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #6

SR-241/SR-71 DIRECT TOLL CONNECTOR FOR SR-241 AND SR-71 TRAFFIC



Features

AC#6 is a new direct connector between SR-241 and SR-71. This proposed facility would be dedicated to the north-north and south-south movements between the two facilities. Access to SR-91 would not be provided by the proposed connector. The connectors would be two lanes in each direction for toll vehicles. Similar to the existing 91 Express Lanes, HOVs could be given a discount. This AC will need to be coordinated with RCTC's SR-91/SR-71 Interchange PA/ED project. The alignment of AC#6 could be to the north, south, or within the median of SR-91, or split by direction of travel. In addition, AC#6 could be tied into the westerly portion of MIS Corridor A, though this would pose significant planning and construction challenges.

Potential Benefits

- Promotes carpool and transit
- Consistent with toll use of both SR-91 and SR-241
- Toll revenue on new connector

Potential Issues

- High cost
- All alignments present physical challenges
- High cost for potentially lower benefit - depends on SR-241 to SR-71 traffic volume
- May not be compatible with RCTC plans
- SR-71 is not currently tolled

Legend

Southbound HOT connector for SR-241/SR-71

Northbound HOT connector for SR-241/SR-71

(#) Number of new lanes

($) Tolled facility

CH2MHILL

FIGURE #6

Alternative 1 Preliminary Plans

INDEX OF SHEETS

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	241/91	36.76-38.30/ 16.06-17.90	1	33

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR BUILDING CONSTRUCTION

STATE HIGHWAY

IN ORANGE COUNTY
ON ROUTE 241 FROM WINDY RIDGE TO ROUTE 91
AND ON ROUTE 91 FROM ROUTE 241 TO COAL CANYON ROAD

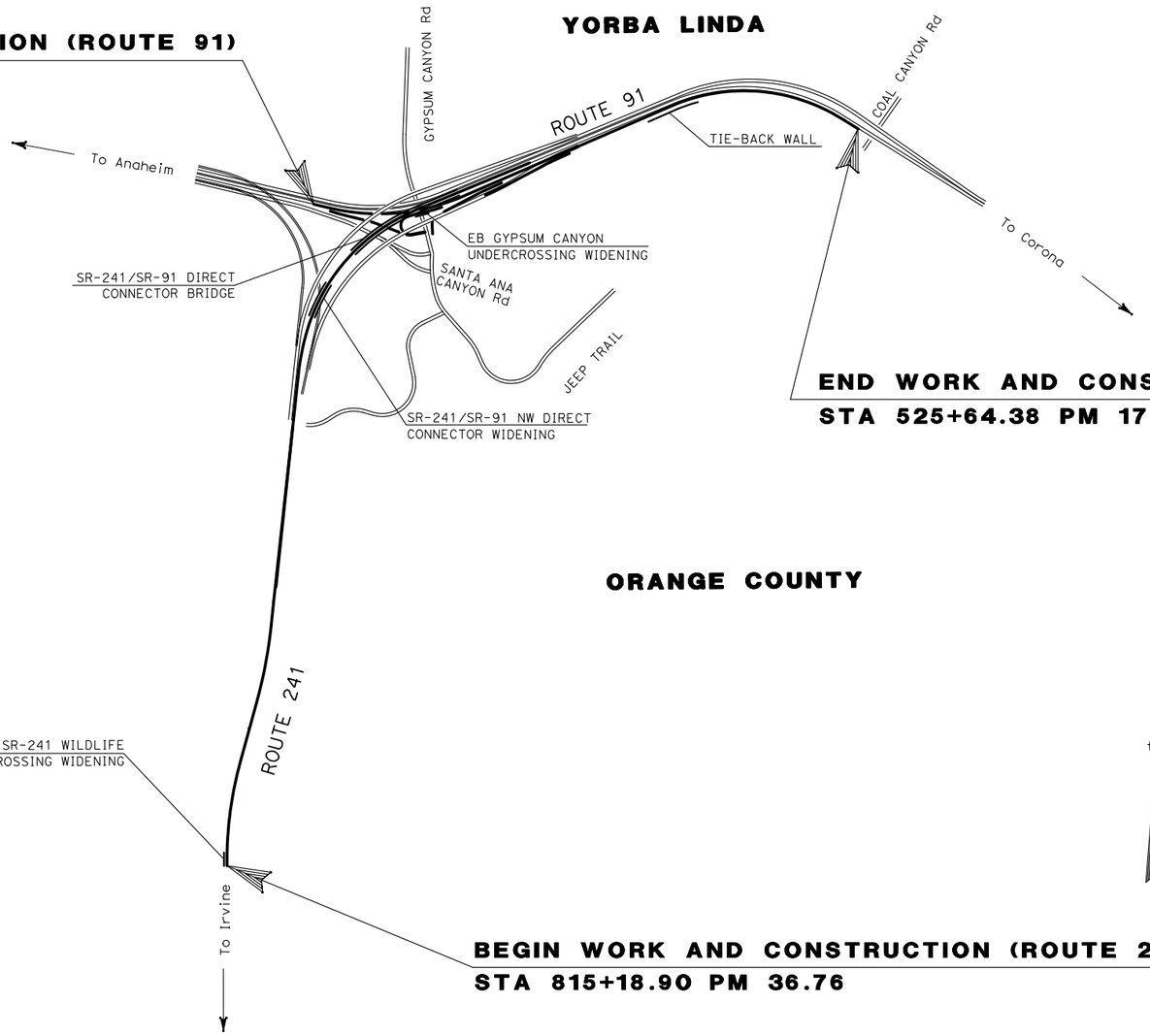
To be supplemented by Standard Plans dated May, 2006

LOCATION MAP

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

To get to the Caltrans web site, go to: http://www.dot.ca.gov

BEGIN WORK AND CONSTRUCTION (ROUTE 91)
STA 427+74.47 PM 16.06



END WORK AND CONSTRUCTION (ROUTE 91)
STA 525+64.38 PM 17.90

BEGIN WORK AND CONSTRUCTION (ROUTE 241)
STA 815+18.90 PM 36.76

15% PLANS

Project Engineer Date
Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

Plans Approval Date

The Contractor shall possess the class (or classes) of license as specified in the ''Notice to Contractors.''

NO SCALE

Contract No.

PROJECT ENGINEER	DATE	PROJECT MANAGER	DATE

LAST REVISION 00-00-00

DATE PLOTTED => 8/16/2011 6:28:55 PM

H:\PDATA\1010774\CADD\Planning\Exhibits\SR241-SR91 Direct Connecter Exhibits\Initial 2 Lane Cut Sheets\Initial 2 Lane T-01.dgn

FORM DC-OE-93-PF (REV. 3/88)

RELATIVE BORDER SCALE

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	2	33

REGISTERED CIVIL ENGINEER DATE

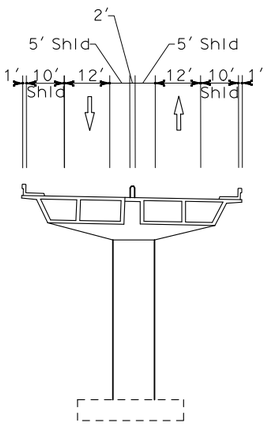
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

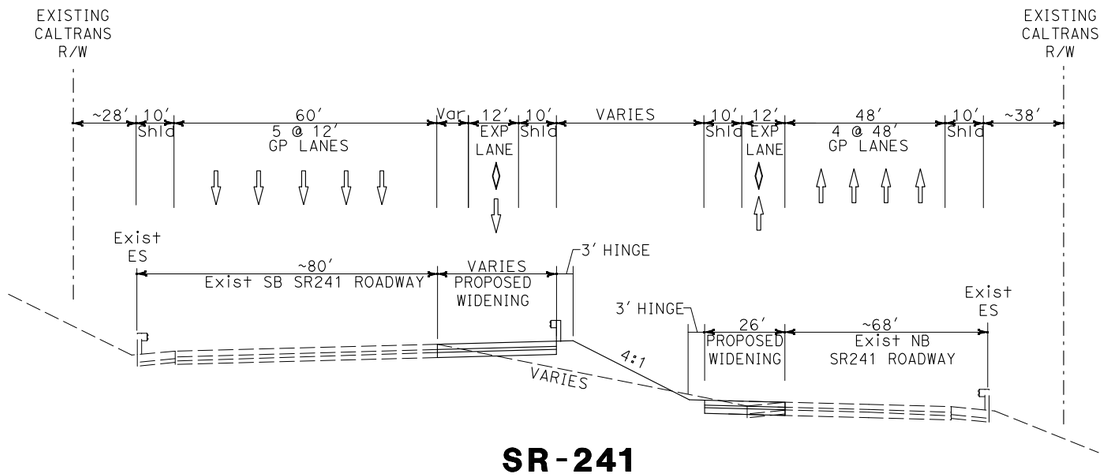
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

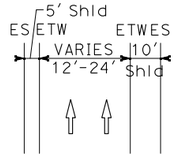


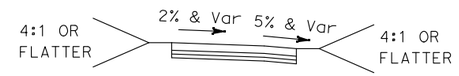
SR-241/ SR-91 DIRECT CONNECTOR



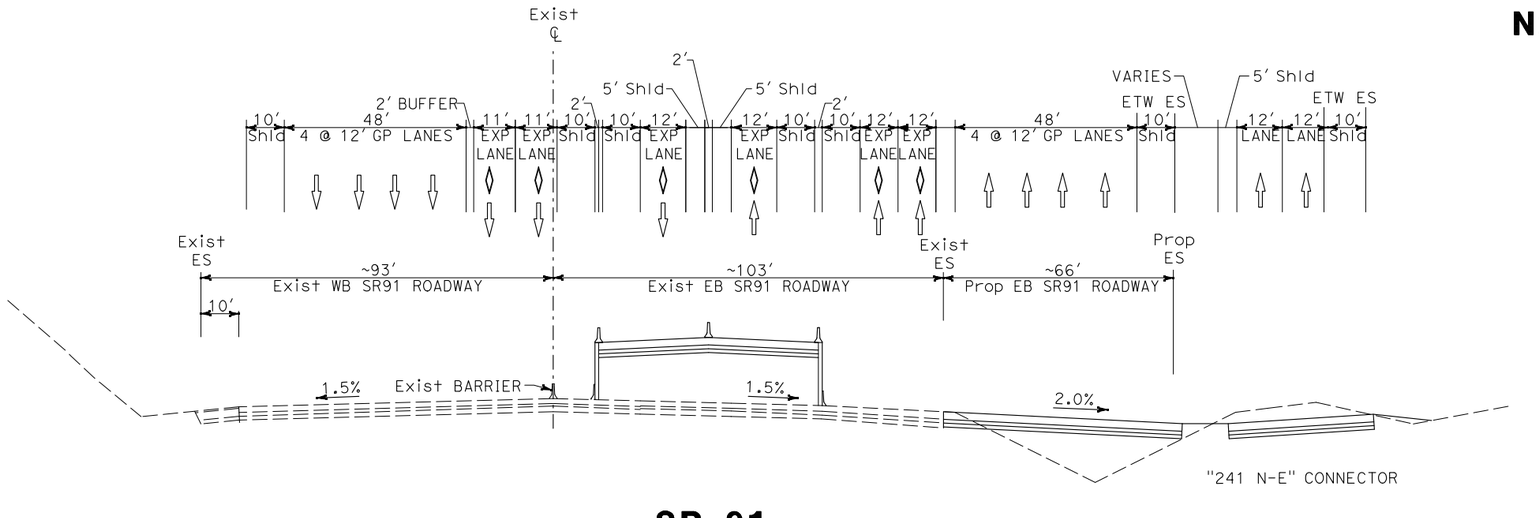
SR-241

121+50 "241 DC" LINE





N241 - E91 CONNECTOR



SR-91

186+50 "241 DC" LINE

TYPICAL CROSS SECTIONS

NO SCALE

X-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | CONSULTANT FUNCTIONAL SUPERVISOR | CALCULATED-DESIGNED BY | CHECKED BY | REVISED BY | DATE REVISED

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 9:30:07 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES | DGN FILE => ...\Initial 2 Lane X-01.dgn | CU 00000 | EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	3	33

REGISTERED CIVIL ENGINEER DATE

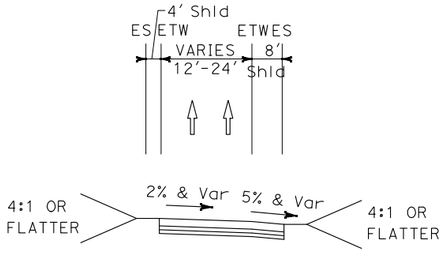
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

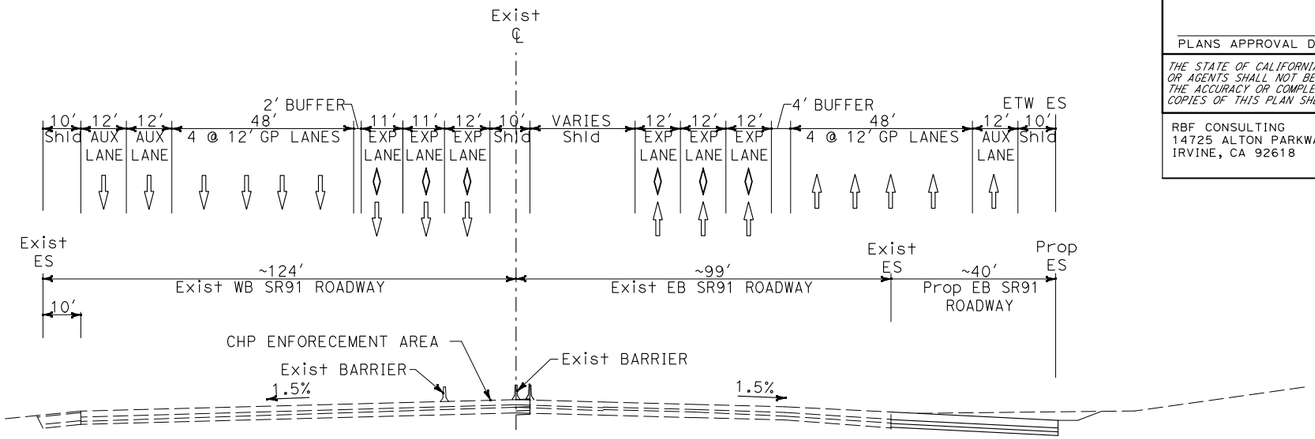
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

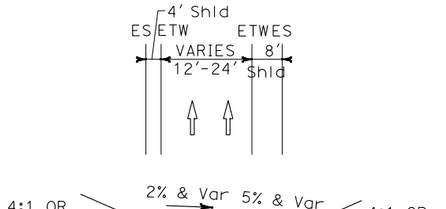


EB GYPSUM CANYON OFF RAMP



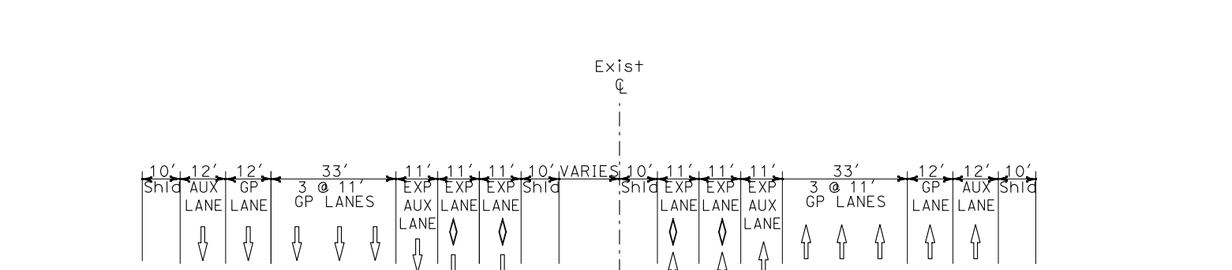
SR-91

1479+50 "A3" LINE



EB GYPSUM CANYON LOOP ON RAMP

EB GYPSUM CANYON HOOK ON RAMP



SR-91

530+50 "A2" LINE

TYPICAL CROSS SECTIONS

NO SCALE

X-2

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 9:30:41 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES | DGN FILE => ...\Initial 2 Lane X-02.dgn | CU 00000 | EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	4	33

REGISTERED CIVIL ENGINEER DATE

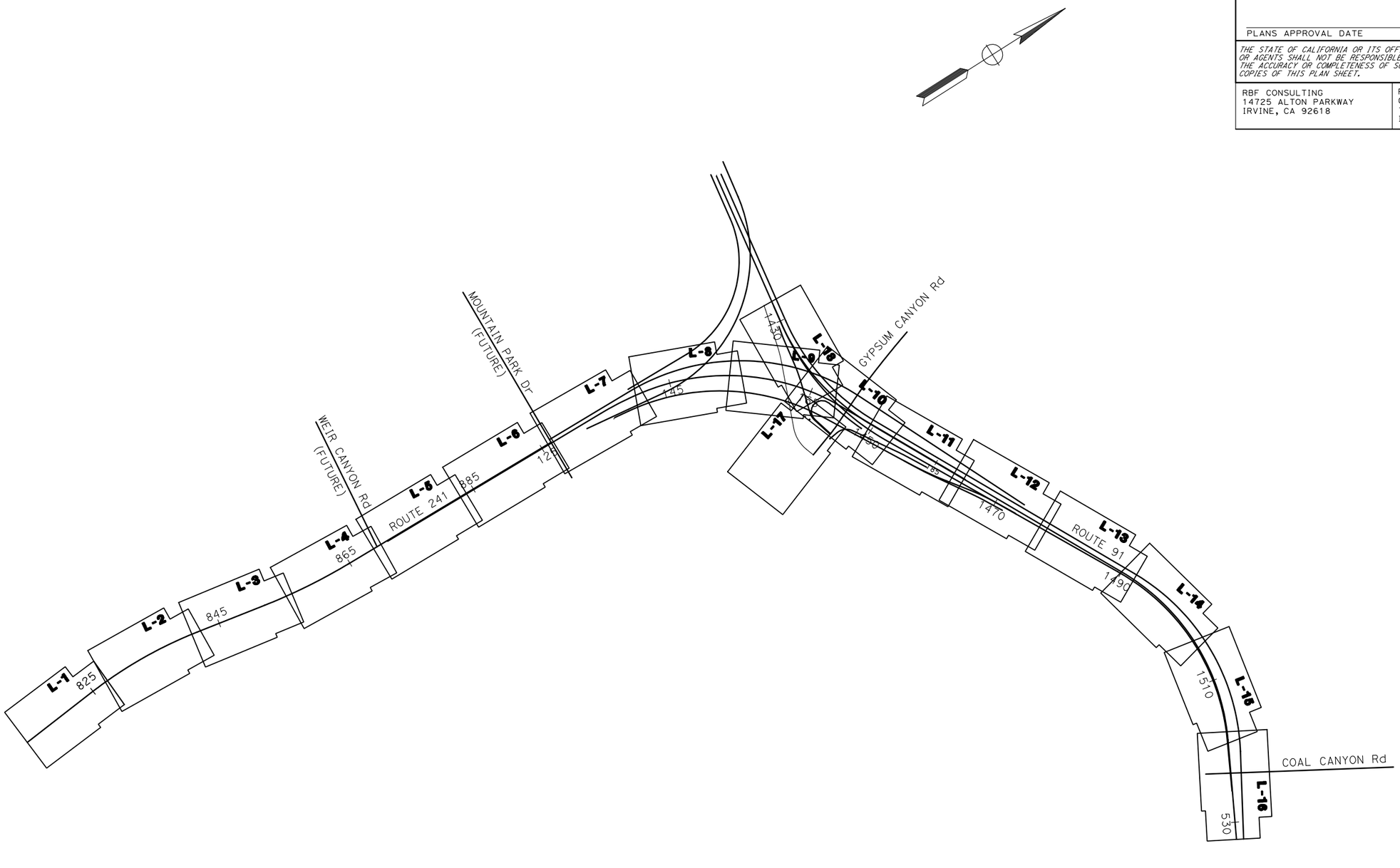
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS.
CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



KEY MAP

NO SCALE

K-1

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 TIME PLOTTED => 9:29:08 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES DGN FILE => ...\Initial 2 Lane K-01.dgn | CU 00000 | EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	5	33

REGISTERED CIVIL ENGINEER DATE

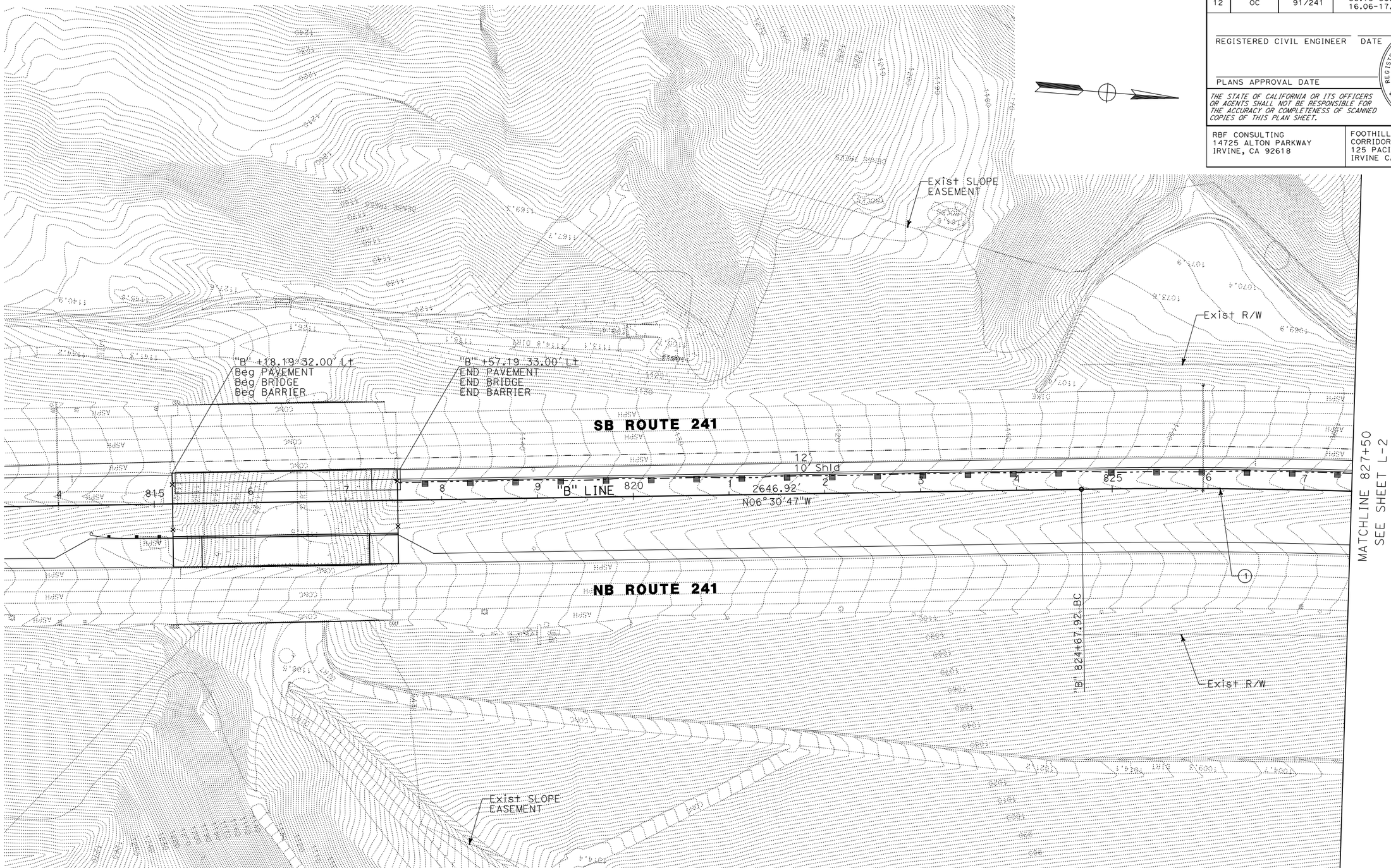
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



CURVE DATA

No.	R	Δ	T	L
(1)	6000.00	16°15'43"	857.23	1702.94

LAYOUT

SCALE 1"=50'

L-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
CONSULTANT FUNCTIONAL SUPERVISOR
CALCULATED-DESIGNED BY
CHECKED BY
REVISED BY
DATE REVISED

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 9:34:29 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-01.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	6	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

CURVE DATA

No.	R	Δ	T	L
(2)	6000.00	16°15'43"	857.23	1702.94

LAYOUT

SCALE 1"=50'

L-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION — Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

REVISED BY	DATE REVISED

LAST REVISION 00-00-00
DATE PLOTTED => 8/17/2011
TIME PLOTTED => 9:35:00 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-02.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	7	33

REGISTERED CIVIL ENGINEER DATE

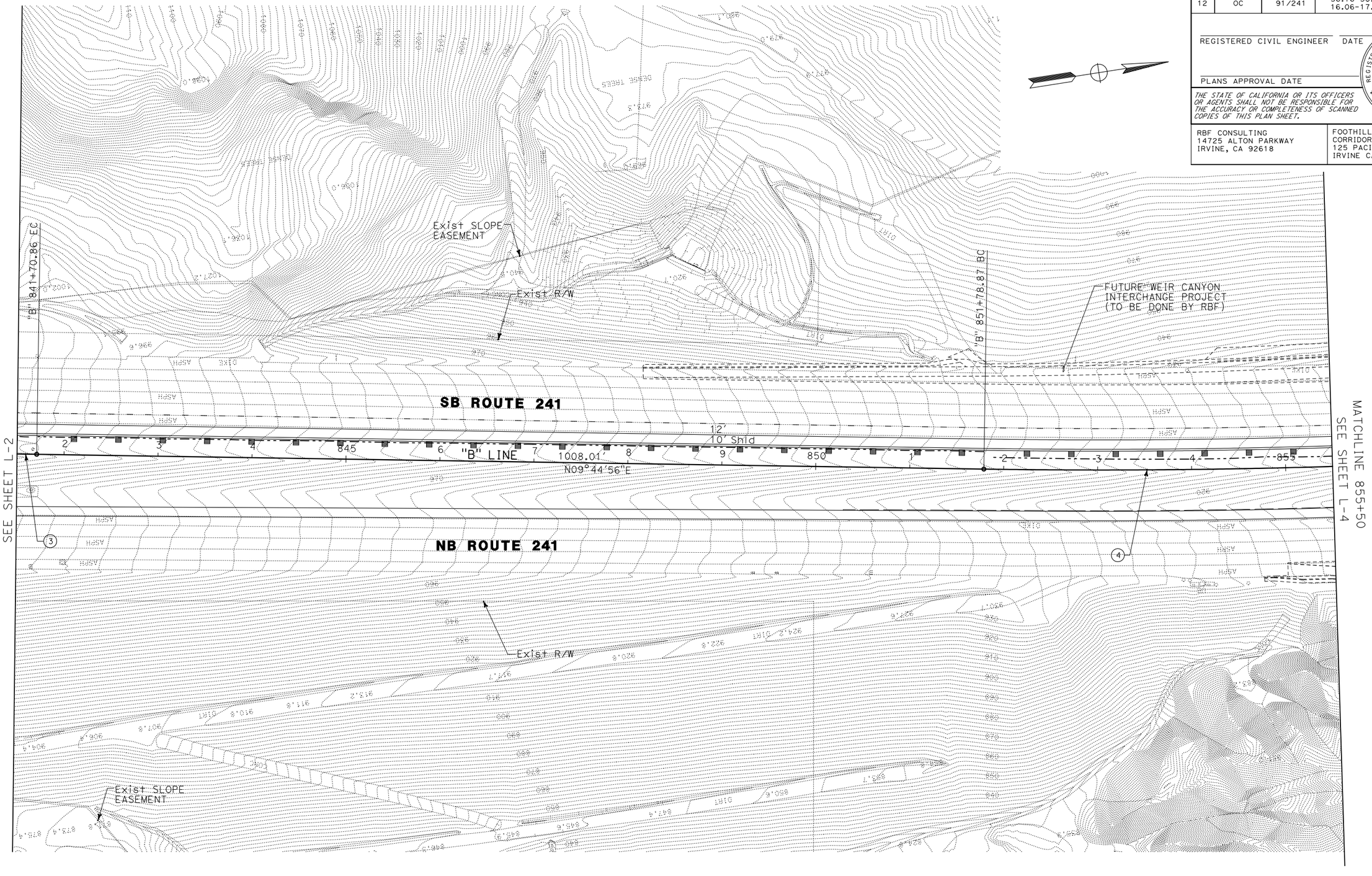
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



CURVE DATA

No.	R	Δ	T	L
③	6000.00	16°15'43"	857.23	1702.94
④	8000.00	09°18'59"	651.85	1300.83

LAYOUT

SCALE 1"=50'

L-3

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY

CHECKED BY

SUPERVISOR

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00

DATE PLOTTED => 8/17/2011
TIME PLOTTED => 9:35:32 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-03.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	8	33

REGISTERED CIVIL ENGINEER DATE

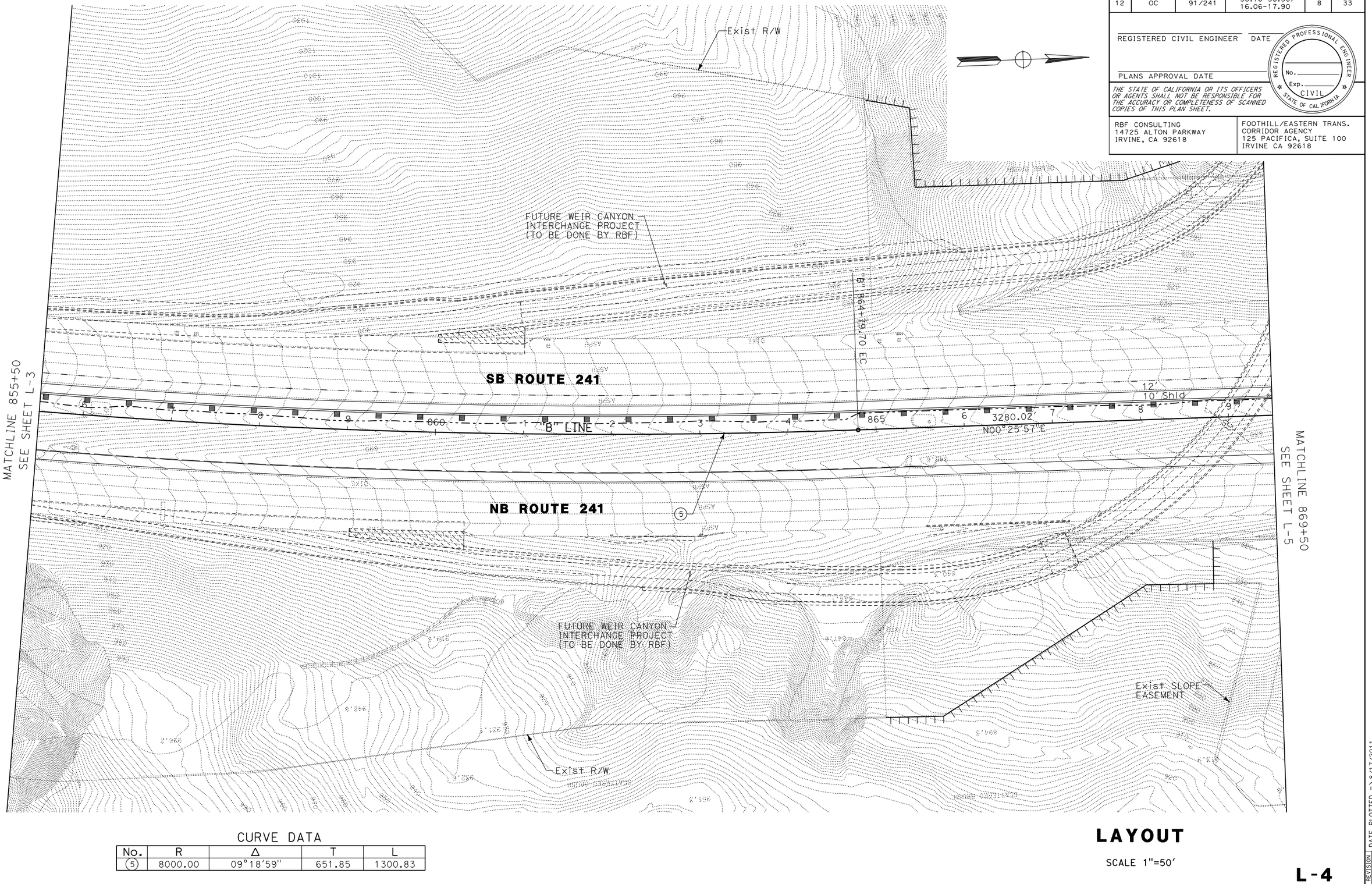
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



CURVE DATA

No.	R	Δ	T	L
(5)	8000.00	09°18'59"	651.85	1300.83

LAYOUT

SCALE 1"=50'

L-4

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 9:40:43 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-04.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	9	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

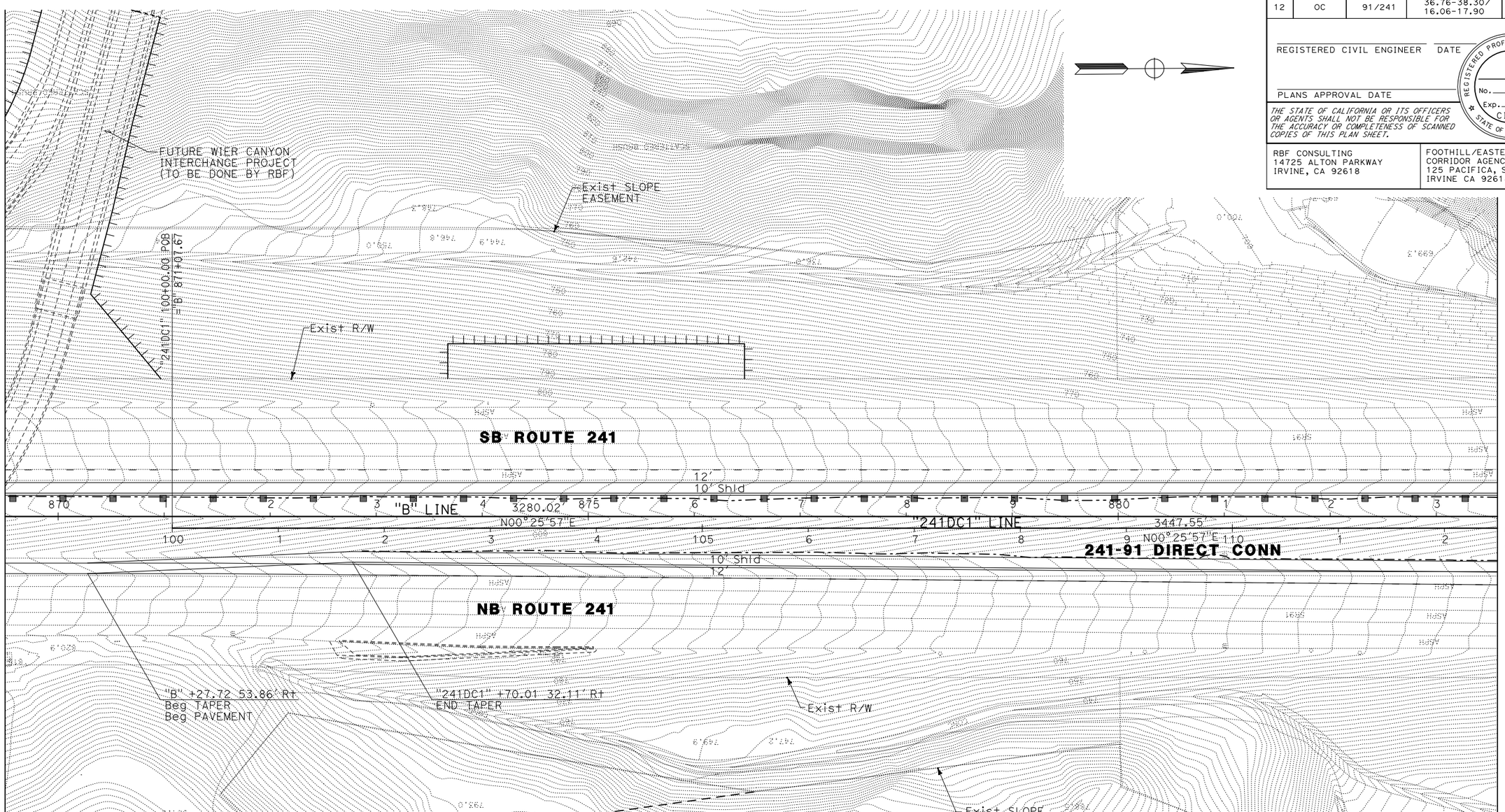
REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans



MATCHLINE 869+50
SEE SHEET L-4

MATCHLINE 112+50
SEE SHEET L-6

LAYOUT

SCALE 1"=50'

L-5

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 TIME PLOTTED => 9:42:08 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES DGN FILE => ...\Initial 2 Lane L-05.dgn | CU 00000 | EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	10	33

REGISTERED CIVIL ENGINEER DATE

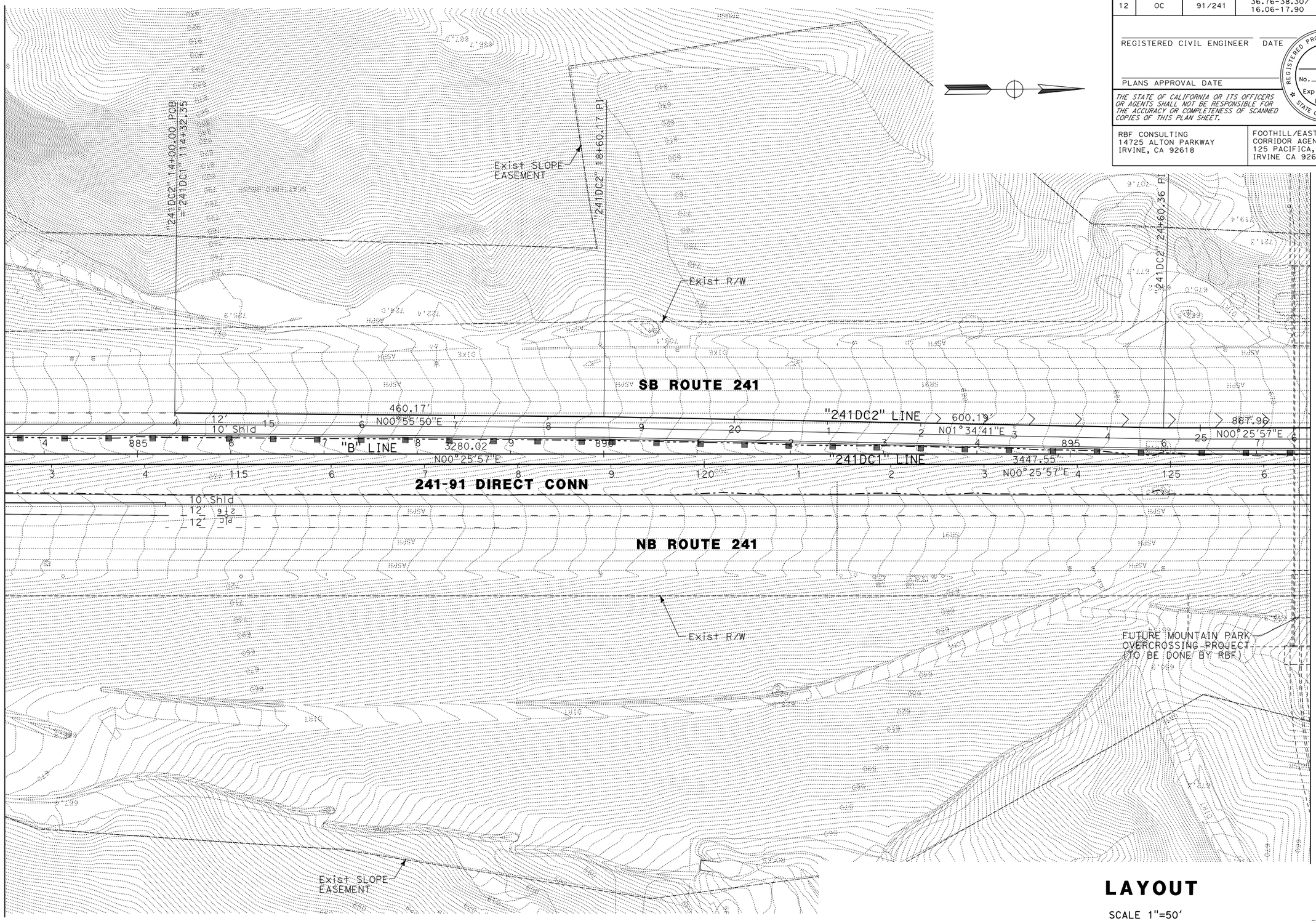
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



LAYOUT

SCALE 1"=50'

L-6

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | CONSULTANT FUNCTIONAL SUPERVISOR

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 9:43:49 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES | DGN FILE => ...\Initial 2 Lane L-06.dgn | CU 00000 | EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	11	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

FUTURE MOUNTAIN PARK OVERCROSSING PROJECT (TO BE DONE BY RBF)

Exist R/W

"241DC2" 33+28.32 BC

SR 241 S-W CONN

241-91 DIRECT CONN

"241DC2" LINE

"241DC1" LINE

"241DC3" LINE

"241DC3" 35+85.05 12.00' Lt
Beg MBGR

Conc BARRIER

MBGR

867.96'
N00°25'57"E

3447.55'
130 N00°25'57"E

1101.48'
20 N00°25'57"E

10' Shld
12'
10' Shld

10' Shld
12'
10' Shld

MATCHLINE 126+50
SEE SHEET L-6

MATCHLINE 140+50
SEE SHEET L-8

SR 241 N-E CONN

Exist R/W

"241DC3" 17+00.00 POB
="241DC1" 126+68.98

"241DC3" +17.32 12.00' Rt
Beg MBGR

"241DC1" 134+47.55 BC
END MBGR
Beg Conc BARRIER
Beg MBGR

"DC3" 28+01.48 BC

"241DC1" 139+65.25 PCC

CURVE DATA

No.	R	Δ	T	L
(6)	4516.29	06°34'40"	259.13	517.70
(7)	3734.78	02°33'49"	83.57	167.11
(8)	4260.67	14°02'53"	524.96	1044.66
(9)	4516.29	06°34'04"	259.13	517.70

SCALE 1"=50'

L-7

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY

CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00
DATE PLOTTED => 8/17/2011
TIME PLOTTED => 9:44:49 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-07.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	12	33

REGISTERED CIVIL ENGINEER DATE

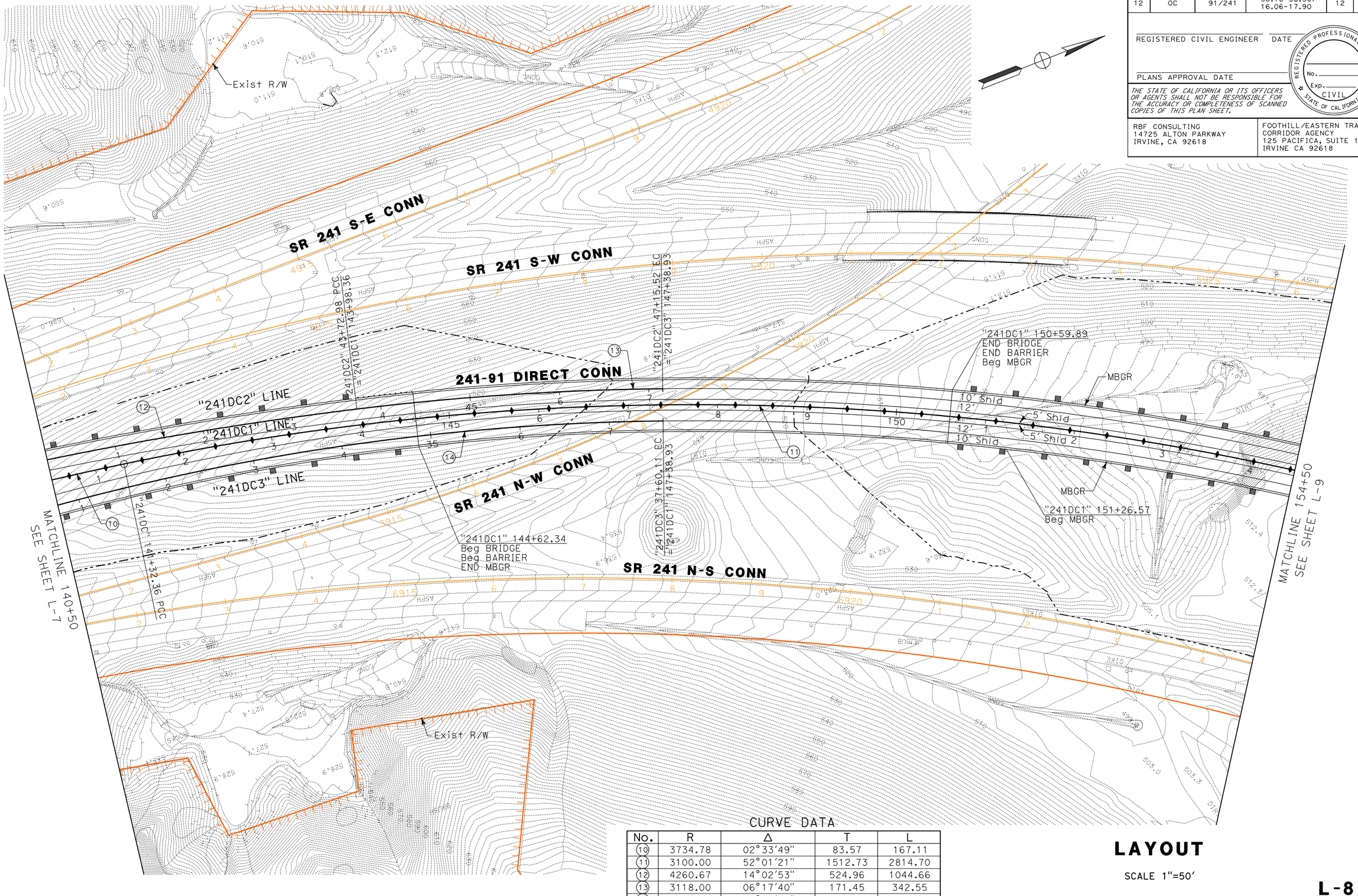
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



CURVE DATA

No.	R	Δ	T	L
(10)	3734.78	02°33'49"	83.57	167.11
(11)	3100.00	52°01'21"	1512.73	2814.70
(12)	4260.67	14°02'53"	524.96	1044.66
(13)	3118.00	06°17'40"	171.45	342.55
(14)	2700.00	20°20'34"	484.41	958.63

LAYOUT

SCALE 1"=50'

L-8

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION | DATE PLOTTED => 8/17/2011
00-00-00 | TIME PLOTTED => 9:46:31 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-08.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	13	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

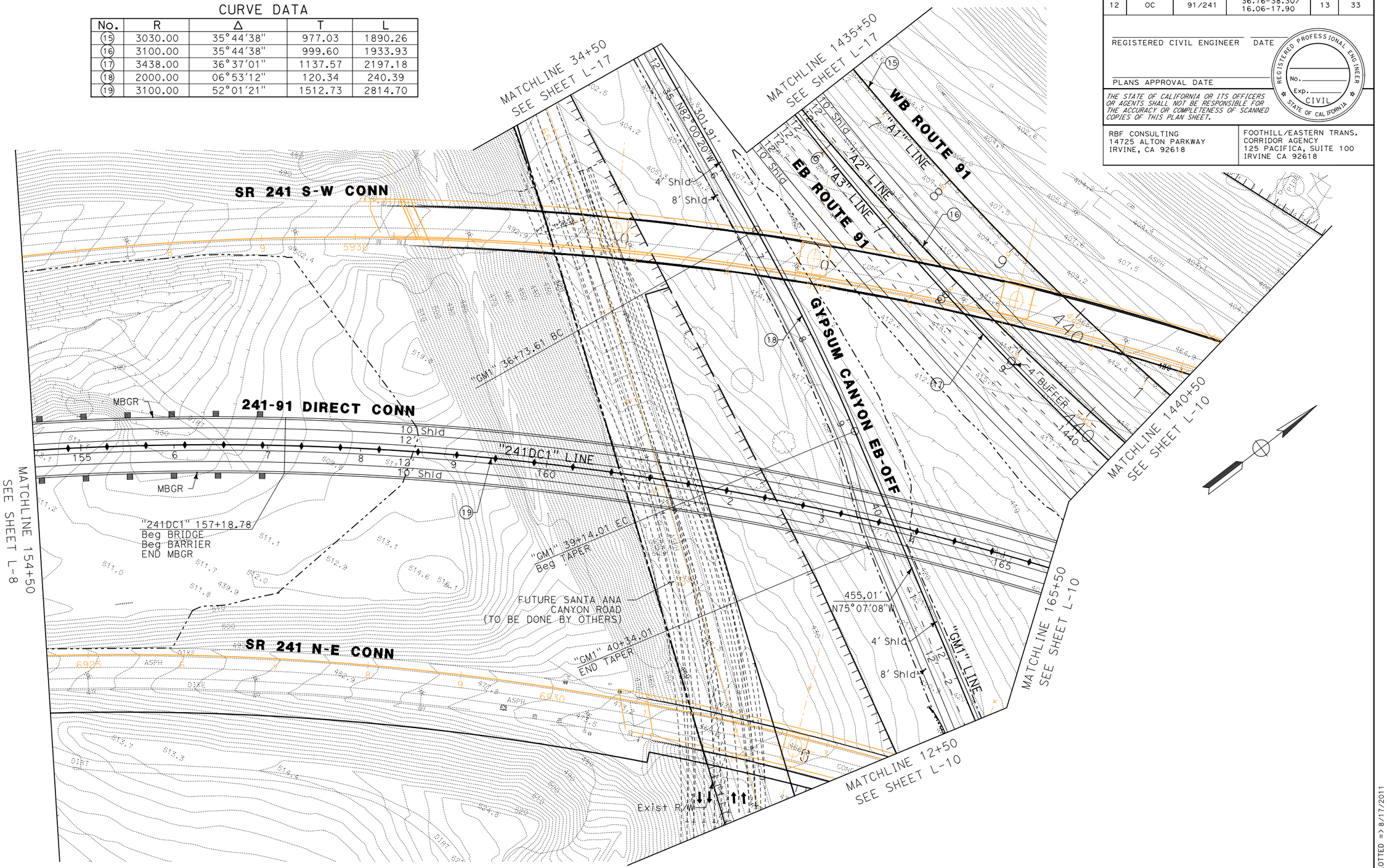
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

CURVE DATA

No.	R	Δ	T	L
(15)	3030.00	35°44'38"	977.03	1890.26
(16)	3100.00	35°44'38"	999.60	1933.93
(17)	3438.00	36°37'01"	1137.57	2197.18
(18)	2000.00	06°53'12"	120.34	240.39
(19)	3100.00	52°01'21"	1512.73	2814.70



LAYOUT

SCALE 1"=50'

L-9

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION | DATE PLOTTED => 8/17/2011
00-00-00 | TIME PLOTTED => 9:47:14 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES | DGN FILE => ...\Initial 2 Lane L-09.dgn | CU 00000 | EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	14	33

REGISTERED CIVIL ENGINEER DATE

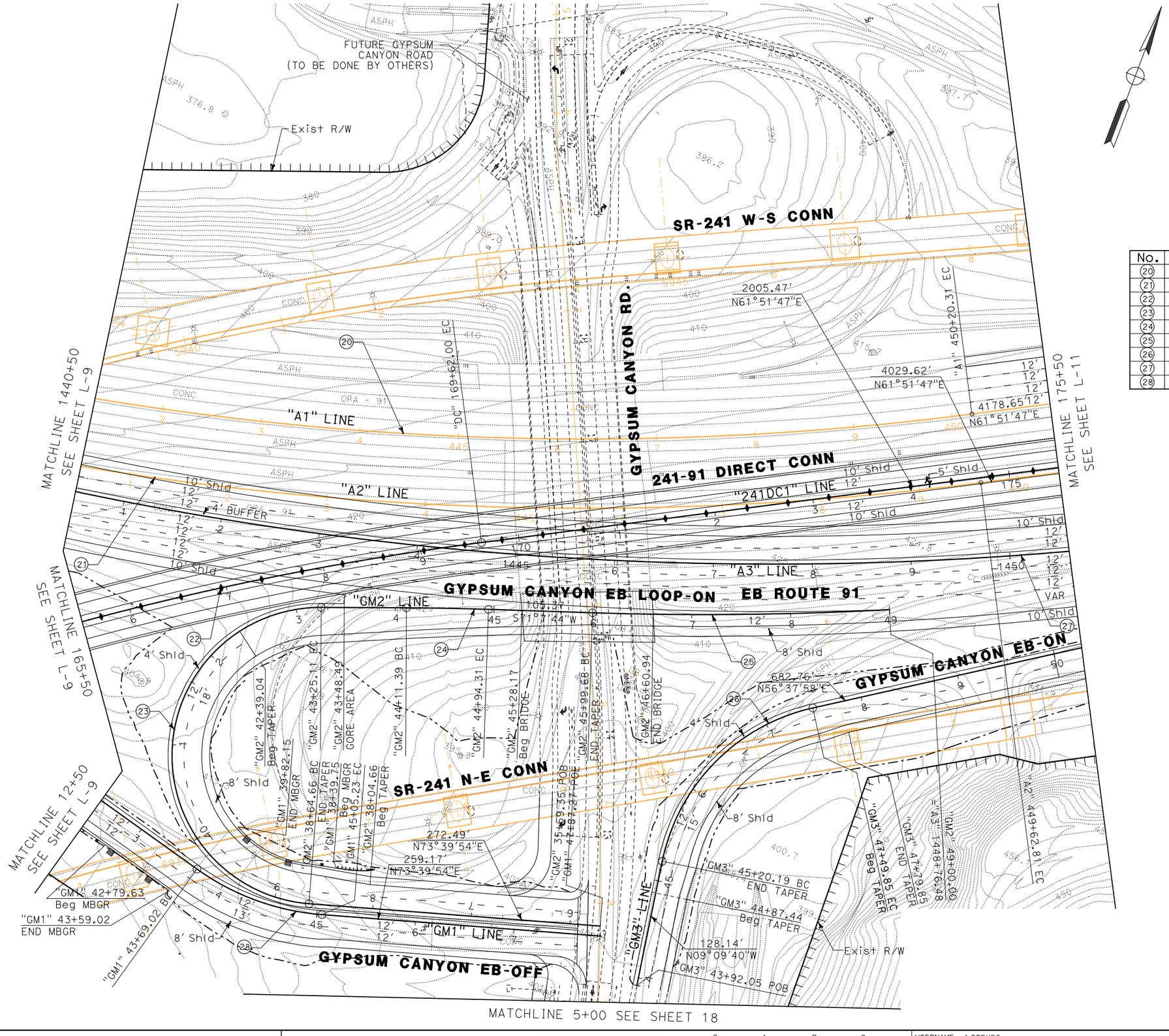
REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



CURVE DATA

No.	R	Δ	T	L
(20)	3030.00	35°44'38"	977.03	1890.26
(21)	3100.00	35°44'38"	999.60	1933.93
(22)	3100.00	52°17'56"	1521.99	2829.64
(23)	150.00	175°52'48"	4170.22	460.45
(24)	3000.00	01°35'01"	41.46	82.92
(25)	3486.00	04°56'10"	150.25	300.32
(26)	200.00	65°47'38"	129.37	229.66
(27)	3438.00	36°37'01"	1137.57	2197.18
(28)	250.00	31°12'57"	69.84	136.21

LAYOUT

SCALE 1"=50'

L-10

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION | DATE PLOTTED => 8/17/2011
00-00-00 | TIME PLOTTED => 9:48:57 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES | DGN FILE => ...\Initial 2 Lane L-10.dgn | CU 00000 | EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	15	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

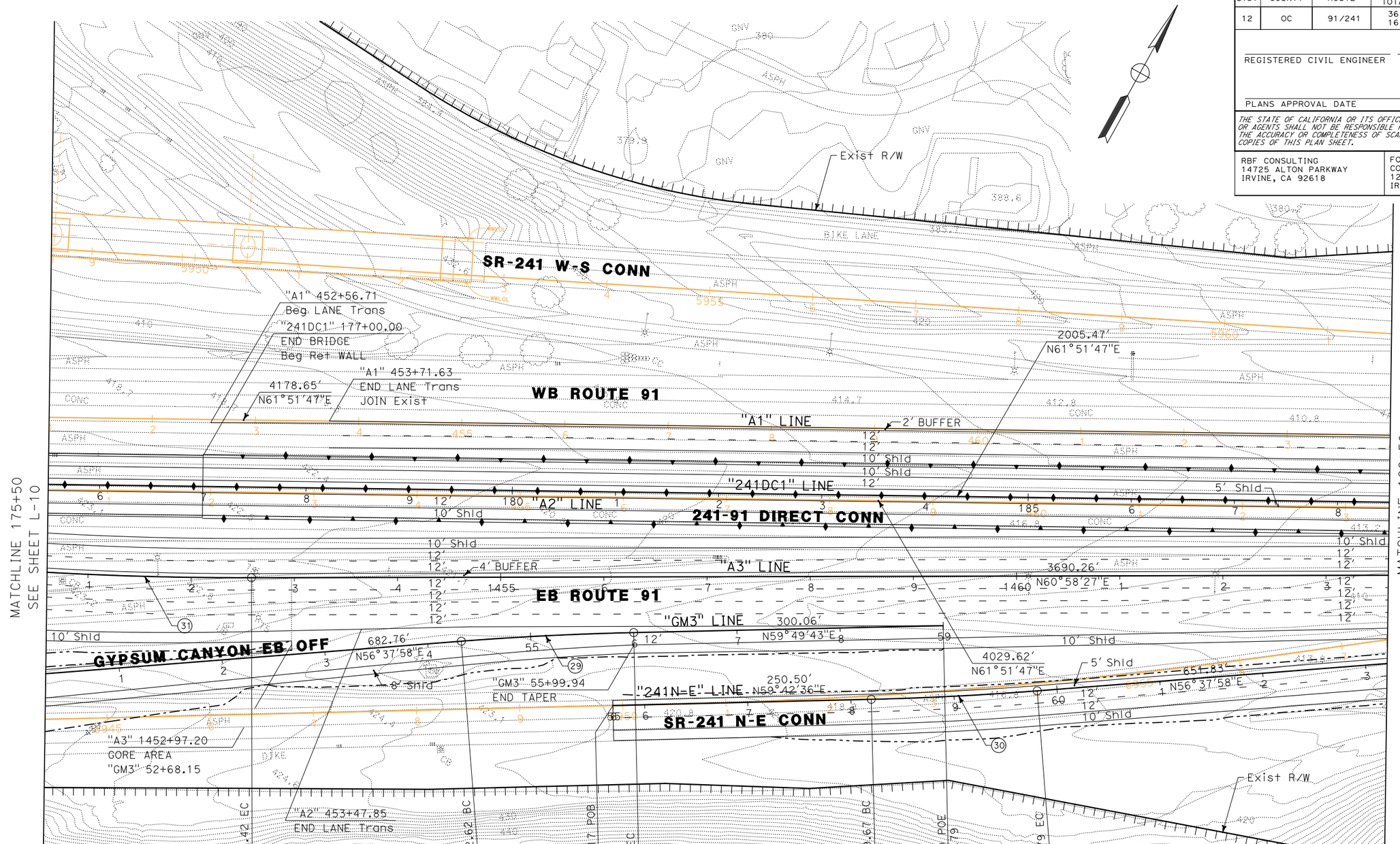
REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans



CURVE DATA

No.	R	Δ	T	L
(29)	3000.00	03°11'44"	83.68	167.32
(30)	3000.00	03°04'38"	80.58	161.12
(31)	3438.00	36°37'01"	1137.57	2197.18

LAYOUT

SCALE 1"=50'

L-11

LAST REVISION DATE PLOTTED => 8/17/2011
00-00-00 TIME PLOTTED => 9:49:33 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-11.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	16	33

REGISTERED CIVIL ENGINEER DATE

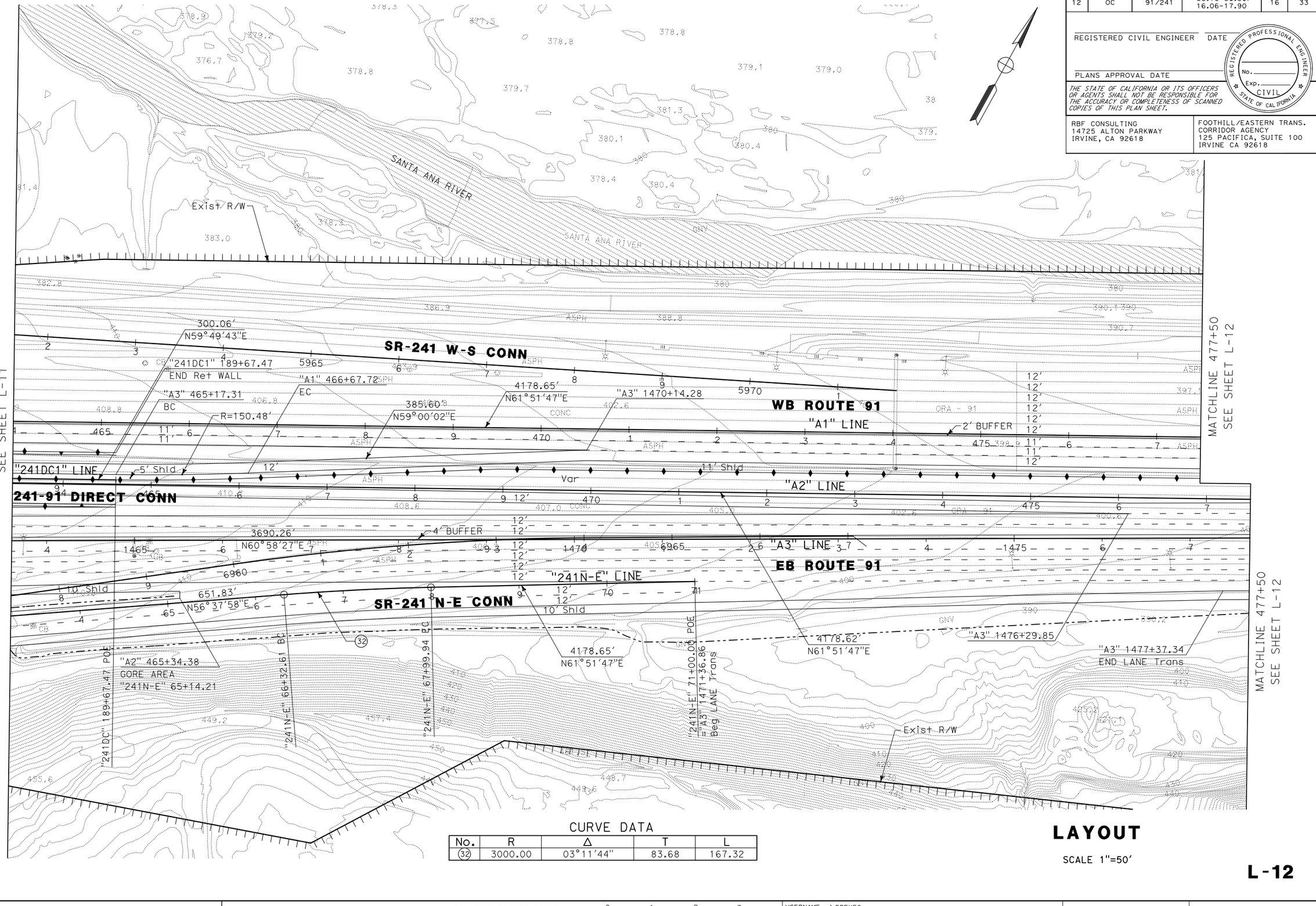
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



CURVE DATA

No.	R	Δ	T	L
(32)	3000.00	03°11'44"	83.68	167.32

LAYOUT

SCALE 1"=50'

L-12

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
CONSULTANT FUNCTIONAL SUPERVISOR
CALCULATED-DESIGNED BY
CHECKED BY
REVISED BY
DATE REVISED

LAST REVISION DATE PLOTTED => 8/17/2011
00-00-00 TIME PLOTTED => 9:50:11 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-12.dgn

CU 00000

EA 000000

CURVE DATA

No.	R	Δ	T	L
(33)	3000.00	54°38′03"	1549.55	2860.64
(34)	2984.00	47°23′59"	1309.88	2468.61

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	17	33

REGISTERED CIVIL ENGINEER DATE

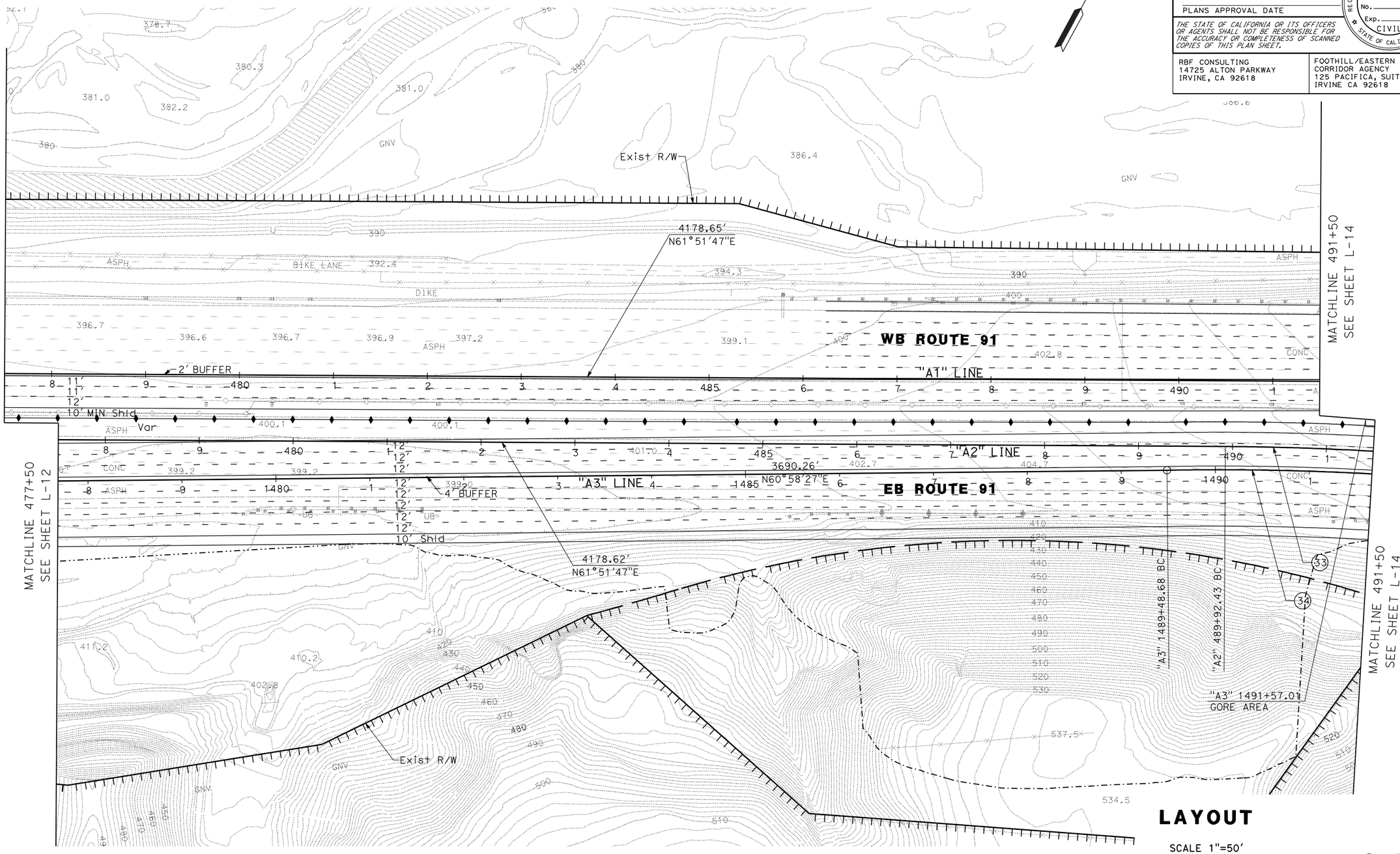
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



LAYOUT

SCALE 1"=50′

L-13

LAST REVISION	DATE PLOTTED => 20-OCT-2011
00-00-00	TIME PLOTTED => 09:53

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | CONSULTANT FUNCTIONAL SUPERVISOR | CALCULATED-DESIGNED BY | CHECKED BY | REVISED BY | DATE REVISED

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => Initial 2 Lane L-13.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	18	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

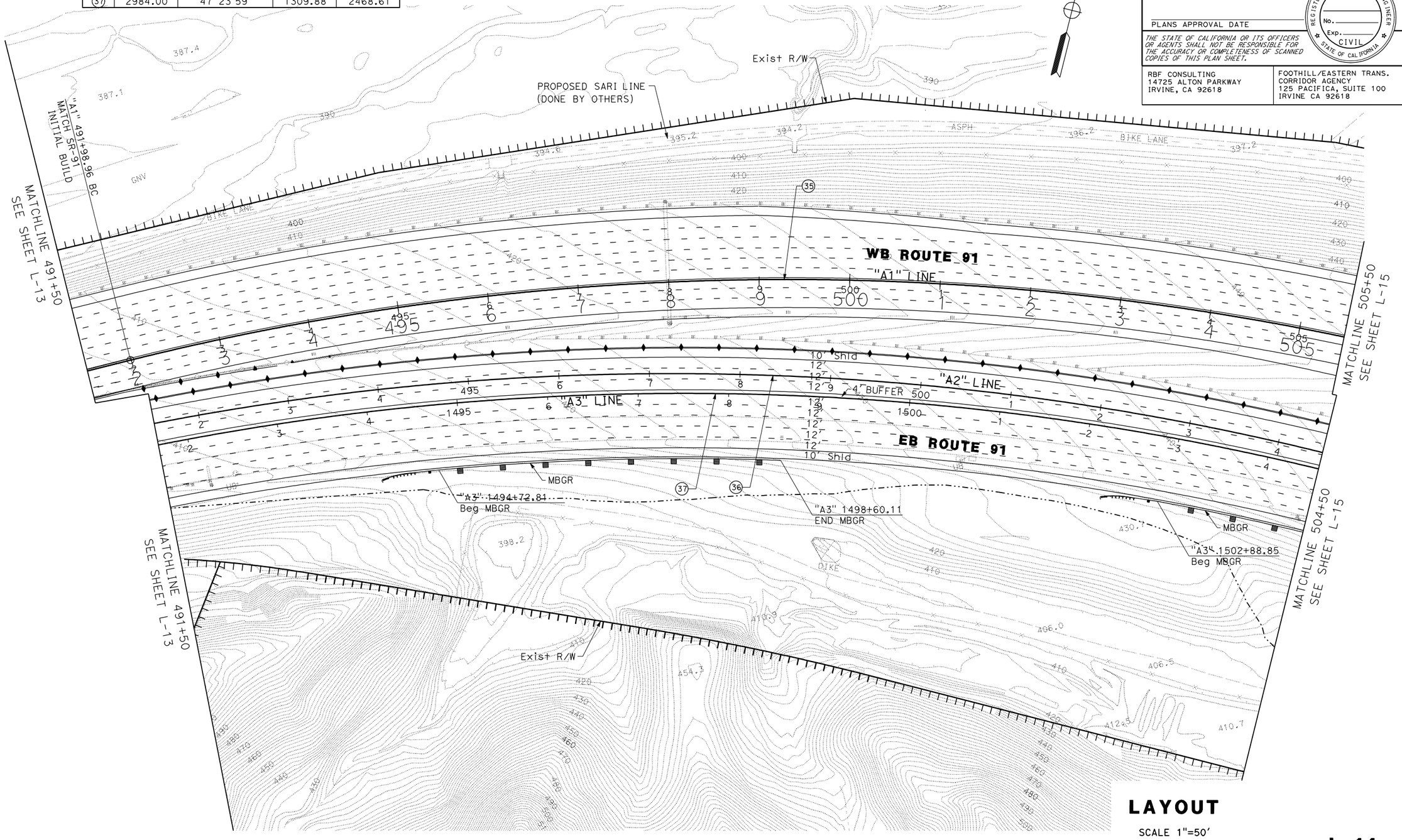
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

CURVE DATA

No.	R	Δ	T	L
(35)	3000.00	57°24'04"	1642.49	3005.52
(36)	3000.00	54°38'03"	1549.55	2860.64
(37)	2984.00	47°23'59"	1309.88	2468.61



LAYOUT

SCALE 1"=50'

L-14

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY

CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00

DATE PLOTTED => 20-OCT-2011
TIME PLOTTED => 09:53

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => Initial 2 Lane L-14.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	19	33

REGISTERED CIVIL ENGINEER DATE

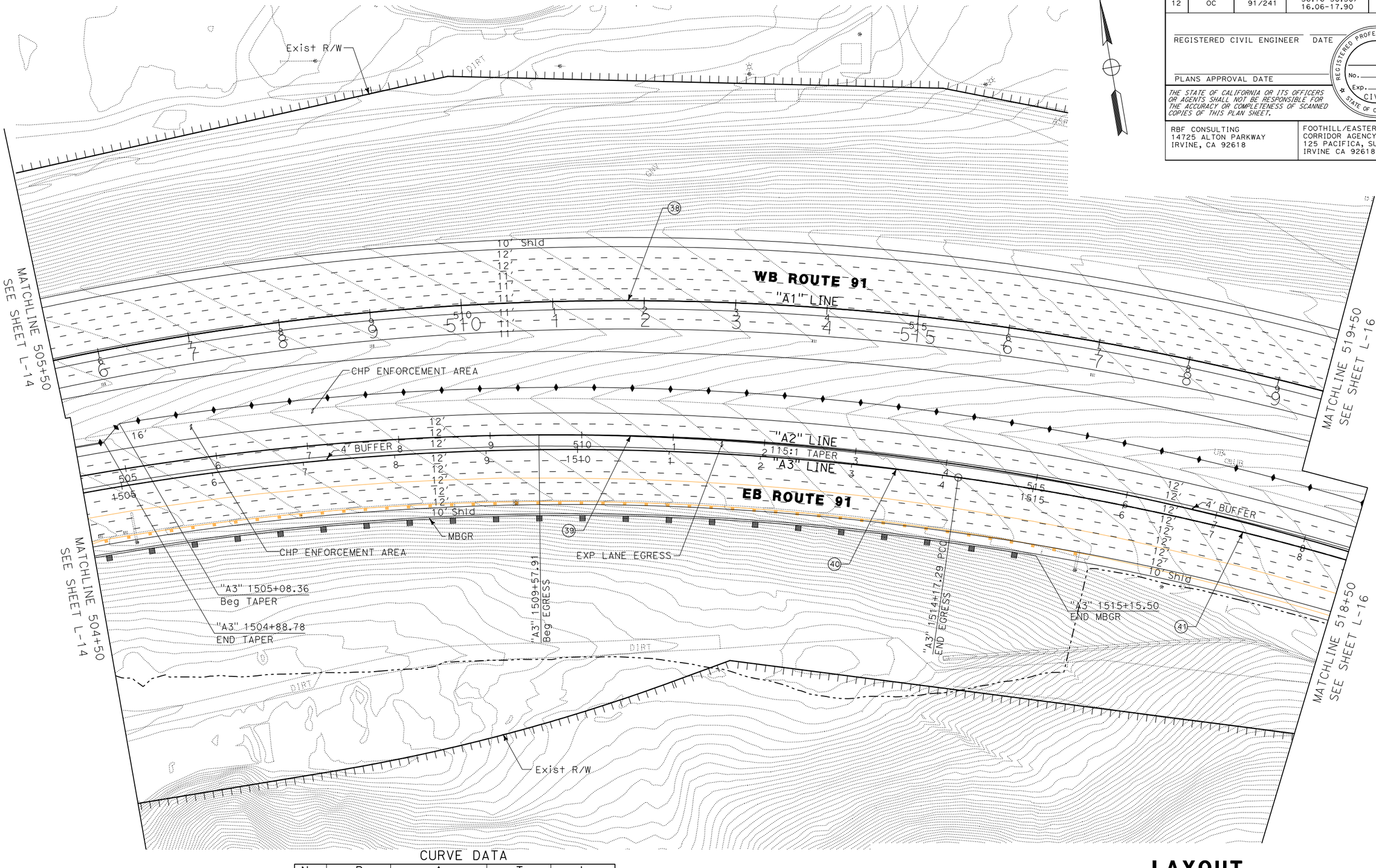
REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



CURVE DATA

No.	R	Δ	T	L
(38)	3000.00	57°24'04"	1642.49	3005.52
(39)	3000.00	54°38'03"	1549.55	2860.64
(40)	2984.00	47°23'59"	1309.88	2468.61
(41)	2984.00	08°38'24"	225.41	449.97

LAYOUT

SCALE 1"=50'

L-15

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION | DATE PLOTTED => 8/17/2011
00-00-00 | TIME PLOTTED => 9:52:01 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-15.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	20	33

REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

MATCHLINE 519+50
SEE SHEET L-15

Exist R/W

"A1" 522+04.48 EC

COAL CANYON RD.

ROUTE 91
"A1" LINE

520 1 2 3 4 525 6 7 8 9 530 1 2 3 4

(42) (43) (44)

12' 12' 12' 12' 12' 12' 12' 12' 12'

3690.26
N60°58'27"E

"A3" LINE

"A2" LINE
ROUTE 91

520 1520 525 1525 530

"A2" 518+53.07 EC
"A3" 518+67.26 EC

MATCHLINE 518+50
SEE SHEET L-15

"A3" 1525+65.11 POE
"A2" 525+64.48
MATCH INITIAL BUILD
END PAVEMENT
END Conc BARRIER

EXISTING CALTRANS R/W

Exist R/W

DIRT

CURVE DATA

No.	R	Δ	T	L
(42)	3000.00	57°24'04"	1642.49	3005.52
(43)	3000.00	54°38'03"	1549.55	2860.64
(44)	2984.00	08°38'24"	225.41	449.97

LAYOUT

SCALE 1"=50'

L-16

LAST REVISION | DATE PLOTTED => 8/17/2011
00-00-00 | TIME PLOTTED => 9:53:31 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

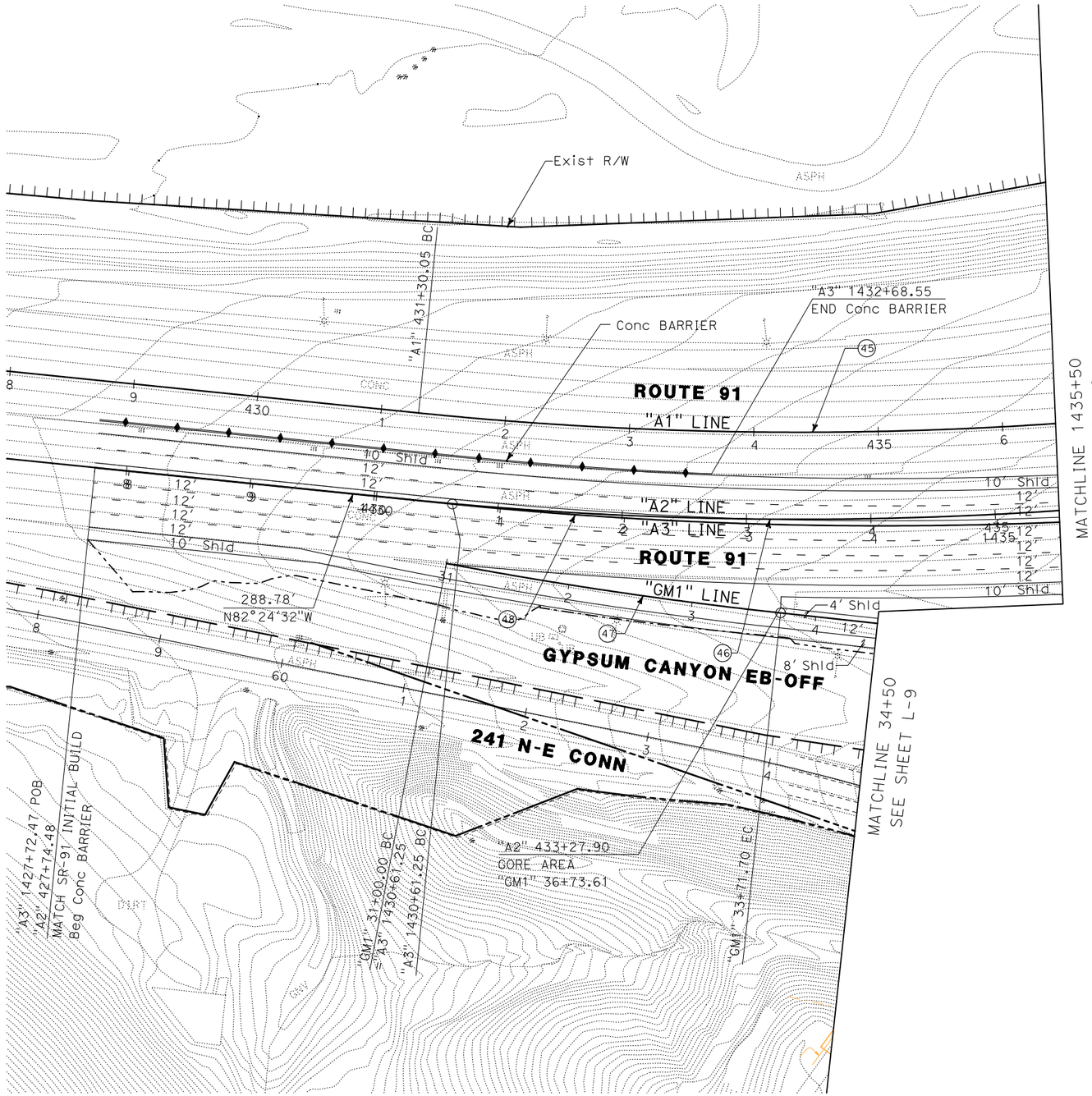
USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-16.dgn

CU 00000

EA 000000

CURVE DATA

No.	R	Δ	T	L
(45)	3030.00	35°44'38"	977.03	1890.26
(46)	3100.00	35°44'38"	999.60	1933.93
(47)	3486.00	04°27'57"	135.92	271.70
(48)	3438.00	36°37'01"	1137.57	2197.18



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	21	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

LAYOUT

SCALE 1"=50'

L-17

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

SUPERVISOR | CONSULTANT FUNCTIONAL SUPERV

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 TIME PLOTTED => 9:54:05 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-17.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	22	33

REGISTERED CIVIL ENGINEER DATE

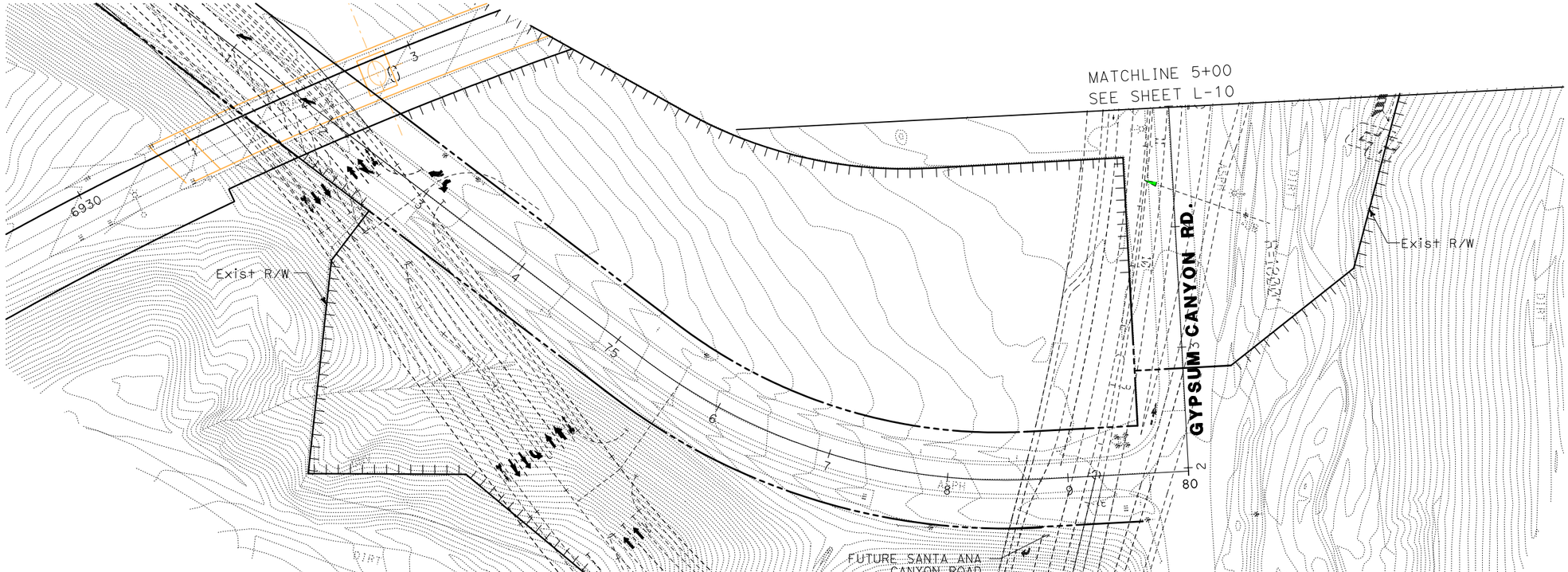
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS.
CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



LAYOUT

SCALE 1"=50'

L-18

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 9:54:40 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane L-18.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	23	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

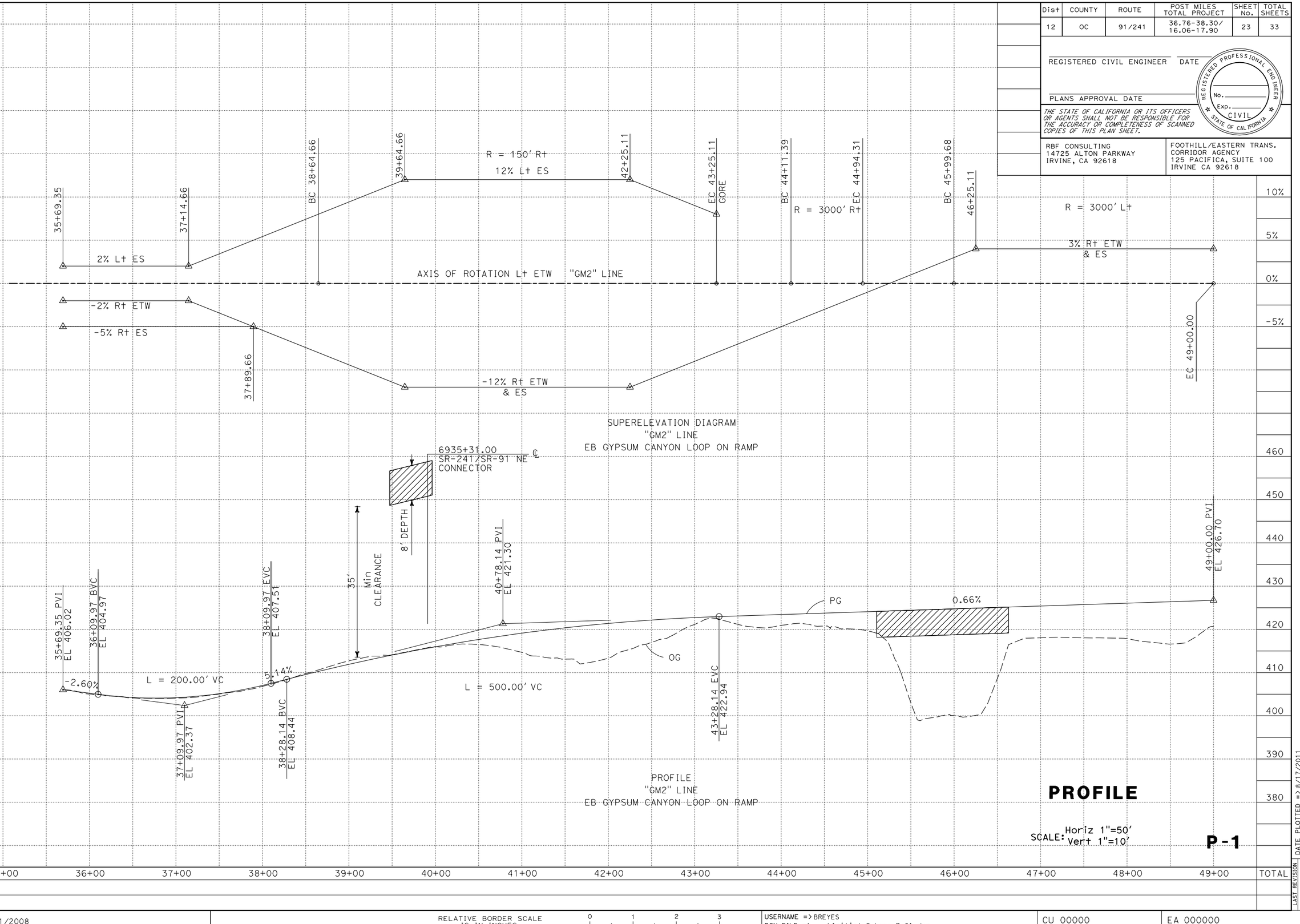
REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans



PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-1

STATION	35+00	36+00	37+00	38+00	39+00	40+00	41+00	42+00	43+00	44+00	45+00	46+00	47+00	48+00	49+00	TOTAL
CY Exc																
CY Emb																

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 9:55:33 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane P-01.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	24	33

REGISTERED CIVIL ENGINEER DATE

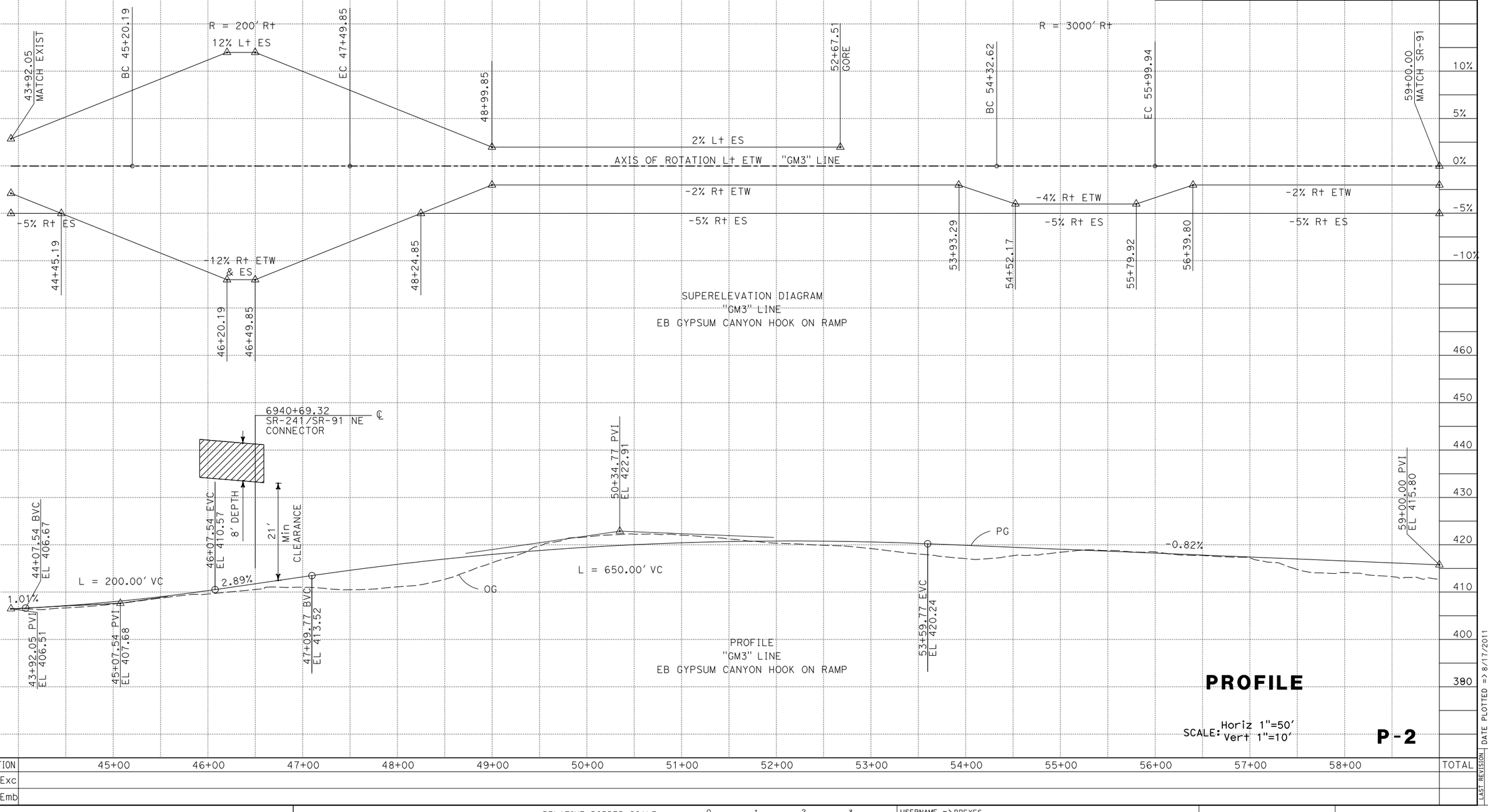
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-2

STATION	45+00	46+00	47+00	48+00	49+00	50+00	51+00	52+00	53+00	54+00	55+00	56+00	57+00	58+00	TOTAL
CY Exc															
CY Emb															

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CONSULTANT FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

DATE REVISED	REVISED BY

LAST REVISION 00-00-00

DATE PLOTTED => 8/17/2011
TIME PLOTTED => 9:56:32 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane P-02.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	25	33

REGISTERED CIVIL ENGINEER DATE

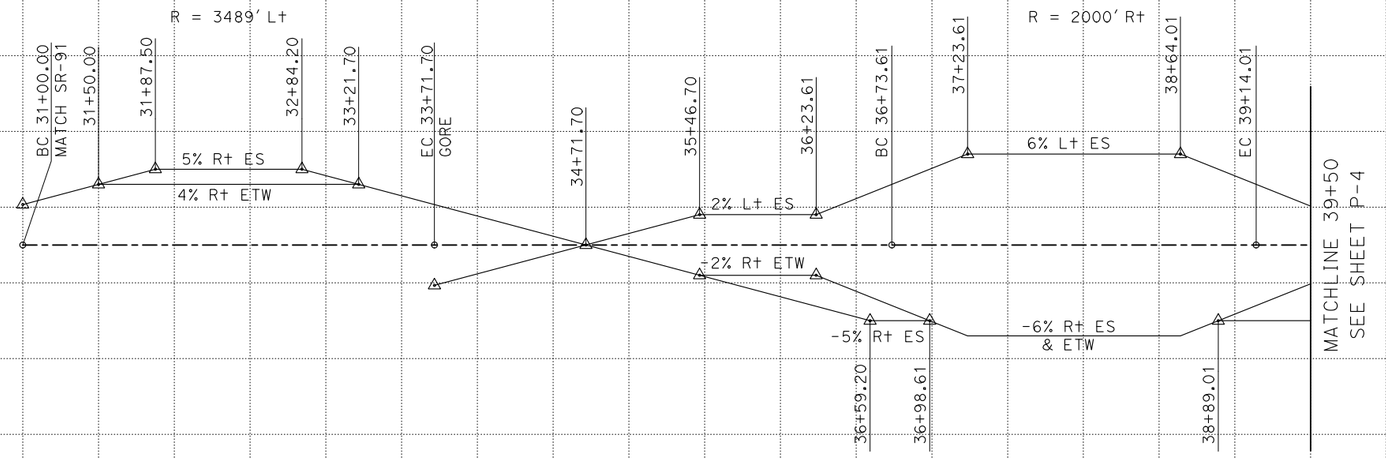
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

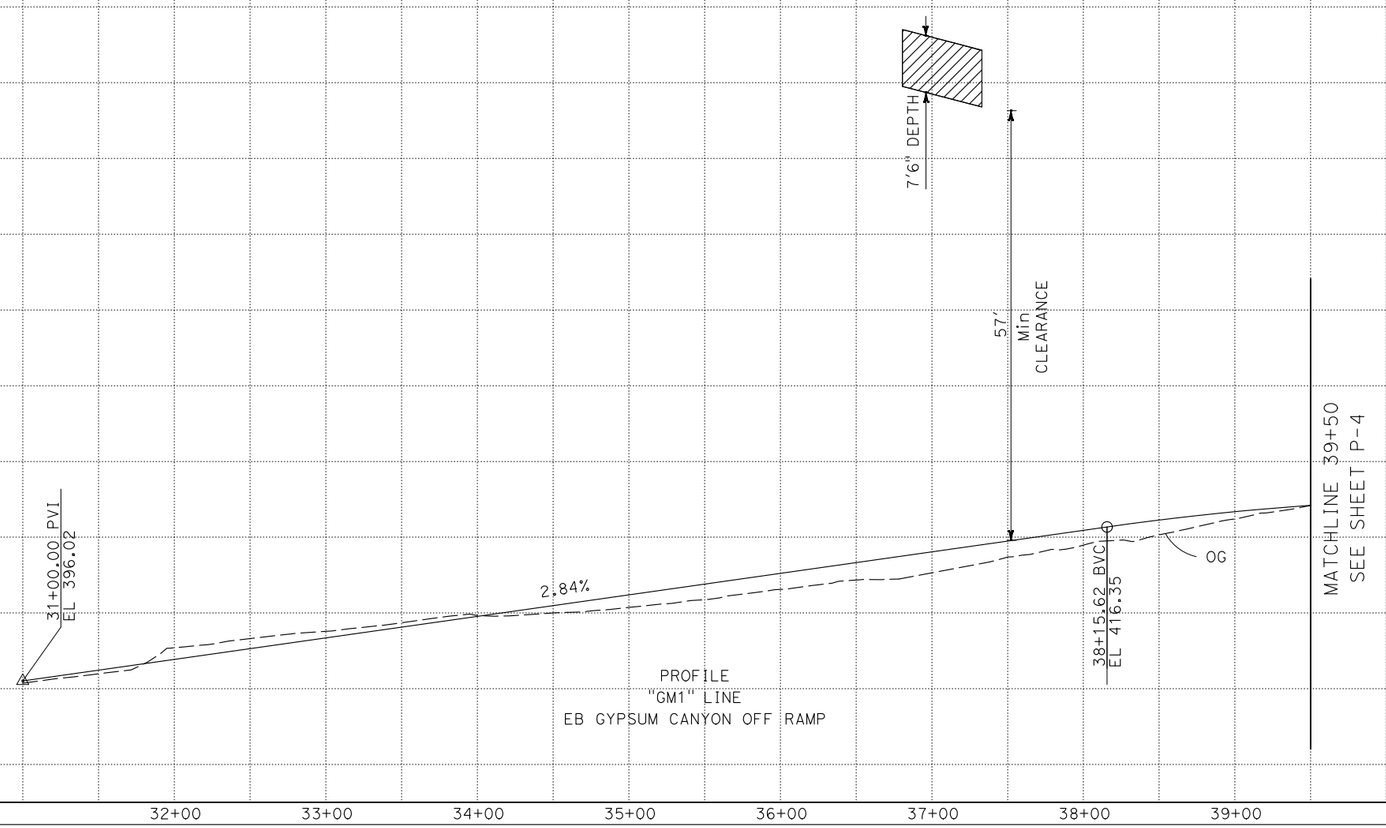
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



SUPERELEVATION DIAGRAM
"GM1" LINE
EB GYPSUM CANYON OFF RAMP



PROFILE
"GM1" LINE
EB GYPSUM CANYON OFF RAMP

PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-3

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

REVISED BY

DATE REVISED

LAST REVISION DATE PLOTTED => 8/17/2011
00-00-00 TIME PLOTTED => 9:57:04 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane P-03.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	26	33

REGISTERED CIVIL ENGINEER DATE

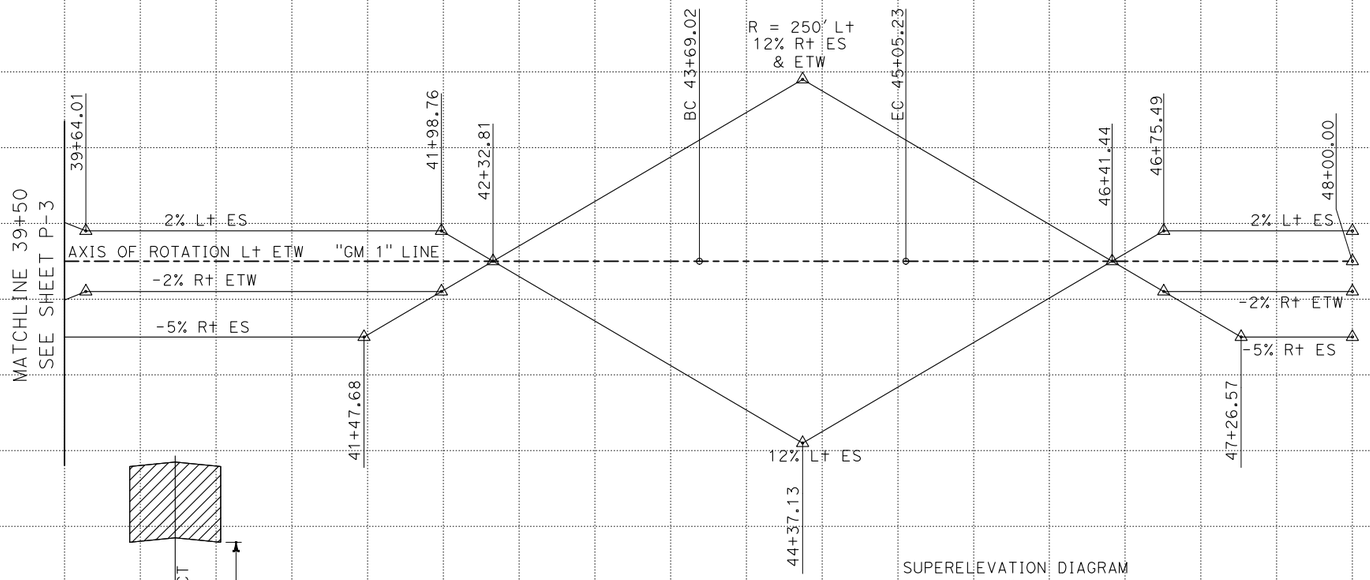
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

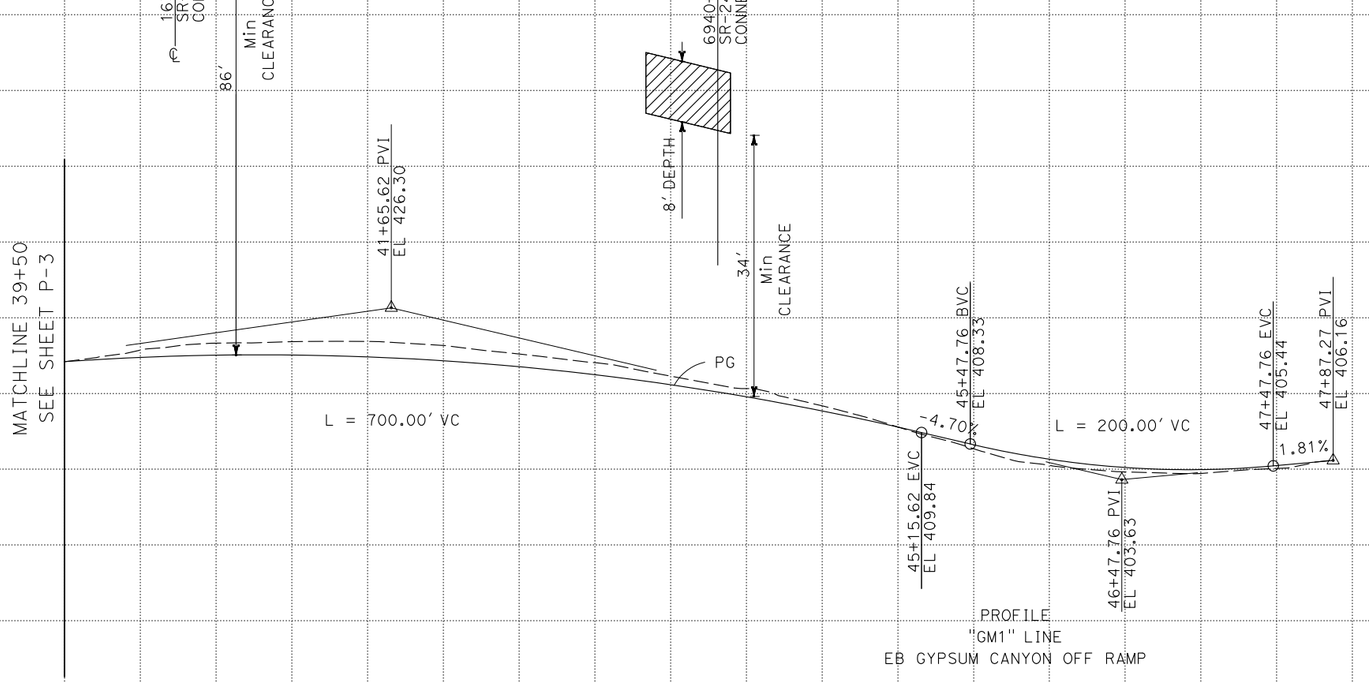
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



SUPERELEVATION DIAGRAM
"GM1" LINE
EB GYPSUM CANYON OFF RAMP



PROFILE
"GM1" LINE
EB GYPSUM CANYON OFF RAMP

PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-4

STATION 40+00 41+00 42+00 43+00 44+00 45+00 46+00 47+00 48+00 TOTAL

CY Exc

CY Emb

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CONSULTANT FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

REVISED BY

DATE REVISED

LAST REVISION 00-00-00 DATE PLOTTED => 8/17/2011 TIME PLOTTED => 9:57:34 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane P-04.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	27	33

REGISTERED CIVIL ENGINEER DATE

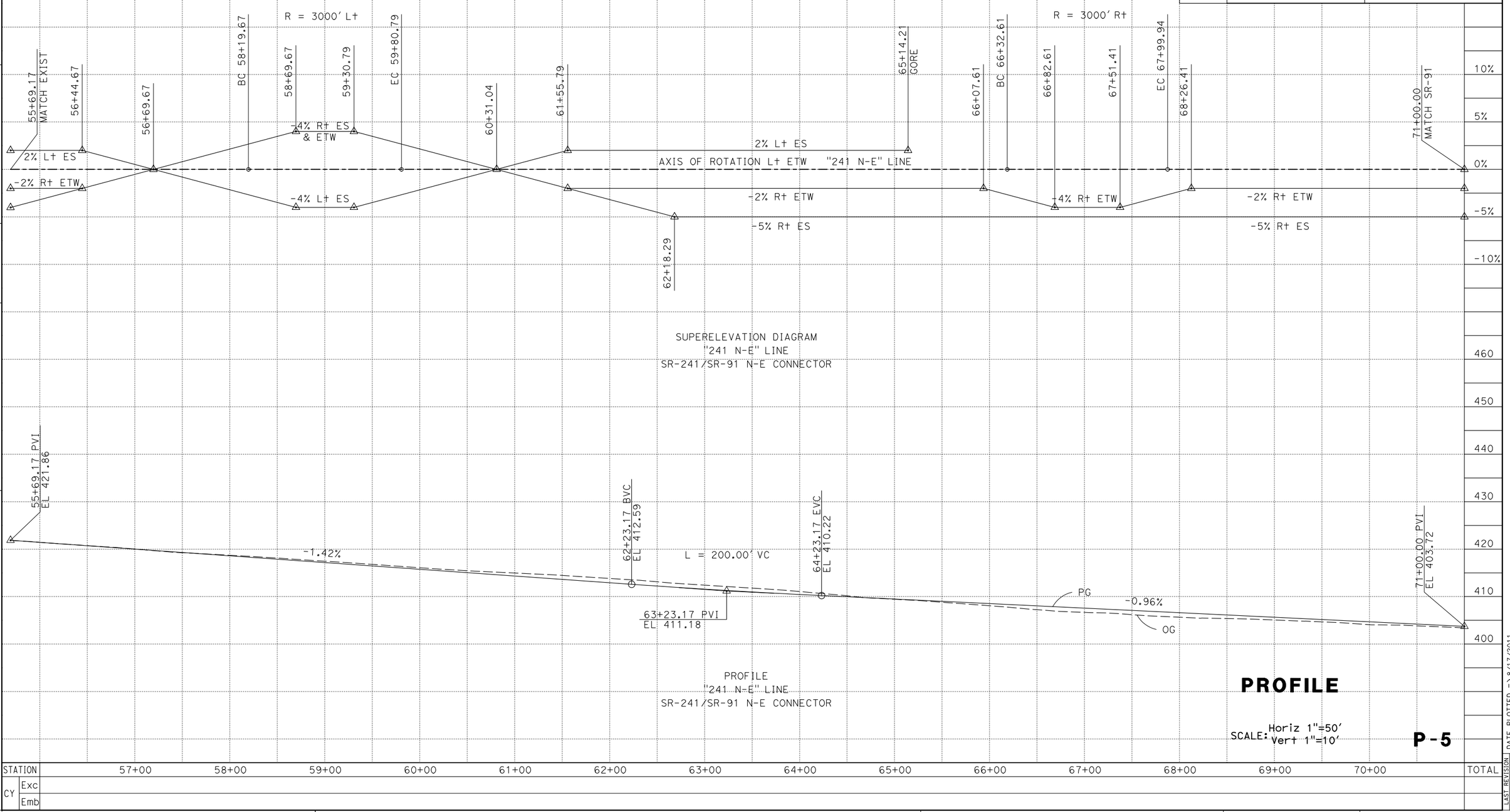
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. Exp. CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



SUPERELEVATION DIAGRAM
"241 N-E" LINE
SR-241/SR-91 N-E CONNECTOR

PROFILE
"241 N-E" LINE
SR-241/SR-91 N-E CONNECTOR

PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-5

STATION	57+00	58+00	59+00	60+00	61+00	62+00	63+00	64+00	65+00	66+00	67+00	68+00	69+00	70+00	TOTAL
CY Exc															
CY Emb															

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

CHECKED BY

DATE REVISED	REVISED BY

LAST REVISION 00-00-00
DATE PLOTTED => 8/17/2011
TIME PLOTTED => 9:58:38 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane P-05.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	28	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

SUPERELEVATION DIAGRAM
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

123+28.83
MATCH EXIST

123+28.83 PVI
EL 684.32
MATCH EXIST

AXIS OF ROTATION "241 DC1" LINE

-2% SB & EB ETW

-5% EB & SB ES

129+72.55

131+97.55

BC 134+47.55

134+97.55

R = 4516.29

+2% SB ETW

AXIS OF ROTATION "241 DC1" LINE

-2% EB ETW

-5% EB ES

MATCHLINE 137+00
SEE SHEET P-7

5%
0%
-5%

700
690
680
670
660
650
640
630
620
610
600

PROFILE
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

-5.92%

PG

OG

MATCHLINE 137+00
SEE SHEET P-7

PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-6

STATION	123+00	124+00	125+00	126+00	127+00	128+00	129+00	130+00	131+00	132+00	133+00	134+00	135+00	136+00	137+00	TOTAL
CY Exc																
CY Emb																

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 9:59:08 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane P-06.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	29	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

SUPERELEVATION DIAGRAM
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

137+22.55
R = 4516.29
138+15.25
PCC 139+65.25
R = 3734.78
PCC 141+32.36

5%
+4% SB ETW & ES
0%
AXIS OF ROTATION "241 DC1" LINE
-4% EB ETW
-5%
-5% EB ES

MATCHLINE 151+00
SEE SHEET P-8

MATCHLINE 137+00
SEE SHEET P-6

137+91.01 BVC
EL 597.73

L = 500.00' VC

142+91.01 EVC
EL 578.18

PG

-1.90%

140+41.01 PVI
EL 562.93

3918+34.56
SR-241/SR-91 NW
CONNECTOR

10' DEPTH

149+35.29 BVC
EL 565.94

L = 1400.00' VC

OG

PROFILE
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

600 590 580 570 560 550 540 530 520 510 500

STATION 137+00 138+00 139+00 140+00 141+00 142+00 143+00 144+00 145+00 146+00 147+00 148+00 149+00 150+00 151+00 TOTAL

CY Exc
CY Emb

PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-7

LAST REVISION | DATE PLOTTED => 8/17/2011
00-00-00 | TIME PLOTTED => 9:59:34 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane P-07.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	30	33

REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

SUPERELEVATION DIAGRAM
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

R = 3100'

+4% SB ETW & ES

AXIS OF ROTATION "241 DC1" LINE

-4% EB ETW

-5% EB ES

MATCHLINE 151+00
SEE SHEET P-07

MATCHLINE 160+50
SEE SHEET P-9

156+35.29 PVI
EL 552.64

PG

L = 1400.00' VC

PROFILE
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

5%
0%
-5%

560 550 540 530 520 510 500 490 480 470 460 450 440

STATION	151+00	152+00	153+00	154+00	155+00	156+00	157+00	158+00	159+00	160+00	161+00	TOTAL
CY Exc												
CY Emb												

PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-8

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

SUPERVISOR

CONSULTANT FUNCTIONAL

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 10:00:11 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES | DGN FILE => ...\Initial 2 Lane P-08.dgn | CU 00000 | EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	31	33

REGISTERED CIVIL ENGINEER DATE

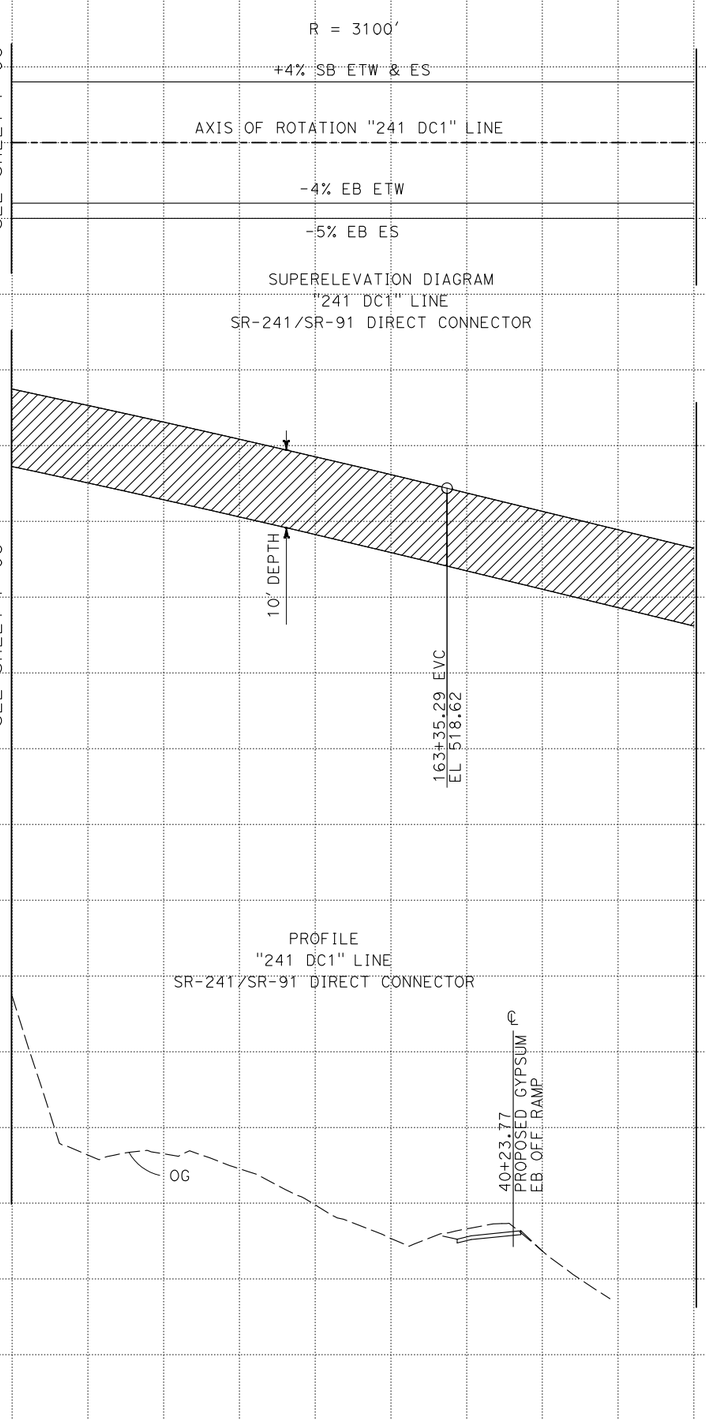
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-9

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 10:00:42 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES | DGN FILE => ...\Initial 2 Lane P-09.dgn | CU 00000 | EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	32	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

SUPERELEVATION DIAGRAM
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

169+12.00
EC 169+62.00
+4% SB ETW & ES
AXIS OF ROTATION "241 DC1" LINE
-4% EB ETW
-5% EB ES
169+87.00
171+37.00
172+49.50
-2% SB & EB ETW
-5% EB & SB ES
MATCHLINE 165+00 SEE SHEET P-9
MATCHLINE 179+00 SEE SHEET P-11
5%
0%
-5%
-10%
510
500
490
480
470
460
450
440
430
420
410
400
10' DEPTH
-4.86%
177+00 BEGIN MSE WALL
PG
OG

PROFILE
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-10

STATION	165+00	166+00	167+00	168+00	169+00	170+00	171+00	172+00	173+00	174+00	175+00	176+00	177+00	178+00	179+00	TOTAL
CY Exc																
CY Emb																

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00

DATE PLOTTED => 8/17/2011
TIME PLOTTED => 10:01:11 AM

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => BREYES
DGN FILE => ...\Initial 2 Lane P-10.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	33	33

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PARKWAY
IRVINE, CA 92618

FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

SUPERELEVATION DIAGRAM
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

AXIS OF ROTATION "241 DC" LINE
-2% SB & EB ETW
-5% EB & SB ES

MATCHLINE 179+00
SEE SHEET P-10

188+92.47
MATCH EXIST

PROFILE
"241 DC1" LINE
SR-241/SR-91 DIRECT CONNECTOR

MATCHLINE 179+00
SEE SHEET P-10

179+51.56 BVC
EL 440.07

PG

L = 900.00' VC

OG

184+01.56 PVI
EL 418.20

188+51.56 EVC
EL 413.70

188+92.47 PVI
EL 413.29

-1.00%

10% 5% 0% -5% -10%

470 460 450 440 430 420 410 400 390

STATION: 178+00 179+00 180+00 181+00 182+00 183+00 184+00 185+00 186+00 187+00 188+00 189+00 190+00 TOTAL

CY Exc
CY Emb

PROFILE

SCALE: Horiz 1"=50'
Vert 1"=10'

P-11

REVISED BY | DATE REVISED

CALCULATED-DESIGNED BY | CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

LAST REVISION 00-00-00 | DATE PLOTTED => 8/17/2011 | TIME PLOTTED => 10:01:41 AM

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => BREYES | DGN FILE => ...\Initial 2 Lane P-11.dgn | CU 00000 | EA 000000

Right of Way Data Sheet (Alternative 1)

To: Caltrans, District 12

Attention:

Subject: Right of Way Data

Date: October 18, 2011
Dist 12 Co ORA Rte 241 P/M 36.1 Rte 91 P/M 14.7-17.9
EA 0K970K
Project Description SR-241 / SR-91 Direct Connector
Alternate No. 1 (Build Alt.)

This Alternate meets the criteria for a Design/Build project: Yes ☑ No ☐

1. Right of Way Cost Estimate: To be entered into PMCS COST RW1-5 Screens.

	Current Value Future Use	Escalation Rate	Escalated Value
A. Total Acquisition Cost			$ 2,000
Acquisition, including Excess Lands, Damages, and Goodwill.	$ 0	10%	$ 0
Project Permit Fees.			$ 2,000*
B. Utility Relocation (Owner Share)	$ 27,000	10%	$ 29,700
C. Relocation Assistance	$ 0	%	$ 0
D. Clearance/Demolition	$ 0	%	$ 0
E. Title and Escrow	$ 0	%	$ 0
F. Total Estimated Cost	$ 27,000		$ 31,700
G. Construction Contract Work	$ 0		

(These are construction costs that are to be included in the projects PS&E.)

*Note: Does not include costs for inspection during construction. Initial cost for permit fees.

2. Current Date of Right of Way Certification: N/A

3. Parcel Data: To be entered into PMCS EVNT RW Screen.

Type		Dual/Appr	Utilities		RR Involvements	
X		N/A	U4-1		None	X
A		N/A	-2		C & M Agrmt	
B		N/A	-3		Sve Contract	
C		N/A	-4		Design	
D		N/A	U5-7	7	Const.	
E	XXXX		-8		Lic/RE/Clauses	
F	XXXX		-9			
					Misc. R/W Work	
Total	0				RAP Displ	N/A
					Clear/Demo	N/A
					Const Permits	N/A
					Condemnation	N/A
					Excess	0

Areas: R/W 0 sf No. Excess Parcels 0
Entered PMCS Screens ___/___/___ by _____
Entered AGRE Screen (Railroad data only) ___/___/___ by _____

4. Are there any major items of construction contract work? Yes ☐ No ☑ (If "Yes", explain)

5. Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.). No right of way required. ☑

   Right of way acquisition is not required for the proposed project.

6. Is there an effect on assessed valuation? Yes ☐ Not Significant ☐ No ☑ (If "Yes", explain)

7. Are utility facilities or rights of way affected?

   Yes ☑ No ☐ (If "yes", attach Utility Information Sheet, Exhibit 4-EX-5.)
   The following checked items may seriously impact lead time for utility relocation:

   ☐Longitudinal policy conflict(s)
   ☐Environmental concerns impacting acquisition of potential easements
   ☐Power lines operating in excess of 50 KV and substations
   (See attached Exhibit 4-EX-5 for explanation.)

   Utility relocations are not anticipated. However, utility verifications will be required. The following existing utilities are within or adjacent to the project construction area:

   - Southern California Gas Company
   - AT&T California
   - Southern California Edison (Distribution)
   - Sprint
   - Metropolitan Water District of Southern California
   - Questar Line 90 Company
   - Transportation Corridor Agencies

   These utilities will be protected in place and any potential interference with any existing utilities will be designed around these utilities. Utilities in the project vicinity will need to be potholed prior to PS&E to determine utility depths to avoid potential conflicts. Preliminary contacts have been initiated with utility owners and the scope of project communicated. Utility coordination and verification will continue through PS&E and construction.

8. Are Railroad facilities or rights of way affected?

   Yes ☐ No ☑ (If "Yes", attach Railroad Information Sheet, Exhibit 4-EX-6.)

9. Were any previously unidentified sites with hazardous waste and/or material found?

   Yes ☐ None Evident ☑ (If "Yes", attach memorandum per R/W Manual, Chapter 4, Section 4.01.10.00.)

10. Are RAP displacements required? Yes ☐ No ☑ (If "Yes", provide the following information.)

    No. of single family _____ No. of business/nonprofit _____

    No. of multi-family _____ No. of farms _____

    Based on Draft/Final Relocation Impact Statement/Study dated _____N/A_____, it is anticipated that sufficient replacement housing (will/will not) be available without Last Resort Housing.

11. Are there Material Borrow and/or Disposal Sites required? Yes ☑ No ☐ (If "Yes", explain)

    It is anticipated that a material borrow site will be required due to the likely use of MSE walls and fill for the structure approach within the SR-91 median.

12. Are there potential relinquishments and/or abandonments? Yes ☐ No ☑ (If "Yes", explain)

13. Are there any existing and/or potential airspace sites? Yes ☐ No ☑ (If "Yes", explain)

14. Indicate the anticipated Right of Way schedule of lead time requirements. (Discuss if district proposes less than PMCS lead time and/or if significant pressures for project advancement are anticipated).

    Based on the R/W requirements on Page 1 of this Data Sheet, R/W will require a lead time of N/A months* from the date regular appraisals can begin to project certification.

    In any event, RW Maps will require N/A months from Final Maps to project certification.

15. It is anticipated that Caltrans staff perform all Right of Way work? Yes ☐ No ☑ (If "No," discuss).

    Right of way activities, if any, will be conducted by the TCA's right-of-way consultant. Legal descriptions and exhibits will be prepared by consultants and approved by the Department if required.

Evaluation Prepared By:

Right of Way:	Name: Alan Su, P.E.	Date 10/18/2011
Railroad:	Name Alan Su, P.E.	Date 10/18/2011
Utilities:	Name Alan Su, P.E.	Date 10/18/2011

Recommended for Approval:

Alan Su, P.E.
Senior Associate
RBF Consulting

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates, and assumptions are reasonable and proper subject to the limiting conditions set forth, and I find this Data Sheet complete and current.

Thomas E. Wheeler, P.E.
Corridor Manager - Design
Transportation Corridor Agencies

10/19/11
Date

PSR-PDS Comment Response Matrix

CALTRANS TECHNICAL COMMENT REVIEW AND RESPONSE FORM				
SR91/SR241 MEDIAN-TO-MEDIAN CONNECTOR EA: 0C970K PROJECT ID#: 1200020097 IMPLEMENTING AGENCY: OCTA CONSULTANT: RBF CONSULTING				
ACTION CODE: A=WILL COMPLY; B=WILL FURTHER EVALUATE IN NEXT PHASE; C=DELETE COMMENT;				
DOCUMENT TITLE AND DISTRIBUTED DATE: **90% PSR(PDS) August 23, 2011**		REVIEW DISCIPLINE:	REVIEWED BY DATE:	TOTAL PAGES: THIS PAGE:

ITEM NO.	DRAWING NO., SPEC. OR CALC.	COMMENT	REVIEW ACTION	FINAL DISPOSITION
		ENVIRONMENTAL BRANCH		
1	Report: Title Page	Please use the correct Expenditure Authorization "0K970K" and include "Project ID # 1200020097". Correct where appropriate.	A	Report has been revised.
2	Report: Page 8	Environmental Determination Document: For both the PEAR and the PSR/PDS, please revise to say: "The additional Environmental Document will either be a Revalidation/Addendum or a new Environmental Document".	A	Report has been revised.
3	Report: Page 8	Environmental Determination Document: It should be noted that although the old Environmental document does mention HOV to HOV connectors, Air, Noise, and Traffic Study analyses specifically for the connectors, were not prepared. Also, a new soundwall have been proposed outside of the study area.	A	Comment noted. The proposed project does not have any soundwall within the project study area.
4	Report: Page 9	Environmental Determination Document: Please include Traffic Study, Geotechnical Survey Report, Community Impacts Assessment, visual Impacts Assessment, and Floodplain/Hydraulics Encroachment Report in the paragraph regarding technical studies.	A	A separate Floodplain/Hydraulics Encroachment Report is not anticipated to be required but will be discussed in the Addendum document.
5	Report: Page 11	Funding: Verify that there are no federal funds involved for this project.	A	The proposed project does not have any federal funds.
6	Report: Page 11	District./Project Contacts: Please replace "Kathleen Dove" with Bahar Heydari. Her contact number is 949-724-2703	A	Report has been revised.
7	Report: Page 11	Attachments: Please include "Right of Way Data sheet (Alternative One) before the PEAR.	A	Report has been revised.
8	Report:	Attachments: The PEAR should be signed and approved.		Comment noted. The PEAR should be signed and approved by Caltrans staff.
8a	Report: Page 8	Environmental Determination Document: Please disregard the statement about a new soundwall being proposed outside the original study area.	A	Comment noted.

8b	Report: Page 9	Environmental Determination Document: In regards to the tie back wall being proposed, ROW acquisition will be required in order to build the tie back wall. Furthermore, it is imperative to include Aesthetic treatment for the wall as part of the Visual Impact Assessment as well as the Geotechnical Report (this comment ties in to comment #4 of the previous comments)	A	1. The proposed project does not have any proposed tie-back wall. Plan sheet has been revised. Additionally, the proposed project is within the existing Caltrans right of way, therefore, no right of way acquisition will be required. 2. Visual Impact Assessment and Preliminary Geotechnical Report will be developed during the PA&ED phase.
8c	Report: Alternative Concepts 1 through 6	Figures #1 & 2: Clarify why Alternative Concept #1 is entitled Two Lane HOV Connector to Existing 91 Express Lanes, and Alternative Concept # 2 is entitled as Four Lane HOT Connector To Existing 91 Express Lanes. Why are the two maps labeled differently?	A	1. Alternative Concept (AC) #1 is one of the alternatives from the Feasibility Study. This alternative consists of one lane in each direction connector for HOV only. However, this AC can also be operated as a High Occupancy Toll (HOT) facility as described in the Feasibility Study. 2. AC #2 is one of the alternatives from the Feasibility Study. This alternative consists of a four-lane connector to the existing SR-91 Express Lanes. This alternative was defined as a HOT connector facility in the Feasibility Study report.
9	Report	During the Design Phase, the final plans will need to depict any Environmentally Sensitive Areas (ESAs)	A	Comment noted.
		RIGHT-OF-WAY BRANCH		
11	Report	There is no discussion in the Report regarding the utility involvement?	A	This discussion is included in the Right of Way Data Sheet.
12	Report	There is no discussion in the report regarding no other R/W involvement (Acquisition & Railroad).	A	This discussion is included in the Right of Way Data Sheet.
13	Report	Section 12, should add District Contact, Robert Enriquez, (949) 724-2406	A	Report has been revised.
14	Report	Data Sheet indicates there is $2,000 for permits, and $29,700 for utility	A	Comment noted.

		relocation, for total R/W cost of $31,700. Cost needs to be included in project cost.		
15	R/W Data Sheet: Page 2	Item 7 needs to be corrected to show Yes.	A	Right of Way Data Sheet has been revised.
		PROJECT STUDIES UNIT BRANCH		
16	Design Exception	General: Review of the attached preliminary geometric layout sheets indicate both Advisory and Mandatory non-standard features exist. All non-standard design features must be shown in the report for each viable alternative.	A	The proposed connector project consists only Advisory non-standard design feature. The non-standard westbound travel lane widths of 11 ft. are part of the proposed SR-91 CIP project.
17	Design Exception	A non-standard lane width of 11' exists elsewhere in the layout sheet. This information may not be correct from a recently completed SR-91 Eastbound Widening Project from SR-241 to SR-71 that widened these lanes to 12' to meet current standards. However, an 11' lane will require a Mandatory Fact Sheet. Justification for an 11' lane may be difficult when a recent project was just completed to standardized the lane widths.	A	The westbound non-standard travel lane widths are being proposed and implemented as part of the SR-91 CIP project. The proposed connector project does not have non-standard travel lane widths. Therefore, mandatory non-standard design exception fact sheet is not required.
18	Design Exception	Review of the layout sheets show that there could be a non-standard Stopping Sight Distance elsewhere. This will require a Mandatory Fact Sheet.	A	Based on the proposed connector geometry, we do not have any Stopping Sight Distance (horizontal and vertical) issue. Any additional non-standard features will be addressed in the PA&ED phase.
19	Report	Title Sheet: To read "Project Study Report – Project Development Study (PSR-PDS)	C	This is consistent with the Project Study Report – PDS template as defined in the Project Development Procedures Manual (PDPM.)
20	Report	Second Sheet: Title for this sheet is "Vicinity Map"	A	Report has been revised.
21	Report	Introduction: Under Funding Source: Any federal funds for this project? Section * refers to NEPA compliance. Last paragraph/Last sentence to read: "A project report……of the selected alternative"	A	There is no federal funding for this project.

22	Report	General: The alternatives must show that the proposed improvements shall not degrade the overall operational integrity of both the mainline SR91 and SR241. During the PA&ED phase, a detailed traffic analysis, with current traffic numbers, shall be developed to show compatibility and improvements to the level of service from the existing condition.	A	Comment noted. A detailed traffic analysis will be included in the PA&ED phase.
23	Report	Alternatives: A standard alternative was not discussed in the report. For a PSR/PDS, a standard alternative needs to be included and discussed in the report.	A	Alternative 4 is a full standard alternative as discussed on page 8 of the report.
24	Report	The feasibility study (page 9) recommended AC#1, AC#3, and AC#4 carry forward to the PSR/PDS for further study. It was mentioned that variations will need to be explored. However, the PSR/PDS showed only AC#1 and rejected AC#3 and AC#4 without discussing whether any variations of these alternatives were even considered.	A	AC#3 and 4 were discussed on page 8 of the report including reasons for rejections. Variations of the basic concepts explored in AC#3 and 4 would not eliminate the reasons why that they were rejected.
25	Report	General: This report is being reviewed and commented on as a stand-alone project. The planning of an unfunded ultimate project offers any justification or mitigation for this project's nonstandard features.		Comment noted.
26	Cooperative Agreement	Section 46: List all required environmental permits	B	This information will not be known until the PA/ED phase and will be included in the Project Report.
27	Cooperative Agreement	Signatures: Replace Frank Lin with Adnan Maiah	A	Agreement has been revised.
28	Report	Section 4 Deficiencies: Need to identify all secondary deficiencies (deficiencies that should be addressed when scoping the project, but not related directly to the stated need and purpose)?	B	Comment noted.
29	Report	Alternatives: The report should additionally discuss the boundaries of the study area required for formal investigations during the PA&ED phase, resources needed to complete the engineering, environmental, and right of way studies to achieve PA&ED, estimated order of magnitude of capital cost for each alternative, discuss Stormwater Best Management Practices that could affect the project cost, discuss Context Sensitive Solutions or Complete Streets that could affect the estimated resources and PA&ED delivery milestone date. Briefly discuss any constructability issues such as full closure and staged construction.	B	Comment noted.
30	Report	Schedule: Update as necessary	A	The current schedule in the PSR-PDS is still valid. A better defined schedule will be provided in the PA/ED phase of the project.
31	Report	District Project Contacts: Replace Jose Hernandez to Gary Slater (949)	A	Report has been revised.

		756-7685		
		TRAFFIC STUDIES BRANCH		
32	Report	General: A Median Barrier Study will be required in the next Phase	A	Comment noted.
33	Report	General: A Traffic Safety Analysis will be required in the next phase. Caltrans is required to prepare the Traffic Analysis. TCA will need to coordinate closely with Caltrans Traffic Safety Branch in developing this report.	A	Comment noted.
34	Report	General: Pertinent requirements to Chapter 7 of the latest version of the Caltrans Traffic Manual shall be adhered to.	A	Comment noted.
35	Report	General: All traffic volumes, accident data and other traffic data must be updated for use in the PA&ED Phase.	A	Comment noted.
36	Report	General: A new crash testing study has recently been completed by Caltrans HQ. Relevant findings for the report indicates that attachments on top of a concrete barrier or guard rail, except barrier markers or chain link fence, are a potential snagging issue as vehicles roll into the barrier during impact and their hoods override the top. Other attachments, such as sign post or electroliers, may be placed on top of concrete guard rail based on the following restrictions to prevent snagging: (a) The top of the barrier is ramped up to 48", at minimum 4:1 slope, where the attachment is placed or (b) the barrier is widened at minimum 20:1 taper on the approach side to provide a minimum 14-inch setback from the attachment to the face of the barrier. Further safety requirements from this test is shown in Chapter 7 of the latest version of the Caltrans Traffic Manual.	A	Comment noted.
37	Report	Layout sheets show guard rails at various locations. Warrants for guard rails must be followed according to Chapter 7 of the current version of the Caltrans Traffic Manual.	A	Comment noted. Additional analysis will be conducted during the PA&ED phase of the project.
38	Report	During the next phase, cross-slopes for the mainline SR-91 between PM 14.439 and PM 16.950 will need to be re-evaluated to avoid potential flooding. A hydraulic analysis of the facility may be required. This may impact the cost estimate for this project.	A	Comment noted.
		NPDES / STORM WATER UNIT		
39	General	A Water Quality Report will be needed for the Environmental Document at PA/ED to discuss effects to receiving water due to the project. Please ensure adequate resourcing.	A	Comment noted.
40	Report	Section 8 "Environmental Determination/Document" should include	A	Report has been revised.

		language for NPDES / Storm Water: "The limits of the proposed project are within the jurisdiction of the Santa Ana Regional Water Quality Control Board (RWQCB). This project must conform to all applicable water quality regulations and/or permit requirements of the State Water Resources Control Board (SWRCB) and any applicable local Regional Water Quality Control Board(s) (RWQCB), including, but not limited to the Caltrans Statewide NPDES Permit (Order No. 99-06-DWQ, NPDES No. CAS000003), the Statewide General NPDES Permit for Construction Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002), and the Caltrans Storm Water Management Plan (June 2007), and any subsequent revision and/or additional requirements at the time of construction. A Storm Water Data Report (SWDR) will be prepared at PID, PA/ED, and PS&E phases. Caltrans-approved Treatment BMPs will be considered during planning and design phases."		
41	SWDR	Cover Sheet i. Include the Project ID (EA) in the appropriate section.	A	Report has been revised.
42	SWDR	Section 1 Project Description i. Language of Purpose and Need is not to be included in this section. Please remove. ii. What are the length and width of the proposed connectors? iii. Does the calculated disturbed soil area of 25 acres include construction yards and stockpiles? If not, please include in the calculations. iv. This project falls under the Anaheim MS4 rather than the Orange County MS4. v. Of the 23.5 acres of net impervious surface, quantify the additional net impervious. vi. The Anaheim MS4 permit order number is "R8-2009-0030"not "RB8-2002-0010). Please double check the MS4 permit number for Riverside County.	A	Report will be revised as noted.
43	SWDR	Section 2 Site Data and Storm Water Quality Design Issues i. Verify with Environmental for season construction restrictions due to biological restrictions such as birds nesting and/or wildlife breeding time frames. ii. Discussion of Groundwater includes groundwater elevations. How far is the groundwater from the surface?	A	Will include statement about avoidance and minimization measures as determined by the Environmental Analysis Report. The groundwater elevations are an approximation based on a SWDR recently

		iii. Update this section with the calculated Risk Level. iv. Did the determination of Right-of-Way acquisition not being anticipated consider the needs to fulfill Treatment requirements?		approved in our project area. The project SWDR was for Santa Ana River Reach 9 Phase IIB Project approved September 2009 under encroachment permit no. 12-09-N-DD-0451. In the PS&E phase when a Geotechnical Report has been completed, the groundwater elevations will be updated. The calculated risk level will be included in this section. The permanent BMPs being explored are within the existing right of way.
44	SWDR	Section 4 Proposed Design Pollution Prevention BMPs i. Discuss how runoff will be conveyed from the connectors. ii. What is meant by: "There will not be placed off-limits to the Contractor"? iii. Narrative discusses that a portion of the road will be widened. Is roadway widening involved in this project?	B	Storm drain systems will be further evaluated during the PA/ED phase. The statement will be clarified. The existing roadway (SR-241) will be widened in the median then transition to direct connectors that drop in the median of SR-91.
45	SWDR	Section 5 Proposed Treatment BMPs i. The percentage WQV to be treated may be unknown, but state that the goal is 100%.	A	Comment noted.
46	SWDR	Evaluation Documentation Form (EDF) i. Please include the Project ID (EA) ii. Change the MS4 to Anaheim and correct the permit numbers.	A	Comment noted.
47	SWDR	Risk Level Evaluation i. Documentation for determination of the value for the K Factor needs to show how "0.26" was obtained. ii. Include documentation as to how the LS Factor Value was obtained.	A	Comment noted.
		TRAFFIC OPERATIONS		
48		General: There is no discussion or efforts shown to address the weaving that will be expected for traffic going NB on SR-241 who will be using the new connector then weaving across EB SR-91 to access SR-71	A	A detailed traffic operational analysis is in progress as part of the ongoing PA/ED study and will be included in the Project

		connector. Such weave needs to be analyzed and addressed. Earlier discussions on this project by consultant indicated that the Direct connector to SR-71 project will eliminate such weave by placing such move on a Structure to cross over SR-91 lanes and merge with SR-71. Such project is not expected to be funded in the near future according to District 8. A suggested mitigation was proposed by Ferdinand with PSR may provide such mitigation from an Operational standpoint. Such suggestion is to increase the toll charge significantly on the connector, then credit the users back at the next toll facility after passing the exit location to SR-71 to the normal planned rate. Such option will provide financial penalty to traffic who use the hot lane to access SR-71. It will not provide any financial penalty for Riverside long range commuter. From Traffic Operation's standpoint this will limit and possibly discourage such weaving traffic and will have minimal impact on SR-91 GP lane traffic.		Report. The weaving area between SR 241 and SR 71 will be modeled in detail and will be included in the Project Report. The traffic operational analysis being prepared for the PA/ED does not have a tolling/revenue component to test the sensitivity of the proposed toll mitigation on the Direct Connector.
49		On Page 10 under Caltrans Project Contacts, list Caltrans contacts title, and unit they represents from Caltrans. Also this project is not Under Jose Hernandez's area. It is under Gary Slater's area. You need to shown Gary Slater, PE, Branch Chief, Traffic Operations North (949) 756-7685 and show my name, Bassem Barsoum, MSCE, PE, Area Traffic Engineer (949) 724-2331	A	Report has been revised.
50		There is no traffic analysis discussion or even summary of performance to compare all concepts in this PSR PDS document. In the feasibility stage which took place back in 2008, I have seen some analysis done but no reference in this document to any study or even an appendix.	A	A detailed traffic operational analysis is in progress as part of the ongoing PA/ED study and will be included in the Project Report. The feasibility study did include detailed traffic analysis, and it is referenced in the PSR(PDS).
51		There is no travel time, delay performance comparison between the provided alternative concepts. This will need to be included as means of comparison.	A	A detailed traffic operational analysis is in progress as part of the ongoing PA/ED study and will be included in the Project Report.
52		Accident analysis shown on table 4-6 needs to further analyze the type of accident and discuss the cause of the accidents and how this project is expected to provide any potential improvement on certain type of accident. You need to get TSAR report to perform such study as part of the Accident Analysis and show your assessment and evaluation of such accident data.	A	Comment noted. Further traffic accident analysis will be conducted during the PA/ED phase of the project.

53		Under the discussion on " Rejected Alternatives", It shows that all alternatives (Concepts 2 through 6) were rejected except Alternative Concept # 1 with no discussion on traffic/ Operational performance. The dominating reason of being rejected .	A	A detailed traffic operational analysis is in progress as part of the ongoing PA/ED study and will be included in the Project Report.

Preliminary Environmental Analysis Report

PRELIMINARY ENVIRONMENTAL ANALYSIS REPORT

1. Project Information

District 12	County ORA	Route 91 241	PM 17.95 (SR-91) 36.10 (SR-241)	EA
Project Title: SR-241/91 Express Lanes Direct Connector Project				
Project Manager Lisa Ramsey, Caltrans District 12			Phone # (949) 724-2102	
Project Engineer Alan Su, RBF			Phone # (949) 855-5788	
Environmental Office Chief/Manager Charles Baker, Caltrans District 12			Phone # (949) 724-2252	
PEAR Preparers Lisa Williams and Nicole West, LSA			Phone # (949) 553-0666	

2. Project Description

Purpose and Need

The median to median connector (Project) was previously evaluated in the ETC Final EIR/EIS. As stated in the Final EIR/EIS, the overall objective of the proposed ETC project was to accommodate traffic growth associated with planned and approved development in Orange County. Specifically, the ETC project was proposed to meet the following objectives:

- To provide relief for existing freeways;
- To help achieve the Regional Mobility Plan goals of reducing emissions from transportation sources;
- To improve traffic flow on the regional transportation system
- To reduce current and projected congestion and air pollution along portions of SR-91, Costa Mesa Freeway (SR-55) and I-5 by providing an alternative travel route in northeast Orange County;
- To service existing and planned development consistent with the General Plans of the County and the cities in areas that will benefit from the project;
- To employ advanced transportation technology for the maximum operational and design efficiency and automatic vehicle monitoring for toll collections; and

- To implement the County of Orange Master Plan of Arterial Highways.

The purpose of the Project is to implement the buildout of the ETC as approved in 1994, be compatible with the proposed SR-91 Corridor Improvement Project (CIP), while minimizing environmental and financial impacts. The study area includes the SR-241 from the SR-91/SR-241 interchange to 12,600 feet south of the interchange and SR-91 from the SR-91/SR-241 interchange to the Coal Canyon/SR-91 Undercrossing.

The need for the project arises from the lack of connectivity between SR-241 and SR-91 Express Lanes, which results in a variety of deficiencies that negatively affect traffic flow and worsen an already congested SR-91 during peak hours. These deficiencies are described below.

- Northbound vehicles on SR-241 cannot access the eastbound SR-91 Express Lanes. Access from northbound SR-241 to eastbound SR-91 is provided by means of a two-lane connector that merges with the SR-91 general-purpose lanes.
- Northbound SR-241 motorists that want to use the eastbound SR-91 HOV lanes must weave across four lanes to access them.
- Westbound SR-91 Express Lanes cannot access southbound SR-241. Access from westbound SR-91 to southbound SR-241 is provided by means of a two-lane connector that diverges from the general-purpose lanes. The limitations of the existing interchange connections require that vehicles using the westbound SR-91 high-occupancy vehicle (HOV) lane weave across four lanes to access the southbound SR-241 connector ramp.

Description of Work

The Transportation Corridor Agencies (TCA), in cooperation with the California Department of Transportation (Department), proposes to construct new direct connectors between SR-241 and SR-91. The connector would bring lanes from the median of northbound SR-241 to the existing eastbound 91 Express Lanes. The reverse movement would also be accommodated, from the westbound 91 Express Lanes to the median of southbound SR-241. A parallel lane that merges into the existing 91 Express Lanes would be needed for the northbound SR-241 to eastbound SR-91 movement. The connector would be tolled and compatible with the extension of the 91 Express Lanes into Riverside County.

The project was previously evaluated in the ETC EIR/EIS. The Systems Management Concept (SMC) for the ETC project proposed that each build alternative would be staged, incorporating general purpose traffic and eventually HOV lanes, to meet the forecasted demand. Under the SMC, ETC construction would be completed in one stage and three or more phases. The HOV lane connectors were identified for Phase 2 of the ETC project.

The project location and vicinity are shown in Figure 1, and the study area is shown in Figure 2; all figures are attached. For this Preliminary Environmental Analysis Report

(PEAR), the study area includes the project limits within the existing right-of-way. Construction access and staging areas would occur within existing right-of-way.

Alternatives

The Orange County Transportation Agency (OCTA) prepared the 91 Express Lanes Extension and State Route 241 Connector Feasibility Study in March 2009. The objectives were to:

- Develop and evaluate concepts for a median-to-median connection between SR-241 and the 91 Express Lanes;
- Identify where to drop and start the added lanes merging to and from SR-241; and
- Propose how an extension of the new median-to-median connection could be integrated into planned freeway improvements in Orange County and Riverside County.

Initially, six Build Alternatives were studied in the feasibility study, and three of these were rejected (Alternative Concepts 2, 5, and 6) during the screening process. A description of the rejected alternatives is provided below.

Alternative Concept 2. The concept is a four-lane high-occupancy toll (HOT) connector to the existing 91 Express Lanes. This alternative is similar to the Alternative Concept 4 except that no additional capacity would be added to the 91 Express Lanes. The additional traffic added to the Express Lanes would result in potential capacity deficiencies (whether or not the Express Lanes were extended) and weaving issues (if the Express Lanes were not extended). Further study of Alternative Concept 4 rather than Alternative Concept 2 would allow the logical termination point for the proposed third Express Lane between SR-241 and SR-71 to be determined based on needed capacity. Therefore, this alternative concept was rejected in favor of Alternative Concept 4.

Alternative Concept 5. This concept is a four-lane toll connector to the extended 91 Express Lanes (to I-15). Alternative Concept 5 is similar to Alternative Concept 4, except that the third Express Lane extends to I-15. The section of SR-91 between SR-71 and I-15 is constrained, and adding a third Express Lane would result in significant right-of-way impacts in the City of Corona. The physical constraints were considered a fatal flaw to the feasibility of Alternative Concept 5.

Alternative Concept 6. This concept would provide a SR-241/SR-71 Direct Toll Connector for SR-241 and SR-71 traffic. This would be a relatively high-cost concept and only focused on a specific portion of the travel demand between SR-241 and SR-71. Given the physical challenges and cost of this concept, the other alternatives were viewed as more feasible. It was not recommended for further consideration.

During preparation of the Project Study Report/Project Development Support (PSR/PDS), the remaining build alternatives were evaluated, and Alternatives 3 and 4 were rejected. A description of these alternatives is provided below.

Alternative 3 (Two-lane Reversible HOT Connector). This concept is a reversible two-lane connector. Although the concept of a reversible connector was feasible from a design consideration, the additional traffic associated with a tolled connector would be an issue for the Express Lanes, and not the connector itself. The two-lane connector provides sufficient capacity, but the concept would not include any additional capacity on the critical section of the Express Lanes east of SR-241. While the connector could be built, it would not address the project objective of improving traffic congestion.

Alternative 4 (Four-lane Toll Connector). This concept provides a four-lane connector and addresses the operational issues of the additional traffic in the Express Lanes by widening the Express Lanes to three lanes in each direction to approximately the SR-71 interchange. It provides a median-to-median connection and addresses issues of congestion relief, but the concept would have significantly higher costs and is not consistent with the ETC EIR/EIS.

Proposed Build Alternative.

Alternative 1 (Two-lane HOV Connector). Alternative 1 allows for tolled vehicles and HOVs to bypass congestion via a median-to-median connection between SR-241 and SR-91. The connection to the existing Express Lanes could be done with standard HOV tapers, which would not require extensive widening of SR-91. The physical footprint of the concept would be compatible with potential future improvements to SR-91. Also, it is consistent with the ETC EIR/EIS. Alternative 1 is the recommended build alternative.

No Build Alternative. Under this alternative, no direct connector would be constructed between SR-241 and SR-91. This alternative would not close the toll connector gap between the SR-241 and the SR-91.

3. Anticipated Environmental Approval

CEQA		NEPA	
Environmental Determination			
Statutory Exemption	☐		
Categorical Exemption	☐	Categorical Exclusion	☐
Environmental Document			
Initial Study or Focused Initial Study with Negative Declaration or Mitigated ND	☐	Environmental Assessment with Finding of No Significant Impact	☐
Environmental Impact Report	☐	Environmental Impact Statement	☐
CEQA Lead Agency (if determined):		Caltrans District 12	
Estimated length of time (months) to obtain environmental approval:		12 Months	
Estimated person hours to complete identified tasks:		1,523 hours	

Based on the project description, Alternative 1 is anticipated to qualify for a Revalidation/Reevaluation and Addendum of the previously approved EIR/EIS.

It is not anticipated that the build alternative would substantially impact natural, cultural, recreational, or historic resources or air quality, water quality, or the noise environment.

4. Special Environmental Considerations

The project will be required to go through the Section 7 Consultation Process between the Department and United States Fish and Wildlife Service (USFWS) to comply with the federal Endangered Species Act (ESA) consistent with the Biological Opinion for the ETC EIR/EIS.

5. Anticipated Environmental Commitments

Environmental commitments may be required for air quality, noise, water quality, visual, hazardous waste, and cultural resources impacts.

Environmental commitments for temporary and permanent impacts to sensitive biological resources will be required. Bird species covered by the federal Migratory Bird Treaty Act (MBTA) may be present in the study area during construction. Avoidance and minimization measures would be required. For this project, biological resources mitigation could include restricted construction scheduling, habitat enhancement, habitat restoration, and/or habitat replacement.

6. Permits and Approvals

The following is a list of regulatory permits anticipated to be required for the proposed project:

- National Pollutant Discharge Elimination System (NPDES) Permit (Notice of Intent to Comply with the General Construction Permit)
- State Right-of-Way Encroachment Permit
- Section 7 Consultation with USFWS

7. Risks and Assumptions

The project will be designed to be compatible with the SR-91 CIP and to tie into this project after construction. Delays in the SR-91 CIP schedule would result in corresponding delays of the proposed project. It is possible that external factors beyond Department/TCA control, such as resources agency staffing shortages, may lengthen consultation time frames.

8. PEAR Technical Studies

8.1 Land Use: The properties surrounding the study area are mostly vacant, although the Mountain Park residential development is proposed in the southeast quadrant of SR-241 and SR-91. Section 4(f) resources adjacent to the study area include: Featherly Regional Park, Chino Hills State Park, Green River Golf Club, and the Santa Ana River Trail. These properties are not anticipated to be impacted by the project; therefore, a Section 4(f) Resources report is not anticipated to be required. Any changes to land use impacts will be evaluated in the California Environmental Quality Act/National Environmental Policy Act (CEQA/NEPA) document

8.2 Growth: Growth impacts have been previously evaluated in the EIR/EIS. Any changes to growth impacts will be evaluated in the Revalidation/Reevaluation and Addendum document

8.3 Farmlands/Timberlands: The study area does not contain any designated farmlands/timberlands.

8.4 Community Impacts: The project would be constructed entirely within Department right-of-way. Construction of the direct connector would be coordinated with construction of the SR-91 CIP in order to minimize the disruption in this area. Temporary lane closures may be required during construction. No other community impacts are anticipated.

8.5 Visual/Aesthetics: Visual impacts were evaluated in the EIR/EIS. The Orange County Master Plan of Scenic Highways designates SR-91 as a Type I Scenic Highway (Viewscape Corridor).The Orange County segment of the study area falls within these boundaries. SR-91 is only designated as a State Scenic Highway between SR-55 and the City of Anaheim limits, which is outside of the study area. Changes to visual impacts will be evaluated in a Visual Memorandum.

8.6 Cultural Resources: The records searches conducted as part of the feasibility study indicated that 40 surveys have been completed within the alternatives limits and a 0.5-mile (mi) radius. Two previously recorded sites are within the alternatives footprints. One resource, 33-10819/CA-RIV-6532H, is the remains of the town of Alta Vista, also known as the Green River Camp; it was determined not to be eligible for the National Register of Historic Places (National Register) per the State Historic Preservation Officer (SHPO) in a letter dated March 8, 2001. The other site is CA-ORA-303. This prehistoric site consists of several caves (rock shelters).

A windshield and pedestrian reconnaissance-level survey was conducted on February 25, 2008, and site CA-ORA-303 was closely examined. The site was completely destroyed during construction of SR-241. Nothing remains of the rock shelters.

The following documentation will be required: Native American consultation; an Area of Potential Effects map; a Supplemental Historic Property Survey Report (HPSR); and an updated Archaeological Survey Report (ASR).

8.7 Hydrology and Floodplain: The most prominent water feature in the study area is the Santa Ana River, which runs parallel to SR-91. The study area along SR-91 north of the freeway is within the 100-year Flood Zone AE (Federal Insurance Rate Map [FIRM] No. 06059C0180J, December 3, 2009). For this FIRM, Zone AE identifies a special flood hazard area for which Base Flood Elevations have been provided. The project is not anticipated to encroach on the 100-year floodplain.

8.8 Water Quality and Storm Water Runoff: Construction of the project is subject to the requirements of the NPDES Permit, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity (Order No. 99-08, NPDES No. CAS000002), and any subsequent statewide permit in effect at the time of construction. Permit compliance is anticipated to be sufficient to minimize erosion and construction-related water quality impacts during construction of the proposed project.

Operation of the project is subject to the requirements of the Statewide Storm Water Permit and WDRs for Caltrans (Order No. 99-08, NPDES No. CAS000003) or subsequent permit. The policy document for implementing the requirements of the NPDES permit are set forth in the Caltrans Storm Water Management Plan.

Consistent with the NPDES permits, construction site, design pollution prevention, and treatment best management practices (BMPs) will be implemented to minimize potential water pollution during construction and future operation of the proposed project. The feasibility of various treatment, design pollution prevention, and temporary construction BMPs will be documented in the Storm Water Data Report for the project. Construction site BMPs will be detailed in and implemented via a Storm Water Pollution Prevention Plan. A Water Quality Assessment will be prepared.

8.9 Geology, Soils, Seismic, and Topography: The following conditions are evident in the study area:

- The foundations at the south end of the connectors are expected to be located on either bedrock or shallow bedrock.
- The depth to bedrock increases from the Windy Ridge area toward Gypsum Canyon road along the alignment.
- The groundwater table is expected to be shallow and can be expected less than 20 feet (ft) from the surface at some locations.
- The alluvium at the eastern half may contain some potentially liquefiable layers.
- The central portion of the alignment may consistent of medium dense to dense alluvial material.
- Multiple foundations were used for the existing connectors. The foundation consisted of spread footing, to cast-in-place drilled hole (CIDH) concrete piles, to H-piles. Where liquefaction was expected, the piles were designed to account for the downdrag loads.

Three other structures are also planned as part of the proposed improvements, including the wildlife structure on SR-241, the SR-91/SR-241 separation, and widening at Gypsum Canyon Road. Foundations for these structures could consist of CIDH piles and driven steel and/or concrete piles.

8.10 Paleontology: Based on the results of the locality and literature search, there are sediments in the immediate area of the project that have a high sensitivity for containing paleontological resources. Based on the geology, the project may encounter sediments from the Ladd Formation, Silverado Formation, Santiago Formation, Undifferentiated Sespe/Vaqueros Formation, Topanga Formation Pleistocene-aged alluvium and landslide deposits, and recent alluvium. All but the Santiago Peak Volcanics, landslides, and recent alluvium have high paleontological sensitivities. A Paleontology Study or Addendum will be prepared.

8.11 Hazardous Waste/Materials: Technical studies prepared for the SR-91 Eastbound Lane Addition project determined that off-site hazardous waste locations were not likely to have impacted the SR-91 alignment. The Aerially Deposited Lead (ADL) Survey conducted for this project found that soil could be reused on site in

compliance with the variances issued to Caltrans Districts 8 and 12 by the Department of Toxic Substances Control. Asbestos-containing materials were not found in accessible locations of affected bridge structures. For this project, a Hazardous Waste Initial Site Assessment (ISA), including a record search, will be required. A supplementary ADL Survey and Asbestos Survey may be required.

8.12 Air Quality: Although the ETC EIR/EIS included an air quality analysis and received a conformity consistency determination from the Federal Highway Administration (FHWA), the air quality regulations have changed substantially since this document was approved. An Air Quality Analysis that analyzes both regional and project-level air quality will be prepared for the project in accordance with the Caltrans Transportation Project-Level Carbon Monoxide Protocol, the United States Environmental Protection Agency's (EPA) fugitive dust conformity rule, and the South Coast Air Quality Management District (SCAQMD) CEQA Handbook air quality guidelines. Conformity determinations will be made by Department staff, the Transportation Conformity Working Group, and FHWA.

8.13 Noise and Vibration: The proposed project qualifies as a Type 1 project as defined in 23 Code of Federal Regulations (CFR) 772. Therefore, a Noise Screening prepared in accordance with the Caltrans Traffic Noise Analysis Protocol is required. The results of the screening will be compared to the Noise Abatement Criteria to determine the need for a Noise Study Report. If a Noise Study Report is warranted, it will determine the potential long-term traffic impacts of the proposed project and will determine if any noise abatement measures are required to be implemented.

To minimize the construction noise impact for sensitive land adjacent to the project site, construction activities will comply with Caltrans Standard Specifications Section 14-8.02, "Noise Control," and Standard Special Provision S5-310, "Noise Control."

8.14 Energy and Climate Change: It is anticipated that the project will reduce vehicle hours traveled (VHT) since it will reduce congestion. A vehicle miles traveled (VMT)/VHT analysis will be conducted as part of the traffic analysis and will be incorporated into the Air Quality Analysis. A quantitative assessment of greenhouse gas emissions will be conducted.

8.15 Biological Environment: A literature review and analysis was conducted in 2008. This analysis identified a total of 73 special-interest species (species listed by the California Department of Fish and Game (CDFG) Natural Diversity Database as "Special Plants" or "Special Animals") as potentially present in the build alternatives limits, including 12 species currently listed as federal or State threatened or endangered. Of the 73 species listed, 40 have a moderate or high probability of being present in the study area, including three species listed as federal or State threatened or endangered. The three listed species include Braunton's milkvetch (*Astragalus brauntonii*), least Bell's vireo (*Vireo bellii*

pusillus), and coastal California gnatcatcher (*Polioptila californica californica*). Least Bell's vireo, coastal California gnatcatcher, and southwestern willow flycatcher have been found in the Wardlow Wash and Prado Basin areas during prior focused surveys. California gnatcatcher critical habitat is designated in the Chino Hills State Park area.

The project would impact the undercrossing at SR-241 in Gypsum Canyon and the Gypsum Canyon undercrossing at SR-91. These undercrossings have a high potential for wildlife usage. The Coal Canyon undercrossing is an important regional wildlife corridor that connects the Santa Ana Mountains to the Chino Hills and Puente Hills; however, this crossing would not be impacted.

A Natural Environment Study (NES) will be prepared. Section 7 consultation consistent with the prior consultation on the ETC EIR/EIS will be required to help determine if any additional measures are needed to minimize impacts to biological resources.

8.16 Cumulative Impacts: There are two highway projects within the study area either in the planning, environmental, design, or construction phase (SR-241/SR-91 to Tustin Avenue and SR-91 CIP). The Mountain Park Specific Plan EIR has been approved but has not been developed. There is the potential for cumulative impacts to environmental resources and nearby sensitive receptors (air quality, biology, cultural, noise, and water quality). Cumulative impacts should be discussed within the technical reports prepared for the proposed project and the environmental document.

8.17 Context-Sensitive Solutions: Context-Sensitive Solutions (CSS) is an approach that considers the total context within which a transportation improvement project will exist. CSS principles include the employment of early, continuous, and meaningful involvement of the public and all stakeholders throughout the project development process. As the proposed project was evaluated in the EIR/EIS, public input has been provided. As the process progresses, additional opportunities will be available for public input and involvement through the project's public outreach program.

9. Summary Statement for PSR or PSR-PDS

A Revalidation/Reevaluation and Addendum document is anticipated for CEQA and NEPA compliance for the proposed project and is estimated to be completed in 12 months. The findings of the environmental technical studies to be prepared during the Project Approval/Environmental Documentation (PA/ED) phase for the proposed project may change this conclusion.

The proposed project:

- Would add express lanes in the existing median with minimal outside widening and median barrier replacement
- Would not involve large cuts and/or fills
- Would not result in displacements
- Would not generate a need for additional public utilities
- Would not result in changes to access control and local traffic patterns
- Would result in temporary construction impacts
- May impact sensitive biological resources

Required Technical Studies. To address potential impacts of the proposed project, the following studies will be required: Visual Memorandum, Supplemental HPSR, ASR, Water Quality Assessment Report, Paleontology Study or Addendum, Hazardous Waste ISA, Air Quality Analysis, Air Quality Conformity Analysis, and NES.

10. Disclaimer

This PEAR provides information to support programming of the proposed project. It is not an environmental determination document. Preliminary analysis, determinations, and estimates of mitigation costs are based on the project description provided in the PSR/PDS. The estimates and conclusions in the PEAR are approximate and are based on cursory analyses of probable effects. A reevaluation of the PEAR will be needed for changes in project scope or alternatives, or in environmental laws, regulations, or guidelines.

11. List of Preparers

Community Impacts Specialist Agnieszka Napiatek	Date: 5/19/11
Cultural Resources Specialist Debbie McLean	Date: 5/19/11
Biologist Richard Erickson	Date: 5/16/11
Noise and Vibration Specialist Jason Lui	Date: 5/17/11
Air Quality Specialist Keith Lay	Date: 5/17/11
Energy/Climate Change Specialist Eddie Torres	Date: 5/13/11
Paleontology Specialist Brooks Smith	Date: 5/19/11
Water Quality Specialist	Date: 5/9/11

Nicole West	
Hydrology and Floodplain Specialist Nicole West	Date: 5/9/11
Hazardous Waste/Materials Specialist Lisa Williams	Date: 5/23/11
Visual/Aesthetics Specialist Erin Razban	Date: 5/19/11
Other:	Date:
PEAR Preparers (Name and Title) Nicole West, Senior Environmental Specialist Lisa Williams, Associate	Date: 5/26/11

12. Review and Approval

I confirm that environmental cost, scope, and schedule have been satisfactorily completed and that the PEAR meets all Caltrans requirements. Also, if the project is scoped as an EA or EIS, I verify that the HQ DEA Coordinator has concurred in the Class of Action.

Environmental Branch Chief — Date: 11-21-2011

Project Manager — Date: 11-22-11

REQUIRED ATTACHMENTS:

Figures
Attachment A: PEAR Environmental Studies Checklist
Attachment B: Estimated Resources by WBS Code
Attachment C: Schedule (Gantt Chart)

ADDITIONAL ATTACHMENTS:

Attachment D: Cultural Resources Memorandum
Attachment E: Flood Insurance RATE Map
Attachment F: Paleontological Resources Memorandum
Attachment G: RTP Page
Attachment H: Biological Resources Memorandum

ATTACHMENT A

PEAR ENVIRONMENTAL STUDIES CHECKLIST

Attachment A: PEAR Environmental Studies Checklist

Rev. 11/08

Environmental Studies for PA&ED Checklist					
	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Land Use	☒	☐	☐	**L**	
Growth	☒	☐	☐	**L**	
Farmlands/Timberlands	☒	☐	☐	**L**	
Community Impacts	☒	☐	☐	**L**	
Community Character and Cohesion	☒	☐	☐	**L**	
Relocations	☒	☐	☐	**L**	
Environmental Justice	☒	☐	☐	**L**	
Utilities/Emergency Services	☒	☐	☐	**L**	
Visual/Aesthetics	☐	☒	☐	**L**	
Cultural Resources:	☐	☐	☒	**L**	
Archaeological Survey Report	☐	☐	☒	**L**	
Historic Resources Evaluation Report	☒	☐	☐	**L**	
Historic Property Survey Report	☐	☐	☒	**L**	
Historic Resource Compliance Report	☐	☐	☐	**L**	
Section 106 / PRC 5024 & 5024.5	☐	☐	☒	**L**	
Native American Coordination	☐	☐	☒	**L**	
Finding of Effect	☒	☐	☐	**L**	
Data Recovery Plan	☒	☐	☐	**L**	
Memorandum of Agreement	☒	☐	☐	**L**	
Other:	☒	☐	☐	**L**	
Hydrology and Floodplain	☒	☐	☐	**L**	
Water Quality and Stormwater Runoff	☐	☐	☒	**L**	
Geology, Soils, Seismic and Topography	☐	☐	☒	**L**	
Paleontology	☐	☐	☒	**M**	
PER	☐	☐	☒	**M**	
PMP	☐	☐	☒	**M**	
Hazardous Waste/Materials:	☐	☐	☒	**L**	
ISA (Additional)	☐	☐	☒	**L**	
PSI	☒	☐	☐	**L**	
Other:	☐	☐	☒	**L**	ADL/Asbestos
Air Quality	☐	☐	☒	**L**	
Noise and Vibration	☒	☐	☐	**L**	
Energy and Climate Change	☐	☐	☒	**L**	
Biological Environment	☐	☐	☒	**M**	
Natural Environment Study	☐	☐	☒	**M**	
Section 7:	☐	☐	☒	**M**	
Formal	☒	☐	☐	**L**	
Informal	☐	☐	☒	**M**	
No effect	☐	☐	☒	**M**	
Section 10	☒	☐	☐	**L**	
USFWS Consultation	☐	☐	☒	**M**	
NMFS Consultation	☒	☐	☐	**L**	
Species of Concern (CNPS, USFS, BLM, S, F)	☐	☐	☒	**M**	

Environmental Studies for PA&ED Checklist					
	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Wetlands & Other Waters/Delineation	☒	☐	☐	L	
404(b)(1) Alternatives Analysis	☒	☐	☐	L	
Invasive Species	☐	☐	☒	L	
Wild & Scenic River Consistency	☒	☐	☐	L	
Coastal Management Plan	☒	☐	☐	L	
HMMP	☒	☐	☐	L	
DFG Consistency Determination	☒	☐	☐	L	
2081	☒	☐	☐	L	
Other:	☐	☐	☐	L	
Cumulative Impacts	☒	☐	☐	L	
Context Sensitive Solutions	☒	☐	☐	L	
Section 4(f) Evaluation	☒	☐	☐	L	
Permits:					
401 Certification Coordination	☒	☐	☐	L	
404 Permit Coordination, IP, NWP, or LOP	☒	☐	☐	L	
1602 Agreement Coordination	☒	☐	☒	L	
Local Coastal Development Permit Coordination	☒	☐	☐	L	
State Coastal Development Permit Coordination	☒	☐	☐	L	
NPDES Coordination	☐	☐	☒	L	
US Coast Guard (Section 10)	☒	☐	☐	L	
TRPA	☒	☐	☐	L	
BCDC	☒	☐	☐	L	

ATTACHMENT B

ESTIMATED RESOURCES BY WBS CODE

PROJECT SCHEDULE

01/05/2012

TASK NAME	IDENTIFIER	START DATES	END DATES	RESOURCES	DUR DAYS	% Complete
12-0K970_PROJ MGMT - PA&ED CMPNT	CT.12.CO.0K970_.0.100.10	01/01/2012	01/09/2013	1689	374.00	0
12-0K970_PERF PREL ENGRG STUDIES & DRAFT PR	CT.12.CO.0K970_.2.160	01/01/2012	10/01/2012	1139	274.00	0
12-0K970_PERF ENV STUDIES & PREP DED	CT.12.CO.0K970_.2.165	01/01/2012	10/01/2012	1053	274.00	0
12-0K970_PMTS AGRES & RAS DURING PA&ED CMPNT	CT.12.CO.0K970_.2.170	01/10/2012	01/09/2013	58	365.00	0
12-0K970_CIRC DED & SLT PRFD PROJ ALT ID	CT.12.CO.0K970_.2.175	10/01/2012	11/01/2012	191	31.00	0
12-0K970_PREP & APV PR & FED	CT.12.CO.0K970_.2.180	11/01/2012	01/09/2013	459	69.00	0
12-0K970_PA & ED	CT.12.CO.0K970_.2.M200	01/09/2013	01/09/2013	0	0.00	0
Total				4589		

PROJECT SCHEDULE

01/05/2012

TASK NAME	IDENTIFIER	START DATES	END DATES	RESOURCES	DUR DAYS	% Complete
12-0K970_PROJ MGMT - PA&ED CMPNT	CT.12.CO.0K970_.0.100.10	01/01/2012	01/09/2013	169	374.00	0
12-0K970_PERF PREL ENGRG STUDIES & DRAFT PR	CT.12.CO.0K970_.2.160	01/01/2012	10/01/2012	194	274.00	0
12-0K970_PERF ENV STUDIES & PREP DED	CT.12.CO.0K970_.2.165	01/01/2012	10/01/2012	0	274.00	0
12-0K970_PMTS AGRES & RAS DURING PA&ED CMPNT	CT.12.CO.0K970_.2.170	01/10/2012	01/09/2013	0	365.00	0
12-0K970_CIRC DED & SLT PRFD PROJ ALT ID	CT.12.CO.0K970_.2.175	10/01/2012	11/01/2012	0	31.00	0
12-0K970_PREP & APV PR & FED	CT.12.CO.0K970_.2.180	11/01/2012	01/09/2013	0	69.00	0
12-0K970_PA & ED	CT.12.CO.0K970_.2.M200	01/09/2013	01/09/2013	0	0.00	0
Total				362		

ATTACHMENT C

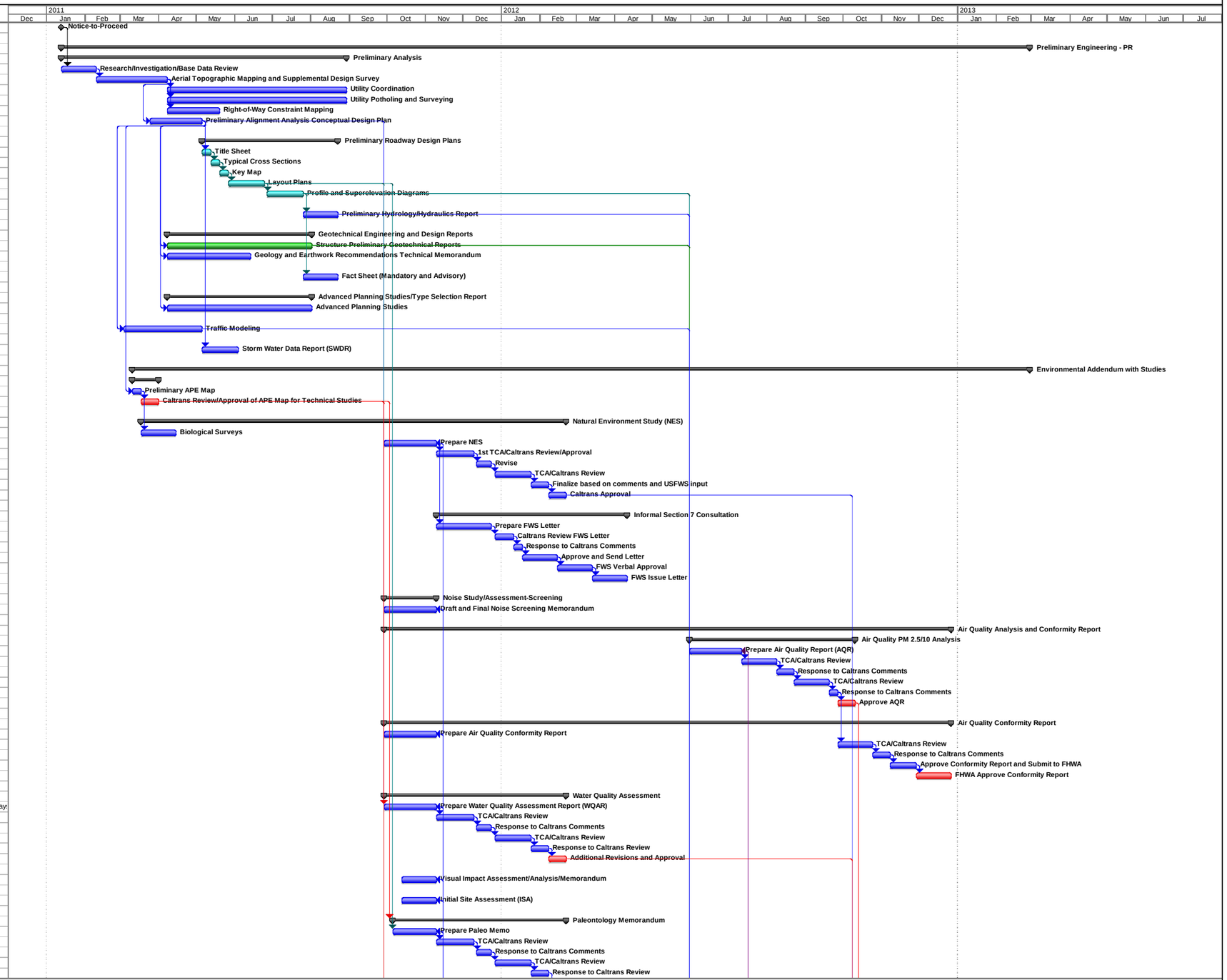
SCHEDULE (GANTT CHART)

RBF CONSULTING

Transportation Corridor Agencies
SR-241/SR-91 Direct Connector
Project Report Schedule

JN: 10-107774

ID	Task Name	Duration	Start	Finish	Predecessors
1	Notice-to-Proceed	0 days	Thu 1/13/11	Thu 1/13/11	
2					
3	**Preliminary Engineering - PR**	**547 days**	**Thu 1/13/11**	**Wed 2/27/13**	
4	**Preliminary Analysis**	**160 days**	**Thu 1/13/11**	**Mon 8/29/11**	
5	Research/Investigation/Base Data Review	20 days	Thu 1/13/11	Wed 2/9/11	1
6	Aerial Topographic Mapping and Supplemental Design Survey	40 days	Thu 2/10/11	Thu 4/7/11	5
7	Utility Coordination	100 days	Fri 4/8/11	Mon 8/29/11	6
8	Utility Potholing and Surveying	100 days	Fri 4/8/11	Mon 8/29/11	6
9	Right-of-Way Constraint Mapping	30 days	Fri 4/8/11	Thu 5/19/11	6
10	Preliminary Alignment Analysis Conceptual Design Plan	30 days	Fri 3/25/11	Thu 5/5/11	6FS-10 days
11					
12	**Preliminary Roadway Design Plans**	**75 days**	**Fri 5/6/11**	**Mon 8/22/11**	
13	Title Sheet	5 days	Fri 5/6/11	Thu 5/12/11	10
14	Typical Cross Sections	5 days	Fri 5/13/11	Thu 5/19/11	13
15	Key Map	5 days	Fri 5/20/11	Thu 5/26/11	14
16	Layout Plans	20 days	Fri 5/27/11	Fri 6/24/11	15
17	Profile and Superelevation Diagrams	20 days	Mon 6/27/11	Mon 7/25/11	16
18					
19	Preliminary Hydrology/Hydraulics Report	20 days	Tue 7/26/11	Mon 8/22/11	17
20					
21	**Geotechnical Engineering and Design Reports**	**80 days**	**Fri 4/8/11**	**Mon 8/1/11**	
22	Structure Preliminary Geotechnical Reports	80 days	Fri 4/8/11	Mon 8/1/11	10FS-20 days
23	Geology and Earthwork Recommendations Technical Memorandum	46 days	Fri 4/8/11	Mon 6/13/11	10FS-20 days
24					
25	**Fact Sheet (Mandatory and Advisory)**	20 days	Tue 7/26/11	Mon 8/22/11	17
26					
27	**Advanced Planning Studies/Type Selection Report**	**80 days**	**Fri 4/8/11**	**Mon 8/1/11**	
28	Advanced Planning Studies	80 days	Fri 4/8/11	Mon 8/1/11	10FS-20 days
29					
30	**Traffic Modeling**	45 days	Fri 3/4/11	Thu 5/5/11	10FS-45 days
31					
32	**Storm Water Data Report (SWDR)**	20 days	Fri 5/6/11	Fri 6/3/11	10
33					
34	**Environmental Addendum with Studies**	**507 days**	**Fri 3/11/11**	**Wed 2/27/13**	
35	**Technical Studies**	**15 days**	**Fri 3/11/11**	**Thu 3/31/11**	
36	Preliminary APE Map	5 days	Fri 3/11/11	Thu 3/17/11	10FS-40 days
37	Caltrans Review/Approval of APE Map for Technical Studies	10 days	Fri 3/18/11	Thu 3/31/11	36
38					
39	**Natural Environment Study (NES)**	**236 days**	**Fri 3/18/11**	**Tue 2/21/12**	
40	Biological Surveys	20 days	Fri 3/18/11	Thu 4/14/11	36
41	Prepare NES	30 days	Thu 9/29/11	Wed 11/9/11	131FF+5 days
42	1st TCA/Caltrans Review/Approval	20 days	Thu 11/10/11	Fri 12/9/11	41
43	Revise	10 days	Mon 12/12/11	Fri 12/23/11	42
44	TCA/Caltrans Review	20 days	Tue 12/27/11	Tue 1/24/12	43
45	Finalize based on comments and USFWS input	10 days	Wed 1/25/12	Tue 2/7/12	44
46	Caltrans Approval	10 days	Wed 2/8/12	Tue 2/21/12	45
47					
48	**Informal Section 7 Consultation**	**105 days**	**Thu 11/10/11**	**Tue 4/10/12**	
49	Prepare FWS Letter	30 days	Thu 11/10/11	Fri 12/23/11	41
50	Caltrans Review FWS Letter	10 days	Tue 12/27/11	Tue 1/10/12	49
51	Response to Caltrans Comments	5 days	Wed 1/11/12	Tue 1/17/12	50
52	Approve and Send Letter	20 days	Wed 1/18/12	Tue 2/14/12	51
53	FWS Verbal Approval	20 days	Wed 2/15/12	Tue 3/13/12	52
54	FWS Issue Letter	20 days	Wed 3/14/12	Tue 4/10/12	53
55					
56	**Noise Study/Assessment-Screening**	**30 days**	**Thu 9/29/11**	**Wed 11/9/11**	
57	Draft and Final Noise Screening Memorandum	30 days	Thu 9/29/11	Wed 11/9/11	131FF+5 days
58					
59	**Air Quality Analysis and Conformity Report**	**321 days**	**Thu 9/29/11**	**Wed 12/26/12**	
60	**Air Quality PM 2.5/10 Analysis**	**95 days**	**Thu 5/31/12**	**Wed 10/10/12**	
61	Prepare Air Quality Report (AQR)	30 days	Thu 5/31/12	Wed 7/11/12	136FF+5 days
62	TCA/Caltrans Review	20 days	Thu 7/12/12	Wed 8/8/12	61
63	Response to Caltrans Comments	10 days	Thu 8/9/12	Wed 8/22/12	62
64	TCA/Caltrans Review	20 days	Thu 8/23/12	Wed 9/19/12	63
65	Response to Caltrans Comments	5 days	Thu 9/20/12	Wed 9/26/12	64
66	Approve AQR	10 days	Thu 9/27/12	Wed 10/10/12	65
67					
68	**Air Quality Conformity Report**	**321 days**	**Thu 9/29/11**	**Wed 12/26/12**	
69	Prepare Air Quality Conformity Report	30 days	Thu 9/29/11	Wed 11/9/11	131FF+5 days
70	TCA/Caltrans Review	20 days	Thu 9/27/12	Wed 10/24/12	65
71	Response to Caltrans Comments	10 days	Thu 10/25/12	Wed 11/7/12	70
72	Approve Conformity Report and Submit to FHWA	15 days	Thu 11/8/12	Wed 11/28/12	71
73	FHWA Approve Conformity Report	20 days	Thu 11/29/12	Wed 12/26/12	72
74					
75	**Water Quality Assessment**	**100 days**	**Thu 9/29/11**	**Tue 2/21/12**	
76	Prepare Water Quality Assessment Report (WQAR)	30 days	Thu 9/29/11	Wed 11/9/11	10,37,131FF+5 days
77	TCA/Caltrans Review	20 days	Thu 11/10/11	Fri 12/9/11	76
78	Response to Caltrans Comments	10 days	Mon 12/12/11	Fri 12/23/11	77
79	TCA/Caltrans Review	20 days	Tue 12/27/11	Tue 1/24/12	78
80	Response to Caltrans Review	10 days	Wed 1/25/12	Tue 2/7/12	79
81	Additional Revisions and Approval	10 days	Wed 2/8/12	Tue 2/21/12	80
82					
83	**Visual Impact Assessment/Analysis/Memorandum**	20 days	Thu 10/13/11	Wed 11/9/11	131FF+5 days
84					
85	**Initial Site Assessment (ISA)**	20 days	Thu 10/13/11	Wed 11/9/11	131FF+5 days
86					
87	**Paleontology Memorandum**	**95 days**	**Thu 10/6/11**	**Tue 2/21/12**	**37**
88	Prepare Paleo Memo	25 days	Thu 10/6/11	Wed 11/9/11	16,131FF+5 days
89	TCA/Caltrans Review	20 days	Thu 11/10/11	Fri 12/9/11	88
90	Response to Caltrans Comments	10 days	Mon 12/12/11	Fri 12/23/11	89
91	TCA/Caltrans Review	20 days	Tue 12/27/11	Tue 1/24/12	90
92	Response to Caltrans Review	10 days	Wed 1/25/12	Tue 2/7/12	91



Project: SR-241/SR-91 Direct Connecto
Date: Tue 11/1/11

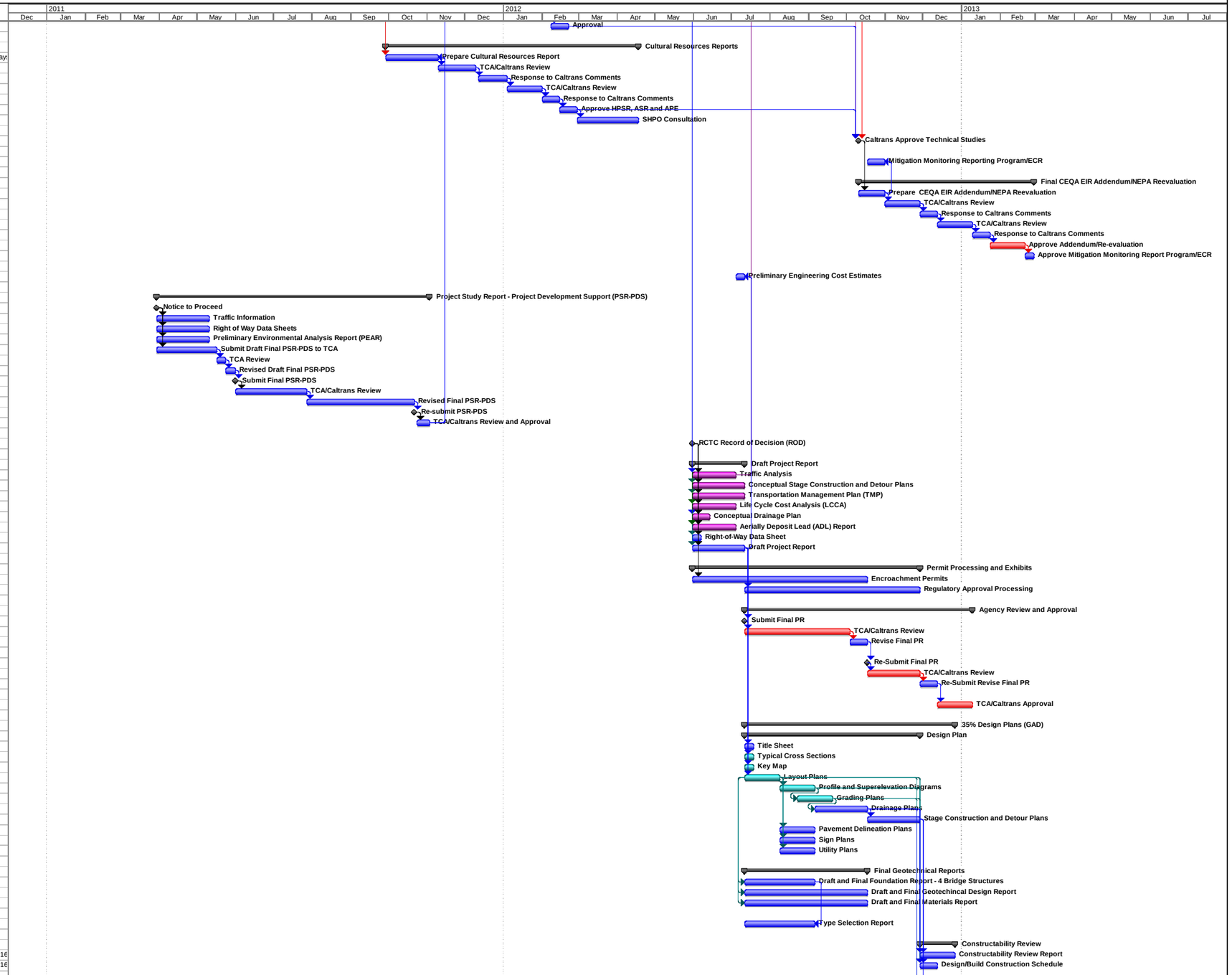
Task · Split · Progress · Milestone · Summary · Project Summary · External Tasks · External MileTask · Split

RBF CONSULTING

Transportation Corridor Agencies
SR-241/SR-91 Direct Connector
Project Report Schedule

JN: 10-107774

ID	Task Name	Duration	Start	Finish	Predecessors
93	Approval	10 days	Wed 2/8/12	Tue 2/21/12	92
94					
95	**Cultural Resources Reports**	**140 days**	**Thu 9/29/11**	**Tue 4/17/12**	
96	Prepare Cultural Resources Report	30 days	Thu 9/29/11	Wed 11/9/11	37,16,131FF+5 days
97	TCA/Caltrans Review	20 days	Thu 11/10/11	Fri 12/9/11	96
98	Response to Caltrans Comments	15 days	Mon 12/12/11	Tue 1/3/12	97
99	TCA/Caltrans Review	20 days	Wed 1/4/12	Tue 1/31/12	98
100	Response to Caltrans Comments	10 days	Wed 2/1/12	Tue 2/14/12	99
101	Approve HPSR, ASR and APE	10 days	Wed 2/15/12	Tue 2/28/12	100
102	SHPO Consultation	35 days	Wed 2/29/12	Tue 4/17/12	101
103					
104	**Caltrans Approve Technical Studies**	0 days	Wed 10/10/12	Wed 10/10/12	101,93,81,66,46
105					
106	**Mitigation Monitoring Reporting Program/ECR**	10 days	Thu 10/18/12	Wed 10/31/12	109FF
107					
108	**Final CEQA EIR Addendum/NEPA Reevaluation**	**100 days**	**Thu 10/11/12**	**Wed 2/27/13**	
109	Prepare CEQA EIR Addendum/NEPA Reevaluation	15 days	Thu 10/11/12	Wed 10/31/12	104
110	TCA/Caltrans Review	20 days	Thu 11/1/12	Wed 11/28/12	109
111	Response to Caltrans Comments	10 days	Thu 11/29/12	Wed 12/12/12	110
112	TCA/Caltrans Review	20 days	Thu 12/13/12	Wed 1/9/13	111
113	Response to Caltrans Comments	10 days	Thu 1/10/13	Wed 1/23/13	112
114	Approve Addendum/Re-evaluation	20 days	Thu 1/24/13	Wed 2/20/13	113
115	Approve Mitigation Monitoring Report Program/ECR	5 days	Thu 2/21/13	Wed 2/27/13	114
116					
117	**Preliminary Engineering Cost Estimates**	5 days	Thu 7/5/12	Wed 7/11/12	143FF
118					
119	**Project Study Report - Project Development Support (PSR-PDS)**	**153 days**	**Wed 3/30/11**	**Wed 11/2/11**	
120	Notice to Proceed	0 days	Wed 3/30/11	Wed 3/30/11	
121	Traffic Information	30 days	Wed 3/30/11	Tue 5/10/11	120
122	Right of Way Data Sheets	30 days	Wed 3/30/11	Tue 5/10/11	120
123	Preliminary Environmental Analysis Report (PEAR)	30 days	Wed 3/30/11	Tue 5/10/11	120
124	Submit Draft Final PSR-PDS to TCA	34 days	Wed 3/30/11	Mon 5/16/11	120
125	TCA Review	5 days	Tue 5/17/11	Mon 5/23/11	124
126	Revised Draft Final PSR-PDS	5 days	Tue 5/24/11	Tue 5/31/11	125
127	Submit Final PSR-PDS	0 days	Tue 5/31/11	Tue 5/31/11	126
128	TCA/Caltrans Review	40 days	Wed 6/1/11	Wed 7/27/11	127
129	Revised Final PSR-PDS	61 days	Thu 7/28/11	Fri 10/21/11	128
130	Re-submit PSR-PDS	0 days	Fri 10/21/11	Fri 10/21/11	129
131	TCA/Caltrans Review and Approval	8 days	Mon 10/24/11	Wed 11/2/11	130
132					
133	**RCTC Record of Decision (ROD)**	**0 days**	**Thu 5/31/12**	**Thu 5/31/12**	
134					
135	**Draft Project Report**	**30 days**	**Thu 5/31/12**	**Wed 7/11/12**	
136	Traffic Analysis	25 days	Thu 5/31/12	Wed 7/4/12	30,133
137	Conceptual Stage Construction and Detour Plans	30 days	Thu 5/31/12	Wed 7/11/12	17,133
138	Transportation Management Plan (TMP)	30 days	Thu 5/31/12	Wed 7/11/12	17,133
139	Life Cycle Cost Analysis (LCCA)	25 days	Thu 5/31/12	Wed 7/4/12	22,133
140	Conceptual Drainage Plan	10 days	Thu 5/31/12	Wed 6/13/12	19,133
141	Aerially Deposit Lead (ADL) Report	25 days	Thu 5/31/12	Wed 7/4/12	22,133
142	Right-of-Way Data Sheet	5 days	Thu 5/31/12	Wed 6/6/12	17,133
143	Draft Project Report	30 days	Thu 5/31/12	Wed 7/11/12	17,133
144					
145	**Permit Processing and Exhibits**	**130 days**	**Thu 5/31/12**	**Wed 11/28/12**	
146	Encroachment Permits	100 days	Thu 5/31/12	Wed 10/17/12	133
147	Regulatory Approval Processing	100 days	Thu 7/12/12	Wed 11/28/12	143
148					
149	**Agency Review and Approval**	**130 days**	**Wed 7/11/12**	**Wed 1/9/13**	
150	Submit Final PR	0 days	Wed 7/11/12	Wed 7/11/12	143
151	TCA/Caltrans Review	60 days	Thu 7/12/12	Wed 10/3/12	150
152	Revise Final PR	10 days	Thu 10/4/12	Wed 10/17/12	151
153					
154	Re-Submit Final PR	0 days	Wed 10/17/12	Wed 10/17/12	152
155	TCA/Caltrans Review	30 days	Thu 10/18/12	Wed 11/28/12	154
156	Re-Submit Revise Final PR	10 days	Thu 11/29/12	Wed 12/12/12	155
157					
158	TCA/Caltrans Approval	20 days	Thu 12/13/12	Wed 1/9/13	156
159					
160	**35% Design Plans (GAD)**	**120 days**	**Thu 7/12/12**	**Wed 12/26/12**	
161	**Design Plan**	**100 days**	**Thu 7/12/12**	**Wed 11/28/12**	
162	Title Sheet	5 days	Thu 7/12/12	Wed 7/18/12	143
163	Typical Cross Sections	5 days	Thu 7/12/12	Wed 7/18/12	143
164	Key Map	5 days	Thu 7/12/12	Wed 7/18/12	143
165	Layout Plans	20 days	Thu 7/12/12	Wed 8/8/12	143
166	Profile and Superelevation Diagrams	20 days	Thu 8/9/12	Wed 9/5/12	165
167	Grading Plans	20 days	Thu 8/23/12	Wed 9/19/12	166FS-10 days
168	Drainage Plans	30 days	Thu 9/6/12	Wed 10/17/12	167FS-10 days
169	Stage Construction and Detour Plans	30 days	Thu 10/18/12	Wed 11/28/12	168
170	Pavement Delineation Plans	20 days	Thu 8/9/12	Wed 9/5/12	165
171	Sign Plans	20 days	Thu 8/9/12	Wed 9/5/12	165
172	Utility Plans	20 days	Thu 8/9/12	Wed 9/5/12	165
173					
174	**Final Geotechnical Reports**	**70 days**	**Thu 7/12/12**	**Wed 10/17/12**	
175	Draft and Final Foundation Report - 4 Bridge Structures	40 days	Thu 7/12/12	Wed 9/5/12	165SS
176	Draft and Final Geotechincal Design Report	70 days	Thu 7/12/12	Wed 10/17/12	165SS
177	Draft and Final Materials Report	70 days	Thu 7/12/12	Wed 10/17/12	165SS
178					
179	**Type Selection Report**	40 days	Thu 7/12/12	Wed 9/5/12	175FF
180					
181	**Constructability Review**	**20 days**	**Thu 11/29/12**	**Wed 12/26/12**	
182	Constructability Review Report	20 days	Thu 11/29/12	Wed 12/26/12	165,166,167,168,16
183	Design/Build Construction Schedule	10 days	Thu 11/29/12	Wed 12/12/12	165,166,167,168,16
184					



Project: SR-241/SR-91 Direct Connecto
Date: Tue 11/1/11

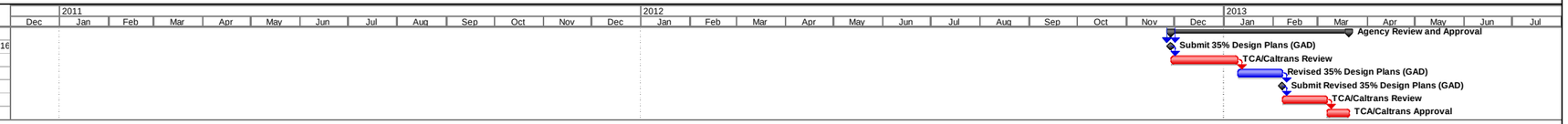
Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External MileTask | Split

RBF CONSULTING

Transportation Corridor Agencies
SR-241/SR-91 Direct Connector
Project Report Schedule

JN: 10-107774

ID	Task Name	Duration	Start	Finish	Predecessors
185	**Agency Review and Approval**	**80 days**	**Wed 11/28/12**	**Wed 3/20/13**	
186	Submit 35% Design Plans (GAD)	0 days	Wed 11/28/12	Wed 11/28/12	165,166,167,168,16
187	TCA/Caltrans Review	30 days	Thu 11/29/12	Wed 1/9/13	186
188	Revised 35% Design Plans (GAD)	20 days	Thu 1/10/13	Wed 2/6/13	187
189	Submit Revised 35% Design Plans (GAD)	0 days	Wed 2/6/13	Wed 2/6/13	188
190	TCA/Caltrans Review	20 days	Thu 2/7/13	Wed 3/6/13	189
191	TCA/Caltrans Approval	10 days	Thu 3/7/13	Wed 3/20/13	190



Project: SR-241/SR-91 Direct Connecto
Date: Tue 11/1/11

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External MileTask | Split

ATTACHMENT D

CULTURAL RESOURCES MEMORANDUM

M E M O R A N D U M

DATE: April 2, 2008

TO: Lisa Williams

FROM: Debbie McLean

SUBJECT: Cultural Resource Analysis of State Route 241 Connector to State Route 91 in Orange and Riverside Counties, California

Records Search. Cultural resources records searches include the project area (Area of Potential Effects [APE]or Study Area) and a buffer (of varying distances). For this project, the project area and 0.25-mile buffer fall within three different counties; thus, three separate records searches were completed through the California Historical Resources Information System. Findings indicate that 40 surveys have been completed within the project area and the 0.5-mile radius. Of these, 29 included various portions of the project area. The only portion of the project area that has not been surveyed is the actual path of State Route 91. Five previously recorded sites are within the 0.25-mile buffer. Two previously recorded sites are within the proposed project area. One resource, 33-10819/CA-RIV-6532H, is the remains of the town of Alta Vista, also known as the Green River Camp; it was determined not to be eligible for listing in the National Register of Historic Places (National Register) per the State Historic Preservation Officer (SHPO) in a letter dated March 8, 2001. The other site is CA-ORA-303. This prehistoric site consists of several caves (rock shelters).

Survey. On February 25, 2008, LSA conducted a windshield and pedestrian reconnaissance-level survey of the project area. The vicinity of site CA-ORA-303 was closely examined. The site was completely destroyed during the construction of State Route 241. Nothing remains of the rock shelters.

Recommendations. Based on the results of the records searches and the field survey, only one cultural resource site (33-10819/CA-RIV-6532H, the remains of the town of Alta Vista, also known as the Green River Camp) is within the project area, and this site has been determined not eligible for listing in the National Register. While the findings of this preliminary study suggest that no cultural resources will be encountered during project-related construction activities, the project APE has not yet been defined. It is possible that once the APE has been determined, areas previously unsurveyed for cultural resources may be included and there may be potential for these as yet undetermined areas to contain cultural resources. Therefore, pending the finalization of the APE, archaeological monitoring is recommended during excavation in areas of native (previously undisturbed) sediments.

If human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be Native American, the County Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely

Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

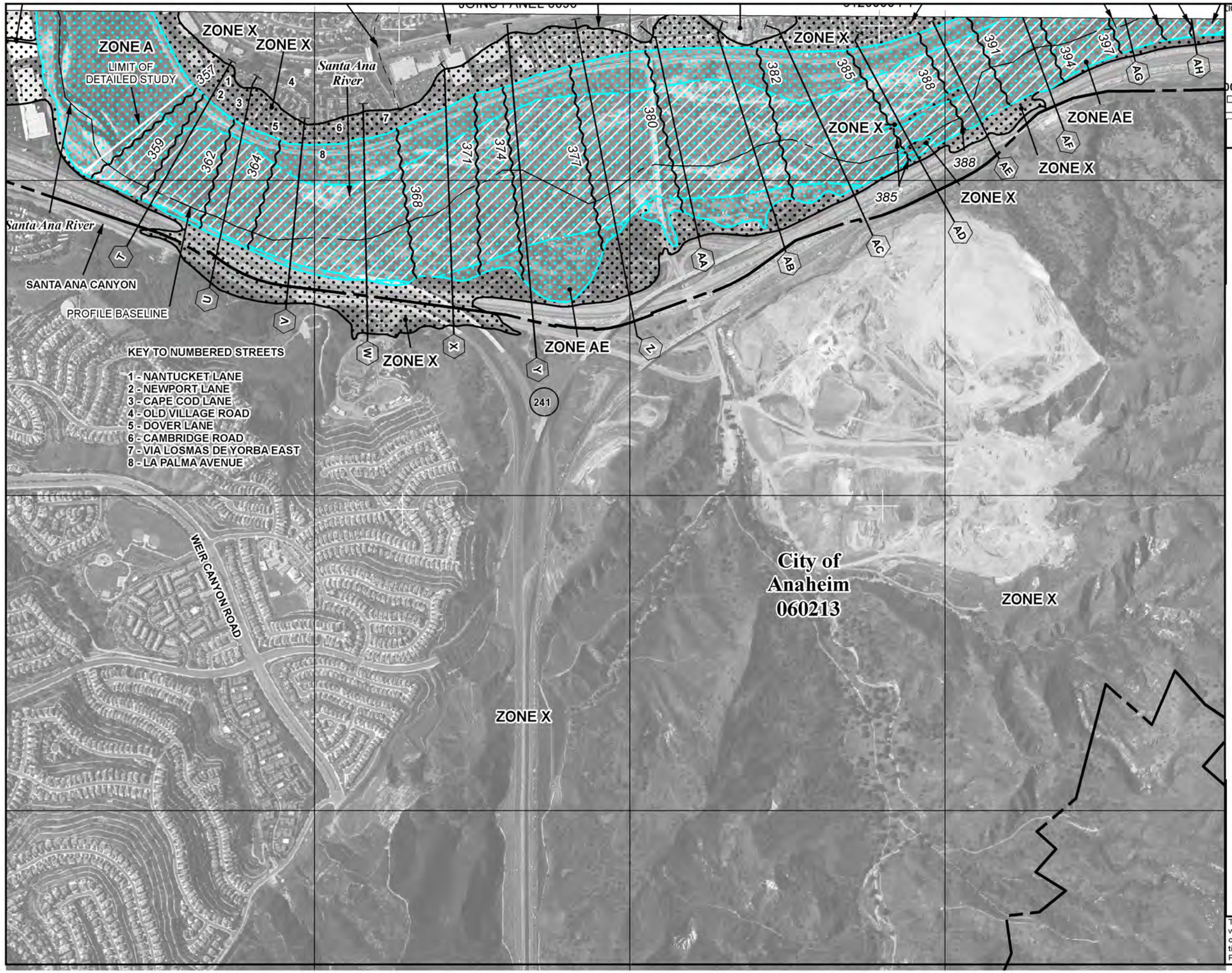
During the Project Report/Environmental Document phase, the following tasks will need to be completed: Native American consultation; an Area of Potential Effects map; a Historic Property Survey Report; and an Archaeological Survey Report.

Additional Tasks for Alternative 4

Architectural Study. The Proposed Impact Line for this alternative passes immediately adjacent to a number of commercial and residential buildings, and it passes through a number of other commercial and residential buildings. Build dates will need to be obtained for all of these buildings. If any of the buildings are at least 45 years old, they will need to be recorded and evaluated on Department of Parks and Recreation (DPR) Series 523 forms. Historical research pertaining to the buildings and the specific vicinity of the buildings will need to be conducted. A Historical Resources Evaluation Report (HRER) will need to be prepared. If none of the buildings are at least 45 years old, they can be addressed per the Section 106 Programmatic Agreement, and neither DPRs, historical research, nor an HRER will be required. This proposal assume that none of the buildings will be at least 45 years old and therefore, the only architectural task that will be necessary is to obtain build dates. If any of the buildings require additional documentation, a budget augment will be required.

ATTACHMENT E

FLOOD INSURANCE RATE MAP



tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

00 0 1000 2000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0180J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 180 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANAHEIM, CITY OF	060213	0180	J
ORANGE COUNTY	060212	0180	J
ORANGE, CITY OF	060228	0180	J
YORBA LINDA, CITY OF	060238	0180	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0180J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

ATTACHMENT F

PALEONTOLOGICAL RESOURCES MEMORANDUM

LSA

LSA ASSOCIATES, INC.
20 EXECUTIVE PARK, SUITE 200
IRVINE, CALIFORNIA 92614

949.553.0666 TEL
949.553.8076 FAX

BERKELEY
CARLSBAD
FORT COLLINS
FRESNO
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROCKLIN
SAN LUIS OBISPO
SOUTH SAN FRANCISCO

MEMORANDUM

DATE: February 29, 2008

TO: Lisa Williams

FROM: Brooks Smith, County of Orange Certified Paleontologist

SUBJECT: Paleontological Resource Analysis of State Route 241 Connector to State Route 91 in Orange and Riverside Counties, California

INTRODUCTION

LSA Associates, Inc. (LSA) has prepared this memorandum to address the potential to encounter paleontological resources for the State Route 241 (SR-241) connector to State Route 91 (SR-91) in the City of Anaheim, County of Orange, and the City of Corona, County of Riverside, California. This memorandum will present the results of a paleontological literature and locality search, and recommendations will be made as to the need for additional studies.

PROJECT ALTERNATIVES

The project is being developed to link the SR-241 with the 91 Express Lanes. Although six Alternatives Concepts (ACs) were developed, AC 1, AC 3, and AC 4 are the most likely to be carried forward for more detailed analysis in the PSR/PDS. AC 1 and AC 3 would extend along SR-91 to approximately Coal Canyon in Orange County, a distance of approximately 1.7 miles (mi) (2.7 kilometers [km]), while AC 4 would extend as far as State Route 71 (SR-71) in Riverside County, a distance of approximately 4.5 mi (7.2 km). All three would extend approximately 1.4 mi (2.3 km) south on SR-241. A more detailed description for each is given below.

AC 1

AC 1 would include new connectors, one lane in each direction for HOV only. Connectors would bring HOVs from the median of the northbound SR-241 to the existing eastbound 91 Express Lanes, which taper into one HOV lane at Green River Road on SR-91. The reverse movement would also be accommodated, from the westbound 91 Express Lanes to the median of the SR-241. A parallel lane that tapers back into the existing 91 Express Lanes would be needed for the northbound SR-241 to the eastbound SR-91 movement. These connectors could be tolled, which would improve the compatibility of AC 1 with the extension of the Express Lanes into Riverside County. No additional improvements to SR-91 (besides the taper described above) are assumed.

AC 3

AC 3 is a single two-lane reversible connector for HOV and toll vehicles. Similar to AC 1, the connector would bring vehicles between the median of SR-241 and the 91 Express Lanes. With AC 2,

however, the connector would be reversible, with two lanes connecting the westbound 91 Express Lanes to the southbound SR-241 in the a.m. peak hour (and no northbound median to median connection). In the p.m. peak hour, the operations would be reversed, so only northbound high-occupancy toll (HOT) lanes from SR-241 could use the connector. In the median of both SR-241 and the 91 Express Lanes, appropriate signage and barriers would be needed to prevent wrong-way movements. The specific times of the operations would be determined later. No additional improvements to SR-91 (other than the necessary tapers) are assumed. A variation of this concept would be a connector with three lanes and a movable median barrier, where two lanes would operate in the direction of peak traffic and one lane would operate in the direction of nonpeak traffic.

AC 4

AC 4 would include new connectors (two lanes in each direction) for toll vehicles. Similar to the existing 91 Express Lanes, HOVs could be given discount/free toll during off-peak periods.

AC 4 assumes that the Riverside County Transportation Commission (RCTC) will extend the 91 Express Lanes (two in each direction) from the Riverside/Orange County line to at least Interstate 15 (I-15). Connectors would bring traffic from the median of northbound SR-241 to the existing eastbound 91 Express Lanes. A third eastbound Express Lane would be added from SR-241 to State Route 71 (SR-71). The extra lane would drop in the vicinity of the SR-71 interchange, without a direct connection to SR-71. The reverse movement would also be accommodated with a third westbound Express Lane from SR-71 to SR-241, and then bring the westbound Express Lane connector to the median of southbound SR-241.

PURPOSE OF THIS MEMO

As this project is along State highways, the project will be obligated to follow the guidelines specified in the Caltrans Standard Environmental Reference (SER). Specifically, the SER Environmental Handbook, Volume 1 Chapter 8, deals with paleontology. The guidelines are designed to address impacts to paleontological resources prior to the beginning of construction. In most cases, three documents are required to be prepared: a Paleontological Investigation Report (PIR), a Paleontological Evaluation Report (PER), and a Paleontological Mitigation Plan (PMP). The PIR and PER are often combined into a single document. The PIR and PER must be prepared prior to completion of Project Approval/ Environmental Document (PA/ED) phase in order to minimize construction delays. The PMP must be developed prior to the beginning of construction.

The purpose of the PIR is to identify whether or not paleontological resources may be present within the project area; the purpose of the PER is to evaluate the significance of the resources, if it is determined that resources are likely to be present; and the purpose of the PMP is to develop mitigation for significant resources. Occasionally the PIR/PER will determine that, despite the results of the literature search, it is unlikely that the project will encounter significant resources during construction. This may be due to the removal of sensitive sediments as a result of previous construction in the area, or burying the sensitive sediments with fill deeper than depths that will be encountered during construction related to the project. In these cases, a PMP will not be required, and the reason will be specified in the PIR/PER.

State Regulations

Under State law, paleontological resources are protected by both the California Environmental Quality Act (CEQA), and the California Public Resource Code (PRC) Section 5097.5.

Under CEQA, Appendix G, lead agencies are required to consider impacts to the direct or indirect destruction of unique resources that are of value to the region or State. Appendix G is a checklist with several choices given, including: Potentially Significant Impact, Less than Significant with Mitigation Incorporation, Less than Significant Impact, and No Impact. Specifically, in Appendix G, Section V(c), lead agencies are required to consider impacts to paleontological resources.

The California PRC Section 5097.5 states:

> "(a) No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.
>
> (b) As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof."

METHODS

Locality Search

The locality search included a review of area geology and any fossil resources recovered within similar sediment to those that will be encountered during the project.

In February 2007, a locality search was completed through the Natural History Museum of Los Angeles County (LACM), the San Bernardino County Museum (SBCM), and records maintained at LSA. Individuals contacted included Eric Scott, Curator of Vertebrate Paleontology at the SBCM, and Dr. Sam McLeod, Curator of Vertebrate Paleontology at the LACM. The results letters from the LACM and SBCM are provided in Attachments A and B, respectively.

The purpose of the search was to establish the status and extent of previously recorded paleontological resources within and adjacent to the SR-241 connector to SR-91 project area and to determine which geologic sediments were likely to be exposed during ground-disturbing activities associated with the proposed improvements. With this knowledge, LSA could make an informed assessment of the potential effects of the proposed project on paleontological resources, anticipate the kinds of resources that might be encountered during earthmoving activities, determine the paleontological sensitivities for each geologic formation or unit exposed in the project area, and make recommendations for additional studies, if necessary.

Paleontological Sensitivity

Planners and paleontologists have worked together to help preserve California's long fossil heritage. A system is used to determine the potential for the occurrence of fossils during the initial scoping phase of each project. These sensitivity ratings are high, low, no, or undetermined potential. This classification, commonly used by paleontologists, was developed by the Society of Vertebrate Paleontology (SVP 1995).

Low Potential. Following a literature search, records check, and field survey, areas may be determined by a qualified vertebrate paleontologist as having low potential for containing significant paleontological resources subject to adverse impacts. Low potential cannot be determined simply by looking for rock unit qualifications on a geologic map. For instance, an area mapped as alluvium may actually be a thin surficial layer of nonfossiliferous sediments that cover fossil-rich Pleistocene sediments. Also, an area mapped as granite may be covered by a Pleistocene soil horizon that contains fossils. The actual sensitivity must be determined by both a records search and a field inspection.

High Potential. Sedimentary rock units with high potential for containing significant nonrenewable paleontological resources are rock units within which vertebrate or significant invertebrate fossils have been determined to be present or likely to be present. These units include but are not limited to sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. High sensitivity ratings include not only the potential for yielding abundant vertebrate fossils but also for production of a few significant fossils that may provide new and significant data (taxonomic, phylogenetic, ecologic, and/or stratigraphic data):

- **High sensitivity (High A)** is based on geologic formations or mappable rock units that are known to contain fossilized body elements and trace fossils such as tracks, nests, and eggs.
- **High sensitivity (High B)** is a sensitivity equivalent to High A, but is based on the occurrence of fossils at a specified depth below the surface that may be impacted during excavation by construction activities. A standard condition is often attached to the environmental planning document for the project, specifying that mitigation will only be required if excavation reaches or exceeds a specified depth.
- **No Potential.** This category includes rock units of intrusive igneous origin, most extrusive igneous rocks, and moderately to highly metamorphosed rocks, as well as areas underlain by artificial fill classified as having no potential for containing significant paleontological resources.
- **Undetermined Potential.** Areas underlain by sedimentary rocks for which literature and unpublished studies are not available have an undetermined potential for containing significant paleontological resources. These areas must be inspected during a field survey conducted by a qualified vertebrate paleontologist. A specific determination of high or low potential for containing significant nonrenewable paleontological resources can then be made.

Field Survey

Neither a field survey nor a windshield survey were completed during preparation of this memo.

Surveys were not warranted because most areas within the project alignment have been covered during previous paleontological studies in the area, namely Lander (2003) along the SR-241 and Wagner (2006) along the SR-91. These studies included field surveys and paleontological mitigation monitoring directly within the current project area.

RESULTS

Geology

The project area is located at the northern end of the Peninsular Range Geomorphic Province, a 1,450-kilometer (km) (900-mile [mi]) long northwest-southeast trending structural block that extends from the tip of Baja California to the Transverse Ranges and includes the Los Angeles Basin (Norris and Webb, 1976). The total width of the province is approximately 362 km (225 mi), with a maximum landbound width of 105 km (65 mi) (Sharp, 1976). This region is characterized by a series of mountain ranges separated by northwest-trending valleys subparallel to faults branching from the San Andreas Fault. The trend of topography is similar to that of the Coast Ranges Geomorphic Province located to the north, but the geology is more like that of the Sierra Nevada, with granitic rock intruding on the older metamorphic rocks. It contains extensive pre-Cretaceous (> 65 million years ago) igneous and metamorphic rocks covered by limited exposures of post-Cretaceous sedimentary deposits.

Specifically, the project is located in Santa Ana Canyon, where the Santa Ana River passes between the Santa Ana Mountains on the south and the Chino Hills to the north. According to the geology map prepared by Morton et al. (2004) various geological units and formations have the potential to be encountered while excavating for this project. The formations and units that have the potential to be encountered include: the Santiago Peak Volcanics, the Ladd Formation, the Silverado Formation, the Santiago Formation, the Undifferentiated Sespe/Vaqueros Formation, and the Sycamore Canyon Member of the Puente Formation. In addition, Quaternary-aged deposits that include Pleistocene-aged nonmarine terrace deposits, Pleistocene-aged landslides, and Holocene alluvium also occur within the project alignment. Each of these is briefly described below.

Santiago Peak Volcanics. The Late Jurassic (165–145 million years ago [Ma]) Santiago Peak Volcanics consist of mildly metamorphosed, extrusive volcanic flows, dikes, and pyroclastics of andesitic to dacitic composition, with interbedded metasediments. Also present are flow breccias, greenstone, volcanic "slate-chip" breccia, intrusive granodiorite, and tonalite.

Ladd Formation. The Cretaceous (Turonian-Campainian) Ladd Formation is primarily deposited in a marine environment. It was named by Popenoe (1937). It is divided into two members: the Baker Canyon Member and the Holtz Shale Member. It can contain conglomerate beds, sandstone beds, or shaly beds.

Silverado Formation. The Paleocene Silverado Formation was deposited during the Thanetian Stage (also known as the Landenian or the Heersian) (58.7 ± 0.2 Ma and 55.8 ± 0.2 Ma), which is the last stage of the Paleocene Epoch (McCulloh et al., 2000). The formation is divided into four units: "A," an unfossiliferous basal conglomerate; "B," a thin sequence of sandstone and siltstone; "C," the

Claymont Clay Bed; and "D," a thick sequence of sandstone, siltstone, and conglomerate, plus the Serrano Clay Bed (Schoellhamer et al., 1981). Only Unit D is marine in origin, and probably only in a region northeast of Silverado Canyon.

Santiago Formation. The middle-Eocene Santiago Formation is composed of marine to nonmarine sediments up to 820 m (2,690 ft) thick. It conformably overlies the Silverado Formation and is in turn conformably overlain by the Undifferentiated Sespe/Vaqueros Formation. In general, the lower beds appear to be marine in origin, while the upper beds are nonmarine in origin. It can contain conglomerate beds, sandstone beds or shaly beds.

Undifferentiated Sespe/Vaqueros Formation. Late Oligocene (Arikareean) to early Miocene Undifferentiated Sespe/Vaqueros Formation is composed of a varied sequence of interbedded marine and nonmarine siltstones, sandstones, and conglomerates. The Undifferentiated Sespe/Vaqueros Formation represents an interfingering of the Sespe Formation (primarily nonmarine) and Vaqueros Formation (primarily marine). Schoellhamer (1981) viewed the Undifferentiated Vaqueros/Sespe Formation as contemporaneous units by their interfingering.

Puente Formation. The Late Miocene marine Puente Formation is divided into four members: the La Vida Member (Tplv), predominantly siltstones; the Soquel Member (Tps), predominantly sandstones; the Yorba Member (Tpy), predominantly siltstones; and the Sycamore Canyon Member (Tpsc), predominantly sandstones. Only the Sycamore Canyon Member is exposed within the project area.

Nonmarine Terrace Deposits. Nonmarine terrace deposits represent the remnants of abandoned floodplains, stream beds, or valley/canyon floors produced during an earlier stage of deposition. These deposits can consist of interbedded silt, clayey sand, and conglomeratic coarse-grained sands. These deposits are sometimes referred to as Pleistocene alluvium, Pleistocene fan deposits, or older alluvium. They can range in age from 10,000 to 2 million years.

Pleistocene to Holocene Landslide Deposits. Pleistocene to Holocene landslide deposits consist of blocks and flows of the underlying sediments and formations. They formed during the last 2 million years as canyon cutting and aqueous erosion caused slope failure. Their composition is dependent on the underlying units that have slid. Sometimes they are no deeper than 1–2 m (several feet) and only involve movement of soil. However, sometimes they are massive, covering several hectares (several acres) with ruptures 6–12 m (tens of feet) deep extending well into the underlying bedrock.

Holocene Alluvium. Holocene alluvium is a geologically recent deposit of gravel, sand, silt, or mud that was deposited by flowing water in a stream or river. It is found within or very close to active stream and river drainages and is usually loosely consolidated. Sand grains are generally subangular to subrounded, while the gravels and cobbles are rounded to well-rounded.

Artificial Fill. Artificial fill is soil/dirt that is placed by humans and can be either unconsolidated or loosely compacted, or engineered and densely compacted. Composition varies and is dependent on the source. It is often mixed with modern debris such as bricks, concrete, asphalt, glass, or wood. Depending on the area, thickness can be less than 0.3 to over 75 m (1 ft or less to several hundred ft).

Paleontology

Locality Search. The LACM has one record of a vertebrate paleontological find within the project area and numerous other localities recovered nearby from formations/units that outcrop within the project area. LACM states that all units that the project crosses except for the Santiago Peak Volcanics and the young alluvial deposits have the potential to contain significant paleontological remains.

The LACM recommends that a mitigation plan be developed that includes monitoring to quickly and professionally recover any fossils that may be encountered while not impeding development during grading within the older alluvium, the Puente Formation, Topanga Formation, Sespe/Vaqueros Formation, Santiago Formation, Silverado Formation, or the Ladd Formation. Any recovered fossils should be placed into a scientific institution for the benefit of current and future generations. A copy of the LACM locality search letter is attached at the end of this memorandum (Attachment A).

The SBCM does not have any recorded localities within the project area. However, it has numerous localities, some within 0.5 mi (0.8 km) of the project alignment, within similar formations/units that are within the alignment and may be encountered during ground-disturbing activities. The SBCM states that the following formations may be encountered during ground-disturbing activities within the project area and have a high paleontological sensitivity: The Ladd Formation, Silverado Formation, Santiago Formation, Sespe and Vaqueros Formations, Topanga Formation, Puente Formation, and the older alluvium (nonmarine terrace deposits).

Because there are sediments within the project area that have high paleontological sensitivity, the SBCM recommends that a qualified vertebrate paleontologist develop a program to mitigate impacts to the nonrenewable resources that may be encountered during excavation in these sediments. The mitigation program should be consistent with California Environmental Quality Act (CEQA) and County of Riverside regulations and follow guidelines of the Society of Vertebrate Paleontology (see Attachment B).

Paleontological Sensitivities. The paleontological sensitivities for each of the units that may be encountered during ground-disturbing activities within the project area are listed in Table A. Table A also lists which formations/units may be encountered in each AC. A brief reasoning for each sensitivity designation is also discussed below.

Table A: Paleontological Sensitivities of Units within the Project Area

Formation/Unit	Sensitivity	Location
Santiago Peak Volcanics	No; Low	AC 4
Ladd Formation	High	AC 1, 3, and 4
Silverado Formation	High	AC 1, 3, and 4
Santiago Formation	High	AC 1, 3, and 4
Undifferentiated Sespe/Vaqueros Formation	High	AC 1, 3, and 4
Topanga Formation	High	AC 1, 3, and 4
Sycamore Canyon Member of the Puente Formation	High	AC 4
Nonmarine terrace deposits	High	AC 1, 3, and 4
Landslide deposits	Low	AC 1, 3, and 4
Recent alluvium	Low	AC 1, 3, and 4
Artificial fill	No Sensitivity	AC 1, 3, and 4

The Santiago Peak Volcanics are primarily igneous and metamorphic rocks and do not contain fossils. Occasionally, fossil impressions of plants and invertebrates have been found in flow breccias or volcanic ash layers in San Diego County within rocks assigned to this unit. However, these are extremely rare and unlikely under most conditions.

The Ladd Formation can contain bivalve, gastropod, and cephalopod fossils that are up to 80 million years old. These are scientifically important.

The Silverado Formation can contain important plant fossils as well as many invertebrates. Any fossils from this formation should be considered important.

The Santiago Formation has produced an important collection of fossils from invertebrates and leaves as well as the bones and teeth of lizards, snakes, turtles, crocodiles, birds, marsupials, and mammals. Any additional fossils from this unit will also be considered important.

The Undifferentiated Sespe/Vaqueros Formation has produced a diverse assemblage of both invertebrate and vertebrate fossils that have added to our understanding of the early Miocene. In addition, new species are continually being discovered whenever these units are encountered. As such, this formation has a high paleontological sensitivity rating.

The Topanga Formation can contain a diverse collection of shallow water invertebrates as well as marine mammals such as seals, whales, dolphins, and sea cows. In addition, other vertebrates such as bony fishes, sharks, turtles, and birds have been collected. As this formation contains such a diverse assemblage of fossils, it is considered to have a high paleontologic sensitivity rating.

The Sycamore Canyon Member of the Puente Formation can contain a diverse collection of fossils including marine and terrestrial vertebrates, marine invertebrates, and marine and terrestrial plants from the late Miocene. These fossils help add to the body of scientific knowledge of life in the late Miocene. As such, this unit is considered to have a high paleontological sensitivity rating.

The nonmarine terrace deposits can contain Pleistocene vertebrate fossils that are scientifically significant, as they add to our understanding of the diversity of life during Pleistocene times in southern California. As such, these sediments have a high paleontological sensitivity rating.

Although landslide deposits can occasionally contain the remains of animals that became trapped within the landslide as it was moving, these occur very infrequently. In addition, although landslide deposits can contain fossils within the bedrock units that moved within the slide mass, these have been transported away from the source area and are less important to science. In addition, much of the large landslide mapped within the project area in the vicinity of the Orange and Riverside County line is within the nonfossiliferous, Santiago Peak Volcanics. Thus, landslide deposits are given a low sensitivity. However, any fossils found within these deposits should still be collected.

Recent alluvium, because of its young age, generally does not contain fossils. As such, these recent alluvial deposits are assigned a low paleontological sensitivity rating.

Artificial fill can contain fossils, but because it has been placed at its current location by humans, any fossils that may be in the fill matrix are out of context and would not be scientifically important. Thus, artificial has no paleontological sensitivity.

Field Survey

Although a field survey was not completed during preparation of this memo, two previous paleontological studies have been completed in the vicinity of the project that cover the same area. During the grading of SR-241, Paleo Environmental Associates, Inc. (PEA) provided paleontological mitigation monitoring. During this monitoring program, PEA collected numerous fossils, including some that are within the current project limits (Lander, 2002).

During preparation of the initial paleontological assessment of the SR-91 lane additions between SR-241 and SR-71, Chambers Group, Inc. (Chambers) completed a field survey of a majority of the project area (Wagner, 2006). This included walking the areas of the proposed project and examining the exposed sediments in the areas of the proposed earthwork. The purpose of this survey was to confirm the geology as it is mapped, determine where potential cuts will occur, and also determine if any fossils were exposed on the surface. Chambers did not observe any fossils within any of the units that outcrop along the SR-91, but was able to confirm most of the mapped geology where it was exposed (Wagner, 2006).

RECOMMENDATIONS

Based on the results of the locality and literature search, there are sediments in the immediate area of the project that have a high sensitivity for containing paleontological resources. Based on the geology, AC 1 and AC 3 may encounter sediments from the Ladd Formation, Silverado Formation, Santiago Formation, Undifferentiated Sespe/Vaqueros Formation, Topanga Formation Pleistocene aged alluvium and landslide deposits, and recent alluvium. AC 4 has the potential to encounter the Santiago Peak Volcanics, Ladd Formation, Silverado Formation, Santiago Formation, Undifferentiated Sespe/Vaqueros Formation, Topanga Formation, Sycamore Canyon Member of the Puente Formation, the nonmarine terrace deposits, landslides, and recent alluvium. All but the Santiago Peak Volcanics, landslides, and the recent alluvium have high paleontological sensitivities.

However, as this project is within existing freeway rights-of-way, it is possible that excavation will not extend below disturbed sediments or any artificial fill that has been placed during previous roadway projects. Therefore, as exact excavation depths and exact alignments have not yet been fully determined at this stage in the project, it is recommended that additional studies such as a PIR, PER, and, possibly, a PMP following the formats specified in the Caltrans SER Environmental Handbook, Volume1, Chapter 8, be developed as project plans are better refined. These documents will better determine exact project impacts to paleontological resources. These documents will also address the need for a mitigation program, as recommended by both the LACM and the SBCM.

At a minimum, the mitigation program, if needed, should be consistent with the guidelines of the Society for Vertebrate Paleontology (SVP; SVP, 1995) and should include, but not be limited to, the following.

- Attendance at the pregrade meeting by a qualified paleontologist or his/her representative. At this meeting, the paleontologist will explain the likelihood for encountering paleontological resources, what resources may be discovered, and the methods that will be employed if anything is discovered (see below).
- During construction excavation, a qualified vertebrate paleontological monitor shall initially be present on a full-time basis whenever excavation will occur within the sediments that have a high sensitivity rating and on a spot-check basis in sediments that have a low sensitivity rating. Monitoring may be reduced to a part-time basis if no resources are being discovered in sediments with a high sensitivity rating (monitoring reductions and when they occur will be determined by the qualified Principal Paleontologist). The monitor shall inspect fresh cuts and/or spoils piles to recover paleontological resources. The monitor shall be empowered to temporarily divert construction equipment away from the immediate area of the discovery. The monitor shall be equipped to rapidly stabilize and remove fossils to avoid prolonged delays to construction schedules. If large mammal fossils or large concentrations of fossils are encountered, the developer shall consider using heavy equipment on site to assist in the removal and collection of large materials.
- Localized concentrations of small (or micro-) vertebrates may be found in all native sediments. Therefore, it is recommended that these native sediments occasionally be spot-screened through 1/8-inch to 1/20-inch mesh screens to determine whether microfossils are present. If microfossils are encountered, additional sediment samples (up to 3 cubic yards or 6,000 pounds [2,721 kilograms]) shall be collected and processed through 1/20-inch mesh screens to recover additional fossils.
- Any recovered specimens shall be prepared to the point of identification and permanent preservation. This includes the picking of any washed mass samples to recover small invertebrate and vertebrate fossils, the removal of surplus sediment from around larger specimens to reduce the volume of storage for the repository and the storage cost, and the addition of approved chemical hardeners/stabilizers to fragile specimens.
- Specimens shall be identified to the lowest taxonomic level possible and curated into an institutional repository with retrievable storage. The repository institutions usually charge a one-time fee based on volume, so removing surplus sediment is important. The repository institution may be a local museum or university that has a curator who can retrieve the specimens on request.

- Preparation of a final report of findings. This report should include, but not be limited to, describing the methods and results of the monitoring program, even if the results are negative. If applicable, the report shall include an appended itemized inventory of identified specimens, discussions on the paleontological significance of any finds, and how they fit into the overall geological context of the area. A copy of the final report and the accession inventory shall be forwarded to the repository institution.

Attachments: A: Locality Search Results from the LACM
B: Locality Search Results from the SBCM

REFERENCES

Lander, E.B.
2003 *Eastern Transportation Corridor Paleontologic Resource Impact Mitigation Program, Final Technical Report of Results and Findings, Part 1.* Prepared for the Foothill/Eastern Transportation Corridor Agency.

Morton, Douglas M.,
2004 *Preliminary Digital Geologic Map of the Santa Ana 30' x 60' Quadrangle, Southern California,* Version *2.0.* Digital Preparation by Rachel M. Alverez, and Kelly R. Bouvard. United States Geological Survey Open-File Report 99-0172. Map Scale 1:100,000.

Norris, R. M. and R. W. Webb
1976 *Geology of California*, John Wiley and Sons, Inc., Santa Barbara.

Schoellhamer J. E., J. G. Vedder, R. F. Yerkes, and D. M. Kinney
1981 *Geology of the Northern Santa Ana Mountains, California*, United States Geologic Survey, Professional Paper 420-D.

Sharp, R. P.
1976 *Geology: Field Guide to Southern California,* Kendall/Hunt Publishing Company, Second Edition, pp. 181.

Society of Vertebrate Paleontology (SVP)
1995 *Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines*. Society of Vertebrate Paleontology *News Bulletin*, No. 163, January 1995:22–27.

Wagner, Hugh M., Ph.D.
2006 *Paleontological Assessment for the Eastbound SR-91 Lane Addition from SR-241 to SR-71 in Orange and Riverside Counties, California, 12-ORA-91-PM 15.9/18.9 (KP 25.629/32.034) EA 0G0400 9-RIV-91-PM 0/2.847 (KP 0/4.58) EA 0E8000.* Prepared by Chambers Group, Inc. for Kimley-Horn and Associates, Inc. February 13, 2006.

ATTACHMENT A

LOCALITY SEARCH RESULTS FROM THE LACM

Natural History Museum of Los Angeles County
900 Exposition Boulevard • Los Angeles, CA 90007

Vertebrate Paleontology Section
Telephone: (213) 763-3325
FAX: (213) 746-7431
e-mail: smcleod@nhm.org

LSA
FEB - 1 2008
RECEIVED
IRVINE

31 January 2008

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614-4731

Attn: Brooks Smith, Cultural and Paleontological Resources Group

re: Paleontological Resources Records Search for the proposed State Route 241 Connector to State Route 91 Project, LSA Project # CHM0702, near the City of Corona, Orange and Riverside Counties, project area

Dear Brooks:

I have searched our paleontology collection records for the locality and specimen data for the proposed State Route 241 Connector to State Route 91 Project, LSA Project # CHM0702, near the City of Corona, Orange and Riverside Counties, project area as outlined on the sections of the Prado Dam and Black Star Canyon USGS topographic quadrangle maps that you sent to me via e-mail on 30 January 2008. We have one vertebrate fossil locality that liee directly within the proposed project area, and other localities nearby from the same sedimentary deposits that occur in the proposed project area.

Along the Riverside Freeway (Highway 91) surface deposits in the lower lying portions of the proposed project route area in the Santa Ana River channel consist of younger Quaternary Alluvium, either as fluvial sands and gravels from the Santa Ana River or as fan deposits from the adjacent hills to the south. At the eastern end of the proposed project route area around the intersection with the Corona Freeway (Highway 71) there are exposures of older Quaternary Alluvium in the less steeply inclined portions of the elevated terrain. The more steeply inclined portions of the elevated terrain in the eastern end of the proposed project route area have exposures of the marine late Miocene Puente Formation (also known as the Sycamore Canyon Formation or members of the Monterey Formation in this area). Just west of the intersection of the Riverside Freeway (Highway 91) with Green River Road there are exposures of the marine middle Miocene Topanga Formation, the late Oligocene or early Miocene Sespe and Vaqueros Formations (these may be difficult to distinguish in this area but the Sespe Formation is typically terrestrial and the Vaqueros is typically marine), the Eocene Santiago Formation, the marine Paleocene Silverado Formation and the marine late Cretaceous Ladd Formation. On the west side of the Whittier Fault, just west of Riverside / Orange County line, there are exposures of the

Mesozoic Santiago Peak volcanics and then a reversal of the sequence of rocks from the Silverado Formation up through the Topanga Formation.

Further west along the proposed project route area, from just east of the intersection of the Riverside Freeway (Highway 91) with Coal Canyon Road, there are additional exposures of the marine late Cretaceous Ladd Formation, then exposures of the Paleocene Silverado Formation, the marine Eocene Santiago Formation, and late Oligocene to early Miocene Sespe / Vaqueros Formations undifferentiated. Where the proposed project route area turns south at the intersection of the Riverside Freeway (Highway 91) and the Eastern Transportation Corridor (Highway 241) there are further exposures of the late Oligocene to early Miocene Sespe / Vaqueros Formations undifferentiated and of the marine Middle Miocene Topanga Formation.

The igneous rocks of the Santiago Peak volcanics, of course, will be devoid of fossils. The younger Quaternary alluvial deposits found in the lower lying portions of the proposed project route area on the southern side of the Santa Ana River drainage typically do not contain significant vertebrate fossils, at least in the uppermost layers, and we have no vertebrate fossil localities anywhere nearby from such deposits. Our closest fossil vertebrate locality from older Quaternary deposits is LACM 1207, almost due east of the eastern-most portion of the proposed project route area between Corona and Norco, that produced a fossil specimen of deer, *Odocoileus*.

Our closest fossil vertebrate localities in the Puente Formation are about sixty localities, LACM 5560, 6307-6337, 7266-7267, 7269-7270, 7272-7284, 7373-7381, 7383, and 7386, just south of Los Serranos and west of the Corona Freeway (Highway 71) directly north of the western portion of the proposed project route area. These localities have produced a rich fauna of fossil fish and marine mammals (see attached for composite fauna from these localities). Our closest vertebrate fossil locality from the Topanga Formation is LACM 6292, along Santiago Canyon Road directly west of the Santiago Reservoir south-southwest of the proposed project route area, that produced a fossil specimen of dog shark, *Mustelus*. We have one vertebrate fossil locality, LACM 4315, from the marine Vaqueros portion of the Sespe / Vaqueros Formations undifferentiated, that lies directly within the proposed project route area. Locality LACM 4315, on the southwest side of the intersection of the intersection of the Riverside Freeway (Highway 91) and Gypsum Canyon Road, produced fossil specimens of basking shark, *Cetorhinus*, sand shark, *Carcharhinus*, angel shark, *Squatina*, and stingray, *Dasyatis*.

Our closest vertebrate fossil localities from the Santiago Formation all occur in San Diego County far to the south-southeast of the proposed project route area, but specimens from one of those localities, LACM 68102, including the fossil camel *Protylopus pearsonensis* and the fossil horned artiodactyl *Leptoreodon leptolophus,* were published in the scientific literature by D.J. Golz (1976. Eocene Artiodactyla of southern California. LACM Science Bulletin, 26:1-85). Our only Silverado Formation locality from this area, LACM 4634, produced a specimen of a fossil

turtle, Testudinidae. Our closest vertebrate fossil locality from the Ladd Formation is LACM 4221, in Silverado Canyon directly south of the eastern portion of the proposed project route area, produced specimens of the fossil sharks *Squalicorax* and *Cretolamna appendiculata*.

Excavations in the small exposures of the Santiago Peak volcanics in the proposed project route area will not encounter any fossils. Surface grading or shallow excavations in the younger Quaternary Alluvium exposed in the lower lying portions of the proposed project area are unlikely to encounter significant vertebrate fossils. Deeper excavations in those areas that extend down into older Quaternary deposits, however, as well as any excavations in the exposures of the Puente Formation, the Topanga Formation, the Sespe / Vaqueros Formations, the Santiago Formation, the Silverado Formation, or the Ladd Formation found in the more elevated portions of the proposed project route area, may well encounter significant remains of fossil vertebrates. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains while not impeding development. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosures: appendix, invoice

Composite fossil fauna from Puente Formation localities just south of Los Serranos, Chino Hills
Localities LACM 5560, 6307-6337, 7266-7267, 7269-7270, 7272-7284, 7373-7381, 7383, and 7386

Osteichthyes		
Clupeiformes		
Clupeidae		- herrings
Ganolytes	*cameo*	
Xyne	*grex*	
Gadiformes		
Gadidae		- cods
Eclipes		
Moridae		- moras
Myctophiformes		
Myctophidae		- lanternfishes
Perciformes		
Carangidae		- jacks; amberjacks; pompanos
Decapterus		
Pseudoseriola		
Gempylidae		- snake mackerels; escolars; oilfishes
Thyrsocles	*kriegeri*	
Sciaenidae		- croakers
Lompoquia		
Scombridae		- mackerels & tunas
Sarda		
Scomber		
Serranidae		- sea basses & groupers
Sparidae		- porgies
Plectrites	*classeni*	
Salmoniformes		
Bathylagidae		- deep sea smelts
Salmonidae		- trouts & salmons
Oncorhynchus		
Scorpaeniformes		
Scorpaenidae		- scorpionfishes & rockfishes
Stomiatiformes		
Chauliodontidae		- viperfish
Chauliodus	*eximius*	
Sternoptychidae		- hatchetfishes
Argyropelecus		
Mammalia		
Carnivora		
Otariidae		- eared seal [sea lions]
Pithanotaria		
Cetacea		
Balaenopteridae		- rorqual baleen whales
Phocoenidae		- porpoises
Physeteridae		- sperm whales
Scaldicetus		

ATTACHMENT B

LOCALITY SEARCH RESULTS FROM THE SBCM

SAN BERNARDINO COUNTY MUSEUM

2024 Orange Tree Lane • Redlands, California USA 92374-4560
(909) 307-2669 • Fax (909) 307-0539 • www.sbcountymuseum.org
TDD (909) 792-1462

COUNTY OF SAN BERNARDINO
PUBLIC AND SUPPORT
SERVICES GROUP

ROBERT L. McKERNAN
Director

11 February 2008

LSA
FEB 2 1 2008
RECEIVED
IRVINE

LSA Associates, Inc.
attn: Brooks Smith
20 Executive Park, Suite 200
Irvine, CA 92614

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, SR-241 CONNECTOR TO SR-91, ORANGE AND RIVERSIDE COUNTIES, CALIFORNIA**

Dear Mr. Smith,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-named project alignment in Orange and Riverside Counties, California. The proposed project alignment traverses portions of sections 29, 30, and 31, Township 3 South, Range 7 West; sections 25, 26 (projected), 33 (projected), 34 (projected), 35 (projected), and 36, Township 3 South, Range 8 West; and section 4 (projected), Township 4 South, Range 8 West, San Bernardino Base and Meridian, as seen on the Black Star Canyon, California (1967 edition) and the Prado Dam, California (1967 edition, photorevised 1981) 7.5' United States Geological Survey topographic quadrangle maps.

Previous geologic mapping of the area (Durham and Yerkes, 1964; Rogers, 1965; Morton, 2004) indicates that the proposed project alignment traverses a number of geologic units with high potential to yield significant nonrenewable paleontologic resources, including (from oldest to youngest): the Baker Canyon and Holz Shale Members of the Ladd Formation (late Cretaceous Period) (= units **Klbc**, **Klhs**); the Silverado Formation (Paleocene Epoch) (= **Tsi**); the Santiago Formation (middle Eocene) (= **Tsa**); undifferentiated rocks of the Vaqueros and Sespe Formations (late Eocene through early Miocene Epochs) (= **Tvs**); the Topanga Formation (middle Miocene) (= **Tt**); the Yorba and Sycamore Canyon Members of the Puente Formation (Miocene and early Pliocene) (= **Tpy**, **Tpsc**); Quaternary very old fan deposits (early Pleistocene Epoch) (= **Qvof**); and Quaternary fan deposits (middle to later Pleistocene Epoch) (= unit **Qof**). The undifferentiated Sespe and Vaqueros rocks have high potential to yield significant nonrenewable paleontologic resources, and so are assigned high paleontologic sensitivity. The Quaternary fan gravels have undetermined paleontologic potential; depending upon their lithology, they may have high paleontologic sensitivity.

The late Cretaceous Ladd Formation consists of marine and locally nonmarine conglomerate, sandstone, siltstone and shale, and is fossiliferous throughout its extent. The Baker Canyon Conglomerate (**Klbc**) consists of marine and, possibly, locally nonmarine conglomerate; sparsely distributed sandstone beds yield abundant mollusc fossils (Morton, 2004). The Holz Shale Member

GLADYS H. PARKER
County Administrative Officer
JOHNNIE R. PIGGEE
Assistant County Administrator
Public and Support
Services Group

Board of Supervisors
BRAD MITZELFELT, First District
PAUL BIANE, Second District
DENNIS HANSBERGER, Third District
GARY C. OVITT, Fourth District
JOSIE GONZALES, Fifth District

(= **Klhs**) consists of marine shale, siltstone, sandstone, localized conglomerate, and yields abundant foraminifera and megafossils (Morton, 2004). Although primarily marine in nature, the Ladd Formation has also yielded fossil remains of terrestrial vertebrates, particularly several fossils of extinct hadrosaurian dinosaurs (Hilton, 2003). This formation is therefore assigned high paleontologic sensitivity.

The Paleocene Silverado Formation (**Tsi**) contains coal seams, lignite beds and commercial clay deposits, as well as abundant fossil mollusks (Woodring and Popenoe, 1945) and vertebrate fossils. The Silverado Formation grades upwards into the Santiago Formation (**Tsa**), a continental and marine sandstone and conglomerate rock unit (Woodring and Popenoe, 1945; Schoellhamer and others, 1981). The lower part of this formation contains abundant marine mollusks, while the upper portion commonly yields silicified wood that is likely of terrestrial rather than marine origin (Morton, 2004).

Rocks of the undifferentiated Sespe and Vaqueros Formations (**Tvs**) consist of interbedded marine and nonmarine sandstones and conglomerates. Locally, marine fossil-bearing strata of the Vaqueros Formation are bed-by-bed interlayered with nonmarine rocks of the Sespe Formation, to such a degree that the formations cannot be mapped as separate units (Morton, 2004). The continental Sespe Formation and interbedded marine Vaqueros Formation are both abundantly fossiliferous; the former has yielded fossil remains of terrestrial vertebrate fossils ranging in age from the Eocene through to the early Miocene, while the marine Vaqueros Formation has yielded shallow water marine megafossils (Morton, 2004).

The Topanga Formation (**Tt**) is a shallow-water marine sandstone unit with small amounts of siltstone and conglomerate deposited during the middle Miocene Epoch, ~18 million years ago (mya) to 16 mya. Exposures of the Topanga Formation are highly fossiliferous throughout Los Angeles and Orange Counties. Marine vertebrates including pinnipeds, whales, dolphins and sea cows, as well as microplankton, clams, snails, bony fish, sharks, sea turtles, and birds have all been collected from this unit. The Topanga Formation has high paleontologic sensitivity throughout its extent.

The Puente Formation was originally named by Eldridge and Arnold (1907) from exposures in the Puente Hills. The Puente Formation is considered to be equivalent to the Upper Miocene Monterey Formation (Blake, 1856) which is widespread in the Coast Range province of California as well as in the Palos Verdes Hills and the San Juan Capistrano area (Bramlette, 1946; Vedder and others, 1957; Vedder, 1975; Woodring and others, 1940; Woodring and others, 1946; Schoellhamer and others, 1981). The Yorba and Sycamore Canyon Members of the Puente Formation (**Tpy**, **Tpsc**) are the uppermost and youngest of the Miocene sediments in this formation (Durham and Yerkes, 1964; Rogers, 1965). The Yorba Member has yielded foraminifera and fish scales from exposures in the Santa Ana Mountains; foraminifera are also abundant in a few sites in the Puente Hills. The fossils indicate a deep water depositional environment, probably greater than 1,800 feet. The thin-bedded, well-laminated sandstone probably reflects deposition by turbidity currents from shallower depths (Durham and Yerkes, 1964; Schoellhamer and others, 1981). The shoreline may have extended as far east as Ontario before trending south to the Santa Ana River (Woodford and others, 1946).

Until 1985, diagnostic fossils were reported to be sparse in the Sycamore Canyon Member both in the Santa Ana Mountains (Schoellhamer and others, 1981) and in exposures in the Puente Hills, although foraminifera are locally common. However, several thousand specimens have since been exposed and recovered from the Sycamore Canyon Member, representing a minimum of 62 identified taxa of microfossil invertebrates and megafossil vertebrates, invertebrates, plants, and marine algae. Taxa identified include whales, bird, marine turtle, shark, bony fishes, terrestrial leaves, wood, reeds, and seaweeds. These fossils, in conjunction with lithologic and stratigraphic data gathered during monitoring, indicated that deposition occurred in near-shore water at a depth near the oxygen-minimum boundary during the latest Miocene Epoch, approximately 8 million years before present.

Surface and subsurface deposits of Pleistocene fan sediments (**Qvof** and **Qof**) include gravels, sands, and clays (Morton, 2004). Of these lithologies, the sands and clays have high paleontologic sensitivity, while the gravels may not be as conducive to the preservation of paleontologic resources (although occasionally significant fossil remains can be recovered from such sediments). Pleistocene older alluvial sediments throughout Riverside County and the Inland Empire have been extensively reported to yield significant fossils of plants and extinct animals from the Ice Age (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999, 2007; Anderson and others, 2002). Fossils recovered from these Pleistocene sediments represent extinct taxa including mammoths, mastodons, ground sloths, dire wolves, short-faced bears, sabre-toothed cats, large and small horses, large and small camels, and bison (Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999, 2007; Anderson and others, 2002).

For this review, Craig R. Manker of the Division of Geological Sciences, SBCM conducted a search of the Regional Paleontologic Locality Inventory (RPLI). The results of this records search indicated that no paleontologic localities are recorded from along the proposed project alignment. However, exposures of the Baker Canyon and Holz Shale Members of the Ladd Formation have yielded fossils from within ½ mile of the project corridor. Localities SBCM 5.5.4 - 5.5.6 are recorded in the RPLI as yielding leaf fragments, water reeds, and molluscs from this formation. The proximity of these localities to the project corridor demonstrates the high paleontologic sensitivity of the Ladd Formation in this region.

Exposures of the Silverado Formation within ½ mile of the proposed project alignment have yielded fossil remains from four localities (SBCM 5.5.7 - 5.5.9 and 5.5.11). Fossils recovered from these localities include water reeds, leaves, wood fragments (including some with insect borings), and abundant molluscs. These localities demonstrate the high paleontologic sensitivity of the Silverado Formation near the project alignment.

Exposures of the Santiago Formation immediately adjacent to the proposed project alignment have yielded fossils from locality SBCM 5.5.12. Fossils recovered from this locality include abundant gastropods. The proximity of this locality to the proposed project corridor demonstrate the high paleontologic sensitivity of the Santiago Formation in this area.

Exposures of the Puente Formation in the near vicinity of the proposed project alignment have yielded fossil resources from thirty-nine (39) resource localities (SBCM 1.116.16 to 1.116.23, 1.116.180 to 1.116.205, 5.5.35, 5.5.40, 5.5.44 - 5.5.45, and 5.5.47). Fossils identified from these localities include fish bones and scales, as well as shark teeth. Nearby exposures of the Puente Formation in Chino Hills to the northwest have yielded several hundred vertebrate fossils of Miocene age from over one hundred discrete resource localities. This wealth of fossil material clearly demonstrates the high paleontologic sensitivity of the Puente Formation in the vicinity of the proposed project corridor.

Additionally, numerous localities in the Chino Hills region have yielded fossil remains of extinct Pleistocene vertebrates from Pleistocene older alluvial sediments mapped (Durham and Yerkes, 1964; Rogers, 1965) as similar to the sediments present along the proposed project corridor.

Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation for the proposed project has high potential to impact significant nonrenewable paleontologic resources. This property is therefore assigned high paleontologic sensitivity along much of its length. Excavation into the Ladd Formation, the Silverado Formation, the Santiago Formation, undifferentiated rocks of the Vaqueros and Sespe Formations, the Topanga Formation, the Puente Formation, and/or older alluvium of Pleistocene age will require a qualified vertebrate paleontologist to develop a program to mitigate impacts to nonrenewable paleontologic resources. This mitigation program should be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of Riverside and the proposed guidelines of the Society of Vertebrate Paleontology. This program should include, but not be limited to:

1. A full paleontologic resource assessment in advance of excavation or development, including a field survey, to locate and recover significant nonrenewable paleontologic resources exposed at the surface.

2. Monitoring of excavation in areas identified as likely to contain paleontologic resources by qualified paleontologic monitors. Based upon the results of this review, areas of concern along the proposed alignment include undisturbed surficial and subsurface rocks of the Ladd Formation, the Silverado Formation, the Santiago Formation, the Vaqueros and Sespe Formations, the Topanga Formation, the Puente Formation, and/or older alluvium of Pleistocene age. Paleontologic monitors should be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens.

3. Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation

and stabilization of recovered fossils are essential in order to fully mitigate adverse impacts to significant resources (Scott and others, 2004).

4. Identification and curation of specimens into an established, accredited museum repository with permanent retrievable paleontologic storage (e.g. SBCM). These procedures are also essential steps in effective paleontologic mitigation (Scott and others, 2004) and CEQA compliance (Scott and Springer, 2003). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not complete until such curation into an established museum repository has been fully completed and documented.

5. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, would signify completion of the program to mitigate impacts to paleontologic resources.

References

Anderson, R.S., M.J. Power, S.J. Smith, K.B. Springer and E. Scott, 2002. Paleoecology of a Middle Wisconsin deposit from southern California. Quaternary Research 58(3): 310-317.

Blake, W.P., 1856. Notice of remarkable strata containing the remains of Infusoria and Polythalmia in the Tertiary formation of Monterey, California. Academy of Natural Sciences, Philadelphia, Proceedings 7:328-331.

Bramlette, N.M., 1946. The Monterey Formation of California and the origin of its siliceous rocks. U.S. Geological Survey Professional Paper 212: 57 p.

Durham, D.L. and R.F. Yerkes, 1964. Geology and oil resources of the eastern Puente Hills area, southern California. U.S. Geological Survey Professional Paper 420-B: 62 p.

Eldridge, G.H. and R. Arnold, 1907. The Santa Clara Valley, Puente Hills, and Los Angeles Oil Districts, southern California. U.S. Geological Survey Bulletin 309:102-137.

Hilton, R.P., 2003. Dinosaurs and other Mesozoic reptiles of California. Berkeley: University of California Press. 318 p.

Jefferson, G.T., 1991. A catalogue of late Quaternary vertebrates from California: Part Two, mammals. Natural History Museum of Los Angeles County Technical Reports, No. 7.

Morton, D.M., 2004. Preliminary digital geologic map of the Santa Ana 30' x 60' quadrangle, southern California, version 2.0. United States Geological Survey Open-File Report 99-172. Digital preparation by K.R. Bovard and R.M. Alvarez. Prepared by the Southern California Areal Mapping Project (SCAMP), in cooperation with the California Geological Survey.

Reynolds, S.F.B. and R.L. Reynolds, 1991. The Pleistocene beneath our feet: near-surface Pleistocene fossils in inland southern California basins, *in* Inland Southern California: the last 70 million years, M.O. Woodburne, S.F.B. Reynolds, and D.P. Whistler, eds. Redlands, San Bernardino County Museum Special Publication 38(3&4), p. 41-43.

Rogers, T.H., 1965. Geologic map of California, Santa Ana sheet, scale 1:250,000. California Division of Mines and Geology Regional Geologic Map Series.

Schoellhamer, J.E., D.M. Kinney, R.F. Yerkes and J.G. Vedder, 1954. Geologic map of the northern Santa Ana Mountains, Orange and Riverside Counties, California. U.S. Geological Survey Oil and Gas Inventory Map OM-154.

Schoellhamer, J.E., D.M. Kinney, R.F. Yerkes and J.G. Vedder, 1981. Geology of the northern Santa Ana Mountains, California. USGS Professional Paper 420-D. 109 p.

Scott, E., 1997. A review of *Equus conversidens* in southern California, with a report on a second, previously-unrecognized species of Pleistocene small horse from the Mojave Desert. Journal of Vertebrate Paleontology 17(3): 75-A.

Scott, E. and K. Springer, 2003. CEQA and fossil preservation in southern California. The Environmental Monitor, Fall 2003, p. 4-10, 17.

Scott, E., K. Springer and J.C. Sagebiel, 2004. Vertebrate paleontology in the Mojave Desert: the continuing importance of "follow-through" in preserving paleontologic resources. In M.W. Allen and J. Reed (eds.) The human journey and ancient life in California's deserts: Proceedings from the 2001 Millennium Conference. Ridgecrest: Maturango Museum Publication No. 15, p. 65-70.

Springer, K.B. and E. Scott, 1994. First record of late Pleistocene vertebrates from the Domenigoni Valley, Riverside County, California. Journal of Vertebrate Paleontology 14 (3): 47A.

Springer, K.B., E. Scott, L.K. Murray and W.G. Spaulding, 1998. Partial skeleton of a large individual of *Mammut americanum* from the Domenigoni Valley, Riverside County, California. Journal of Vertebrate Paleontology 18(3): 78-A.

Springer, K., E. Scott, J.C. Sagebiel, and L.K. Murray, 2007. The Diamond Valley Lake Local Fauna: late Pleistocene vertebrates from inland southern California. Journal of Vertebrate Paleontology 27(3): 151A.

Springer, K.B., E. Scott, J.C. Sagebiel and K.M. Scott, 1999. A late Pleistocene lake edge vertebrate assemblage from the Diamond Valley, Riverside County, California. Journal of Vertebrate Paleontology 19(3): 77-A.

Vedder, J.G., 1975. Revised geologic map, structure sections, and well table, San Joaquin Hills--Capistrano area, California. U.S. Geologic Survey Open-File Report 75-552: 5 sheets.

Vedder, J.G., R.F. Yerkes and J.E. Schoellhamer, 1957. Geologic map of the San Joaquin Hills--San Juan Capistrano area, Orange County, California. U.S. Geological Survey Oil and Gas Investigations Map OM-193, scale 1:24,000.

Woodburne, M.O., 1991. The Cajon Valley, *in* Inland Southern California: the last 70 million years, M.O. Woodburne, S.F.B. Reynolds, and D.P. Whistler, eds. Redlands, San Bernardino County Museum Special Publication 38(3&4), p. 41-43.

Woodring, W.P., M.N. Bramlette and W.S.W. Kew, 1946. Geology and paleontology of the Palos Verdes Hills, California. U.S. Geological Survey Professional Paper 207: 145 p.

Woodring, W.P. and W.P. Popenoe, 1945. Paleocene and Eocene stratigraphy of northwestern Santa Ana Mountains, Orange County, California. United States Geological Survey Oil and Gas Investigations Preliminary Chart OC12.

Woodring, W.P., R.B. Stewart and R.W. Richards, 1940. Geology of the Kettleman Hills oil field, California: stratigraphy, paleontology and structure. U.S. Geological Survey Professional Paper 195: 170 p.

Please do not hesitate to contact us with any further questions you may have.

Sincerely,

Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

ATTACHMENT G

RTP PAGE

ORANGE COUNTY RTP PROJECTS								
CATEGORY	RTP ID	ROUTE #	ROUTE NAME	FROM	TO	DESCRIPTION	PROJECT COMPLETION BY*	PROJECT COST ($1,000'S)
MIXED FLOW	2M0735B	57	SR-57 NB	LINCOLN	ORANGETHORPE	ADD 1 MF LANE NB AND INTERCHANGE IMPROVEMENTS AT SR-91	2020	$39,318
MIXED FLOW	2M01126	91	SR-91 WB	SR-57	I-5	ON SR-91 WB FROM SR-57 TO I-5, TIE EXISTING AUX LANES TOGETHER TO FORM A NEW 4TH MF LANE	2018	$193,863
MIXED FLOW	2M0736	91	SR-91 EB	SR-57	SR-55	ADD 1 MF LANE	2023	$25,295
MIXED FLOW	2M0737	91	SR-91	SR-241	I-15	IN ORANGE COUNTY, ADD A WB MF LANE FROM 241 OFF RAMP TO GYPSUM CANYON AND AUX LANES EACH DIRECTION BETWEEN 241 AND COUNTY LINE. SEE RIVERSIDE COUNTY FOR ADDITIONAL IMPROVEMENTS.	2018	$219,678
MIXED FLOW	2M0728	405	I-405	I-5	SR-55	ADD 1 MF LANE EACH DIRECTION	2035	$1,009,468
NON-MOTORIZED	2L224	0	OTHER TEA	COUNTYWIDE		TRANSPORTATION ENHANCEMENT ACTIVITIES	ONGOING	$330,855
NON-MOTORIZED	2L220	0	NON-MOTORIZED	COUNTYWIDE		BUILD THE COMMUTER BIKEWAYS STRATEGIC PLAN	ONGOING	$124,092
O&M	2OM0701	0	OPERATIONS & MAINTENANCE	COUNTYWIDE		STATE HIGHWAY, ARTERIAL, AND TRANSIT PRESERVATION/ MAINTENANCE AND OPERATIONS	ONGOING	$885,154
OPERATIONAL	2L149	0	MOTORIST SERVICES	COUNTYWIDE		FREEWAY SERVICE PATROL AND CALLBOX PROGRAM	ONGOING	$492,036
OTHER	2SL04	0	CORRIDOR STUDIES			ONGOING CORRIDOR STUDIES AND OTHER STUDIES INCLUDED IN FY 07-08 WORK PROGRAM	ONGOING	$3,881
OTHER	2L150	0	SOUNDWALLS	COUNTYWIDE		RETROFIT SOUNDWALL PROGRAM	ONGOING	$79,045
OTHER	2S1	0	CAL NEVADA HS RAIL	ANAHEIM	ONTARIO AIRPORT	STUDY FEASIBILITY OF ADDING HIGH SPEED RAIL BETWEEN ANAHEIM AND ONTARIO AIRPORT	2020	$1,645
TOLL	2T04128	91	SR-91	FAIRMONT DRIVE		CONSTRUCT NEW PARTIAL OVERCROSSING AT FAIRMONT BLVD TO PROVIDE NORTHERLY ACCESS FOR YORBA LINDA TO/FROM SR-91 EXPRESS LANES; DROP RAMPS ON EAST SIDE OF OVERCROSSING, TO EB AND FROM WB EXPRESS LANES	2018	$91,107
TOLL	2T01135	91	SR-91	SR-241		HOV/HOT CONNECTOR NB 241 TO EB 91, WB 91 TO SB 241	2020	$404,398

ATTACHMENT H

BIOLOGICAL RESOURCES MEMORANDUM

LSA

LSA ASSOCIATES, INC.
20 EXECUTIVE PARK, SUITE 200
IRVINE, CALIFORNIA 92614

949.553.0666 TEL
949.553.8076 FAX

BERKELEY
CARLSBAD
FORT COLLINS
FRESNO
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROCKLIN
SAN LUIS OBISPO
SOUTH SAN FRANCISCO

MEMORANDUM

DATE: February 29, 2008

TO: Lisa Williams

FROM: Richard Erickson

SUBJECT: State Route 91 Express Lanes Extension and SR-241 Connector Modifications—Preliminary Environmental Evaluation of Biological Resources

This memo documents the potential biological resource constraints associated with the proposed State Route 91 (SR-91) Express Lanes Extension and State Route 241 (SR-241) Connector modifications in Orange County, California.

METHODS

A literature review was conducted to assist in determining the existence or potential occurrence of sensitive plant and animal species in the project vicinity. Database records for the *Orange, Yorba Linda, Prado Dam,* and *Black Star Canyon, California* United States Geological Survey (USGS) 7.5-minute quadrangles were searched using the California Department of Fish and Game (CDFG) *RareFind 2* (Version 3.1.0) and the California Native Plant Society (CNPS) *Electronic Inventory of Rare and Endangered Vascular Plants of California* (2007). LSA biologists visited the project area earlier while working on the Eastbound SR-91 Lane Addition project.

EXISTING SETTING

Only limited grading is anticipated as part of the project. SR-91 runs in a generally east-west direction in the study area. Featherly Regional Park and the Santa Ana River are adjacent to SR-91 on the north side from Gypsum Canyon Road to Coal Canyon Road. A sand and gravel mining operation was formerly located near Gypsum Canyon Road, south of SR-91. The steep canyons and hillsides of the northernmost extent of the Santa Ana Mountains border the south side of SR-91. Creeks crossing under SR-91 in the study area include Coal Canyon Creek and Gypsum Canyon Creek. The area east of the sand and gravel mining operation south of SR-91 at Gypsum Canyon Road is designated as preserved as part of the Irvine Ranch Land Reserve. The area south of SR-91 around Coal Canyon Creek is also preserved as part of Chino Hills State Park, primarily because it serves as a critical wildlife linkage between the Santa Ana Mountains and Chino/Puente Hills. Further study is required to determine the consistency of the proposed project with reserve and conservation plan designations.

RESULTS

LSA's analysis, including the literature review, identified a total of 73 special-interest species as potentially present in the study area, including 12 species currently listed as federal- or State-threatened or endangered. Of the 73 species listed, 40 have a moderate or high probability of being

present in the project area, including three species listed as federal- or State-threatened or endangered. The three listed species include Braunton's milkvetch *(Astragalus brauntonii),* least Bell's vireo *(Vireo bellii pusillus),* and coastal California gnatcatcher *(Polioptila californica californica).* Attachment A lists the special-interest species along with short summaries of habitat requirements, legal protection status, and potential for occurrence in the project area.

This assessment is based in part upon site visits to the study area conducted as part of other LSA assignments in the immediate area (e.g., Eastbound SR-91 Lane Addition project). Appropriate habitats for sensitive species that are present in the vicinity of the project site include coastal sage scrub, chaparral, riparian woodland, and oak woodland.

The United States Fish and Wildlife Service (USFWS) has designated critical habitat for the least Bell's vireo within the Prado Dam Basin and within the Santa Ana River upstream of the Prado Basin. For the coastal California gnatcatcher, the USFWS has designated critical habitat south of SR-91 from approximately Gypsum Canyon Road to Green River Road. Further study is required to determine whether the project will have any effect on any designated or proposed critical habitat areas and the species they support. If the areas are determined to be affected by the proposed project, then any federal action related to the project would be subject to formal Section 7 consultation pursuant to the Endangered Species Act.

The proximity to the Santa Ana River and the presence of hydrophytic vegetation such as mulefat *(Baccharis salicifolia)* and cattails *(Typha latifolia)* in tributary washes and canyon drainages indicate the possible presence of wetland habitat in the general vicinity. A wetlands delineation study is required to determine whether wetland habitats may be affected by the proposed project. If wetlands are determined to be affected by the proposed project, then it would be subject to permitting requirements of Section 404 of the Clean Water Act of 1972.

Gypsum and Coal Canyons convey water to the Santa Ana River under SR-91 via culverts. Crossings such as these, and bridges, can also provide important wildlife corridors for animals passing between the Santa Ana Mountains and the Santa Ana River and the Chino Hills beyond. Coal Canyon has been identified as a critical wildlife corridor linking the Puente-Chino Hills and the Santa Ana Mountains. A detailed wildlife corridor study will be required to determine potential impacts on wildlife corridors in the area.

If the project impacts suitable habitat for sensitive species, particularly in the Santa Ana River and the scrub and chaparral areas to the south of SR-91, a general biological survey will be required, and sensitive species surveys may be required to determine the potential biological impacts of the project, as summarized in Table A.

Table A: Potentially Required Special-Interest Species Surveys

Species	Schedule
Coastal California gnatcatcher	Best March through June
Least Bell's vireo	April through July
Southwestern willow flycatcher	May through July
Rare plants	As necessary during flowering period for species
Wetland delineation	Not time sensitive
Wildlife corridors	Not time sensitive

The proposed project is subject to United States Army Corps of Engineers regulatory jurisdiction pursuant to Section 404 of the federal Clean Water Act and to water quality certification by the Regional Water Quality Control Board (Section 401), a California Department of Fish and Game Streambed Alteration Agreement (Section 1602), and compliance with the Endangered Species Act.

During the Project Report/Environmental Document phase, a Natural Environment Study will be required that will identify further studies needed, permit requirements, and mitigation.

Attachment: A: Special-Interest Species Summary

ATTACHMENT A

SPECIAL-INTEREST SPECIES SUMMARY

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
PLANTS				
Chaparral sand-verbena *Abronia villosa* var. *aurita*	Chaparral, coastal scrub, and sandy areas below 5,000 ft elevation Occurs from Riverside to Baja California and into Arizona. Thought to be extirpated from Orange County.	Annual; Jan.–Aug.	US: — CA: SP CNPS: 1B	**Low.** Thought to be extirpated from Orange County.
Braunton's milkvetch *Astragalus brauntonii*	Coastal sage scrub, chaparral, and grasslands below 1,500 ft elevation Los Angeles, San Bernardino, Orange, and Riverside Counties. May require fire to clear areas for colonization.	Year-round; Apr.–May	US: END CA: SP CNPS: 1B	**Moderate.** Known in chaparral habitat and slopes in the project area.
Coulter's saltbush *Atriplex coulteri*	Alkaline depressions or clay soils in Coastal Bluff Scrub, Coastal Dunes, Coastal Scrub, Valley & Foothill Grassland; Los Angeles County east to west San Bernardino County and south to Baja California including the Southern California islands.	Perennial; Mar.–Oct.	US: — State: SP CNPS: 1B	**Low.** Known from *Prado Dam* quadrangle. Relatively non-descript habitat. Often associated with clay or alkaline soils on the coast.
Davidson's saltbush *Atriplex serenana* var. *davidsonii*	Alkaline flats and coastal bluffs below 660 ft elevation Coastal Bluff Scrub, Coastal Sage Scrub; Coastal Ventura County to Baja California and the coastal islands of Southern California.	Annual; Apr.–Oct.	US: — State: SP CNPS: 1B	**Low.** Known from the *Yorba Linda* quadrangle. Somewhat inconspicuous with minute leaves. Often associated with alkaline soils and the coast.
Plummer's mariposa-lily *Calochortus plummerae*	Dry, rocky places, often in brush, below 5,000 ft elevation Usually on granitic soils. Found in grassland, chaparral, coastal sage scrub, yellow pine forest. Santa Monica Mts. to San Jacinto Mts. Riverside, San Bernardino, Los Angeles, and Ventura Counties.	Perennial; May–July	US: — CA: SP CNPS: 1B	**Moderate to High.** Suitable habitat present in dry coastal sage scrub, rocky slopes, and chaparral of canyons adjacent to the project area.
Intermediate mariposa-lily *Calochortus weedii* var. *intermedius*	Rocky areas in hills with annual grassland and coastal sage scrub. Below 2,000 ft Los Angeles, Orange and Riverside Counties.	Perennial; June–July	US: — CA: SP CNPS: 1B	**High.** Known in Gypsum Canyon. Suitable habitat present on slopes and canyons adjacent to the project area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Southern tarplant *Centromadia parryi* ssp. *australis*	Marshes and swamp margins, valley and foothill grasslands and vernal pools below 1,200 ft elevation; Santa Barbara to Baja California and Santa Catalina Island.	Annual; May–Nov.	US: — CA: SP CNPS: 1B	**Moderate.** Suitable habitat may be present in disturbed marginally wet flat areas.
Smooth tarplant *Centromadia pungens* ssp. *laevis*	Often in alkaline soils assoc. with Chenopod Scrub, Meadows, Playas, Riparian Woodland, Valley and Foothill Grassland below 1,600 ft elevation Riverside and San Bernardino Counties.	Annual; Apr.–Sept.	US: — CA: SP CNPS: 1B	**Low.** Some marginal habitat may be present, but generally outside of the project area.
San Fernando Valley spineflower *Chorizanthe parryi* var. *fernandina*	This annual herb known in sandy soils of Coastal Sage Scrub and silty (Calabasas Formation) soils on benches of Riversidean Alluvial Fan Sage Scrub from 400 to 4,000 ft elevation. Identified historically in San Diego, Orange, Los Angeles, and Ventura Counties. Presumed extinct in California until rediscovered in spring 1999 in Los Angeles County.	Apr.–Jun.	US: C CA: END CNPS: 1B	**Low.** Suitable habitat may be present in sandy soils and coastal sage scrub. Presumed extirpated from Orange County.
Tecate cypress *Cupressus forbesii*	This tree occurs in closed-cone coniferous forest and chaparral between 760-4,500 ft elevation in Orange and San Diego Counties, and Baja California.	Evergreen	US: — CA: SP CNPS: 1B	**Moderate.** Northernmost occurrence of this species is in Coal Canyon.
Many-stemmed dudleya *Dudleya multicaulis*	Often on clay soils also around granitic outcrops in chaparral, coastal sage scrub, and grassland; below 2,500 ft elevation Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties.	May–July	US: — CA: SP CNPS: 1B	**High.** Known in foothills adjacent to SR-91. Suitable habitat present on slopes and canyons adjacent to the project area.
Santa Ana River woolly star *Eriastrum densifolium* var. *sanctorum*	Perennial sub-shrub found in alluvial fan sage scrub and coastal sage scrub habitats on alluvial deposits along the Santa Ana River, San Bernardino County.	Year-round	US: END CA: END CNPS: 1B	**Low.** Known in the Santa Ana River, but not likely on slopes adjacent to SR-91.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Vernal barley *Hordeum intercedens*	Coastal dunes, coastal scrub, and valley and foothill grasslands with saline depressions and vernal pools below 3,000 ft elevation Range includes counties from Mono to San Diego in the coast range and some of the islands off Southern California.	Annual; Mar.–June	US: — CA: SP CNPS: 3	**Low.** No suitable habitat is present within the project area.
California walnut *Juglans californica*	Locally common, however, now more rare, below 4,500 ft in scrub oak woodland and canyons. Also occurs in numbers in California Walnut Woodland. Occasionally hybridizes with the English walnut.	Evergreen; April-May	US: — CA: SP CNPS: 4	**High.** Known to be present in areas with mature trees.
Heart-leaved pitcher sage *Lepechinia cardiophylla*	Habitat type is closed-cone coniferous forest, chaparral, and cismontane woodland. Range includes Orange, Riverside, and San Diego Counties and Baja California.	Shrub; Apr.–July	US: — CA: SP CNPS: 1B	**Moderate.** Known in Gypsum Canyon. Suitable habitat may be present in dense chaparral canyons.
Chaparral nolina *Nolina cismontana*	Occurs in chaparral, coastal scrub, and sandstone or gabbro soils between 420 ft and 3,800 ft elevation in Los Angeles, Ventura, Orange, and San Diego Counties.	Evergreen; May–July	US: — CA: SP CNPS: 1B	**High.** Known in Coal and Gypsum Canyon watersheds. Suitable habitat present along dry roadside slopes with chaparral and coastal scrub.
BUTTERFLIES				
Quino checkerspot *Euphydryas editha quino*	Historically occupied open grassy sites from the vicinity of Los Angeles and Riverside south to northern Baja California, always in the vicinity of the larval foodplants, California plantain (*Plantago erecta*) and purple owls-clover (*Castilleja exserta*). Baja California numbers may still be stable but in California, the species is now known from only a few sites in San Diego and western Riverside Counties.	Jan.–May	US.: END CA: SA	**Low.** Nearest USFWS-recommended survey area is Santiago Reservoir (Irvine Lake), which is outside of the project area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
FISH				
Santa Ana sucker *Catostomus santannae*	The Santa Ana sucker's historical range includes the Los Angeles, San Gabriel, and Santa Ana River drainage systems located in Southern California. An introduced population also occurs in the Santa Clara River drainage system. Found in shallow, cool, running water.	Year-round	US: THR CA: CSC	**Low.** Known in the Santa Ana River but probably no habitat in project area.
AMPHIBIANS				
California red-legged frog *Rana [aurora] draytonii*	Streams with slow-moving water and deep pools; dense, shrubby riparian vegetation at pool edges. Coastal streams from Marin County to northern Baja California, but now extirpated from most of southern California.	Dec.–Apr.	US.: THR CA: CSC	**No Potential.** No confirmed records exist for all of Orange County since the late 1960s. The species is believed to be extirpated.
Western spadefoot *Spea hammondii*	Grasslands and occasionally hardwood woodlands; largely terrestrial but for breeding, requires rainpools or other ponded water for 3+ weeks; burrows in loose soils during dry season; Central Valley and foothills, coast ranges, inland valleys, to northern Baja California.	Oct.–Apr. (following onset of winter rains)	US: — CA: CSC	**Moderate.** Suitable habitat and breeding areas are potentially present within or near the project area. Loose soils occur along the bottom of slopes and in canyon drainages.
Arroyo toad *Anaxyrus [Bufo] californicus*	Washes and arroyos with open water; sand or gravel beds; for breeding, pools with sparse overstory vegetation. Coastal and a few desert streams from Santa Barbara County to northern Baja California.	Mar– July	US: END CA: CSC	**Low.** Potential habitat in Santa Ana River but unrecorded there.
Coast Range newt *Taricha torosa torosa*	Breeds in ponds, reservoirs, and slow-moving streams; uses nearby upland areas including grassland, chaparral, and woodland; coastal drainages from Mendocino County to San Diego County.	Oct.–May	US: — CA: CSC (Monterey Co. south)	**Low.** Suitable habitat for this species is generally lacking.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
REPTILES				
Western pond turtle *Actinemys marmorata*	Permanent or nearly permanent water in a wide variety of habitat types; marshes, sloughs, ponds, slow-moving streams; requires basking sites such as partially submerged logs, rocks, or open mud banks. Most Pacific slope drainages below 4,500 ft elevation from western Washington (formerly) to northwestern Baja California.	Year-round with reduced activity Nov.–Mar.	US: — CA: CSC	**Moderate.** Reported in the Prado Flood Control Basin.
San Diego banded gecko *Coleonyx variegatus abbotti*	Chaparral, coastal sage, and desert habitats (often with rocks) from southwestern California to northern Baja California Sur.	Year-round, but primarily the warmer months.	US: — CA: SA	**Low.** Unknown from the Puente Hills, and habitat quality is probably marginal.
San Diego [Blainville's] horned lizard *Phrynosoma [coronatum] blainvillei*	Wide variety of habitats including coastal sage scrub, grassland, riparian woodland; typically on or near loose sandy soils; coastal and inland areas from Ventura County to northern Baja California.	Apr.–July with reduced activity Aug.–Oct.	US: — CA: CSC	**Moderate.** Suitable habitat present in canyons adjacent to the project area.
Orange-throated whiptail *Aspidoscelis hyperthra*	Floodplains and terraces with perennial plants and open areas nearby; sea level to 3,000 ft elevation; inland and coastal valleys of Riverside, Orange, and San Diego counties to Baja California Sur.	Mar.–July with reduced activity Aug.–Oct.	US: — CA: CSC	**High.** Known in areas on both sides of SR-91. Suitable habitat is present in open, sandy areas with light cover, including roadsides.
Coastal western whiptail *Aspidoscelis tigris multiscutatus*	Wide variety of habitats in-cluding coastal sage scrub, sparse grassland, and riparian woodland; coastal and inland valleys and foothills; Ventura County to northern Baja California.	Apr.-Aug.	US: — CA: SA	**Moderate.** Roadside habitat is marginal but moderate potential exists in less disturbed areas.
Silvery legless lizard *Anniella pulchra pulchra*	Central California to northern Baja California. Frequents loose soil and humus of relatively open habitats. Susceptible to drying and live only where they can reach damp soil.	Nearly year round	US.: — CA: CSC	**Low.** Habitat is marginal and presence is unlikely in immediate project area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Rosy boa *Lichanura trivirgata*	Inhabits rock outcrops and rocky shrublands from southwestern California to northern Baja California.	Warmer months	US: — CA: SA	**Low.** Possibly present in undisturbed rocky slopes, but unlikely.
San Bernardino ringneck snake *Diadophis punctatus modestus*	Under surface objects along drainage courses, in mesic chaparral and oak and walnut woodland communities. Moist habitats of southwestern California from Ventura to Orange Counties.	Year-round	US: — CA: SA	**Moderate.** Suitable habitat is present in the project area.
Coast patch-nosed snake *Salvadora hexalepis virgultea*	Coastal chaparral, washes, sandy flats and rocky areas. Widely distributed throughout lowlands, up to 7,000 ft in Pacific drainages from San Luis Obispo County to northern Baja California.	Active diurnally throughout most of the year	US: — CA: CSC	**Moderate.** Potential habitat in canyon washes and rocky areas. Known in the Chino Basin.
Two-striped garter snake *Thamnophis hammondii*	Highly aquatic. Only in or near permanent sources of water. Streams with rocky beds supporting willows or other riparian vegetation. From Monterey County to northwest Baja California.	Diurnal year round	US: — CA: CSC	**Low.** Rare in the project area.
Northern red-diamond rattlesnake *Crotalus ruber ruber*	Desert scrub, thornscrub, open chaparral and woodland; occasional in grassland and cultivated areas. Prefers rocky areas and dense vegetation. Orange and western Riverside counties south to Baja California Sur.	Year-round, but mainly mid-spring to mid-fall	US: — CA: CSC	**Moderate.** Suitable habitat in chaparral and woodland canyons.
BIRDS				
White-tailed kite *Elanus leucurus*	Breeds in riparian trees such as oaks, willows, and cottonwoods in lower elevation areas. Southern California range from San Luis Obispo County to San Diego County.	Year-round	US: — CA: FP	**Moderate.** Suitable habitat for foraging and breeding is present in the project area.
Northern harrier *Circus cyaneus*	Open country in the Temperate Zone worldwide. Forages over grasslands and moderate to sparsely vegetated habitat such as coastal sage scrub and grasslands.	Year-round	US: — CA: CSC (nesting)	**Low.** Foraging potential, but nesting habitat is generally lacking.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Cooper's hawk *Accipiter cooperi*	Primarily forests and woodlands throughout North America. Becoming more common in residential areas with mature trees.	Year-round	US: — CA: CSC (nesting)	**Moderate.** Habitat is suitable for foraging and nesting.
Golden eagle *Aquila chrysaetos*	Grasslands, brushlands, deserts, oak savannas, open coniferous forests and montane valleys. Nesting primarily in rugged mountainous country. Generally open country of the Temperate Zone worldwide. Uncommon resident in southwestern California.	Year-round diurnal	US: — CA: CSC, FP	**Moderate.** Possible foraging in the project area.
Merlin *Falco columbarius*	Open country; breeds in the Holarctic and winters south to the Tropics.	Fall-Winter	US: — CA: CSC	**Moderate.** Probably forages infrequently within the project area.
American peregrine falcon *Falco peregrinus anatum*	Widespread, but scarce and local throughout North America. Nests on buildings and bridges in the L.A. Basin.	Year-round	US: CA: END, CFP	**Low.** Not known to occur in the immediate area, but foraging birds wander widely and can be found almost anywhere.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	Breeds and nests in extensive stands of riparian forest in western North America; winters in South America.	May-Sept.	US: C CA: END	**Low.** Riparian habitat within project area is fragmented and disturbed.
Burrowing owl *Athene cunicularia*	Grasslands and rangelands, usually occupying ground squirrel burrows. Resident in much of North and South America.	Year-round	US: — CA: CSC (burrow sites)	**Low.** Habitat generally unsuitable.
Long-eared owl *Asio otus*	Scarce and local in forests and woodlands throughout much of the Northern Hemisphere.	Nocturnal year round	US: — CA: CSC (nesting)	**Low.** Prefers quiet woodland areas with suitable roosting and foraging areas.
Costa's hummingbird *Calypte costae*	Primarily deserts, arid brushy foothills, and chaparral in the southwestern United States and northwestern Mexico.	Spring through fall.	US: — CA: SA (nesting)	**High.** Habitat suitable and the species is widespread in the area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Allen's hummingbird *Selasphorus sasin*	Chaparral, open oak woodland riparian woodland and residential areas on the breeding grounds from southwestern Oregon to southwestern California; primarily montane woodland on the wintering grounds in central Mexico.	Spring through fall.	US: — CA: SA (nesting)	**Low.** Conditions may be unsuitable for nesting.
Southwestern willow flycatcher *Empidonax traillii extimus*	Rare and local breeder in riparian habitat usually with standing water, in the southwestern U.S. and (formerly?) northwestern Mexico. Winters in Central and South America.	May–Sept.	US: END CA: END	**Low.** Known in Prado Basin. Riparian habitat fragmented in the project area.
Loggerhead shrike *Lanius ludovicianus*	Open country in much of North America.	Year-round	US: — CA: CSC (nesting)	**Low.** Possible presence in coastal sage scrub near the project area.
Least Bell's vireo *Vireo bellii pusillus*	Riparian forests and willow thickets. Breeds and nests only in central and Southern California and Baja California; winters in Baja California Sur.	Apr.–Sept.	US: END CA: END	**Moderate.** Known in Prado Dam and the Santa Ana River. Riparian habitat fragmented in the project area.
California horned lark *Eremophila alpestris actia*	Open grasslands and fields, agricultural areas from northern coastal California to northwestern Baja California.	Year-round	US: — CA: CSC	**Moderate.** Possibly present, but grasslands are limited within the project area.
Oak titmouse *Baeolophus inornatus*	Primarily oak woodland from southern Oregon to southern Baja California Sur.	Year-round	US: — CA: SA	**Moderate.** Habitat suitable and the species occurs in the area.
San Diego cactus wren *Campylorynchus brunneicapillus sandiegensis*	Resident in cactus scrub in Orange and San Diego Counties and extreme northwestern Baja California.	Year-round	US: — CA: CSC	**Low.** Habitat suitability marginal in the project area.
Coastal California gnatcatcher *Polioptila californica californica*	Coastal sage scrub; occurs only cismontane southwestern California and Baja California in low-lying foothills and valleys.	Year-round	US: THR CA: CSC	**Moderate.** Possible presence in coastal sage scrub and canyons near the project area.
California thrasher *Toxostoma redivivum*	Primarily chaparral and riparian woodland from northern California to northwestern Baja California.	Year-round	US: — CA:	**High.** Habitat suitable and the species is widespread in the area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
California yellow warbler *Dendroica petechia brewsteri*	Riparian woodland while nesting in the western U.S. and northwestern Baja California; more widespread in brushy areas and woodlands during migration and winter, when occurring from western Mexico to northern South America.	Apr.–Sept.	US: — CA: CSC (nesting)	**Moderate.** Known in Prado Dam and the Santa Ana River, but riparian habitat fragmented in the project area.
Yellow-breasted chat *Icteria virens*	Riparian thickets of willow, brushy tangles near watercourses. Nests in riparian woodland throughout much of North America. Winters in Central America.	Apr.–Sept.	US: — CA: CSC (nesting)	**Moderate.** Possible presence in bushy riparian thickets along canyon washes and drainage areas.
Southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	Steep, rocky coastal sage scrub and open chaparral habitats, particularly scrubby areas mixed with grasslands. From Santa Barbara County to northwestern Baja California.	Year-round, diurnal activity	US: — CA: CSC	**High.** Suitable habitat present in the coastal sage scrub and chaparral in the project area.
Black-chinned sparrow *Spizella atrogularis*	Breeds in chaparral, sagebrush, and arid scrub in the southwestern U.S. and northwestern Mexico and winters primarily in Mexico.	Mar.–Aug.	US: — CA: SA (nesting)	**Low.** Nests in nearby hills, but habitat in project area is probably unsuitable.
Lark sparrow *Chondestes grammacus*	Open situations with scattered bushes or trees. Breeds throughout much of western North America and winters from the southern United States to southern Mexico.	Year-round	US: — CA: SA (nesting)	**Moderate.** Occurs in the area, but habitat in the project are may be unsuitable for nesting.
Bell's sage sparrow *Amphispiza belli belli*	Chaparral and coastal sage scrub from west-central California to northwestern Baja California.	Year-round, diurnal activity	US: — CA: CSC (nesting)	**Low.** Suitable habitat is fragmented and patchy in the project area.
Lawrence's goldfinch *Carduelis lawrencei*	Oak woodland chaparral, riparian woodland and other habitats in arid regions, but usually near water; from northern California to northern Baja California, but periodically wandering throughout much of western North America.	Primarily spring and summer.	US: — CA: SA (nesting)	**Moderate.** Occurs in the area, but habitat in the project are may be unsuitable for nesting.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
MAMMALS				
Northwestern San Diego pocket mouse *Chaetodipus fallax fallax*	Open habitat on the Pacific slope from southwestern San Bernardino County to northwestern Baja California	Year-round	US: — CA: CSC	**High.** Suitable habitat present in the project area.
San Diego desert woodrat *Neotoma lepida intermedia*	Frequents poorly vegetated arid lands and is especially associated with cactus patches. Occurs along the Pacific slope from about San Luis Obispo to northwestern Baja California.	Year-round	US: — CA: CSC	**High.** Possible presence in coastal sage scrub and canyons near the project area.
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	Open country of coastal Southern California and northern Baja California.	Year-round	US: — CA: CSC	**Low.** Possible presence in undisturbed areas.
Yuma myotis *Myotis yumanensis*	Varied habitats in western North America.	Nocturnal; warmer months	US: — CA: SA	**High.** Suitable habitat present in the project area. The species is widespread in the area.
Long-eared myotis *Myotis evotis*	Varied habitats in western North America.	Warmer months	US: — CA: SA	**Low.** Uncommon and poorly known.
Fringed myotis *Myotis thysanodes*	Varied habitats in western North America.	Warmer months	US: — CA: SA	**Low.** Generally uncommon and local.
Long-legged myotis *Myotis volans*	Varied habitats in western North America.	Warmer months	US: — CA: SA	**Low.** Generally uncommon and local.
Small-footed myotis *Myotis ciliolabrum*	Varied habitats in western North America.	Warmer months	US: — CA: SA	**Moderate.** Suitable habitat present.
Western red bat *Lasiurus blossevillii*	Forages over a wide range of habitats, but generally roosts in woodlands and forests. Ranges from southwestern Canada through the western United States and Middle America to South America.	Year-round; primarily warmer months	US: — CA: SA	**High.** Suitable habitat present in the project area. The species is widespread in the area.
Southwestern yellow bat *Lasiurus xanthinus*	Varied habitats, but usually near water; often associated with palm trees. Southwestern United States to southern Mexico.	Year-round; primarily warmer months	US: — CA: SA	**Moderate.** Habitat suitability may be marginal.
Townsend's big-eared bat *Corynorhinus townsendii*	Varied habitats. Ranges from southwestern Canada through the western United States to southern Mexico.	Year-round; primarily warmer months	US: — CA: CSC	**Low.** Presumably rare and local in the Los Angeles Basin.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Pallid bat *Antrozous pallidus*	Varied habitats in western North America.	Year-round, nocturnal	US: — CA: CSC	**High.** Suitable habitat present in crevices, rocks, and hollow trees, with foraging areas throughout the project vicinity.
California mastiff bat *Eumops perotis californicus*	Ranged historically throughout much of the southwestern United States and northwestern Mexico. In California, most records are from rocky areas at low elevations where roosting occurs primarily in crevices.	Year-round, nocturnal	US: — CA: CSC	**High.** Suitable habitat present in crevices and rocks near the project area, with foraging areas throughout the project vicinity.
Ringtail *Bassariscus astutus*	Woody and rocky areas of the southwestern U.S. and most of Mexico.	Year-round	US: — CA: FP	**Low.** Apparently rare in the local area.

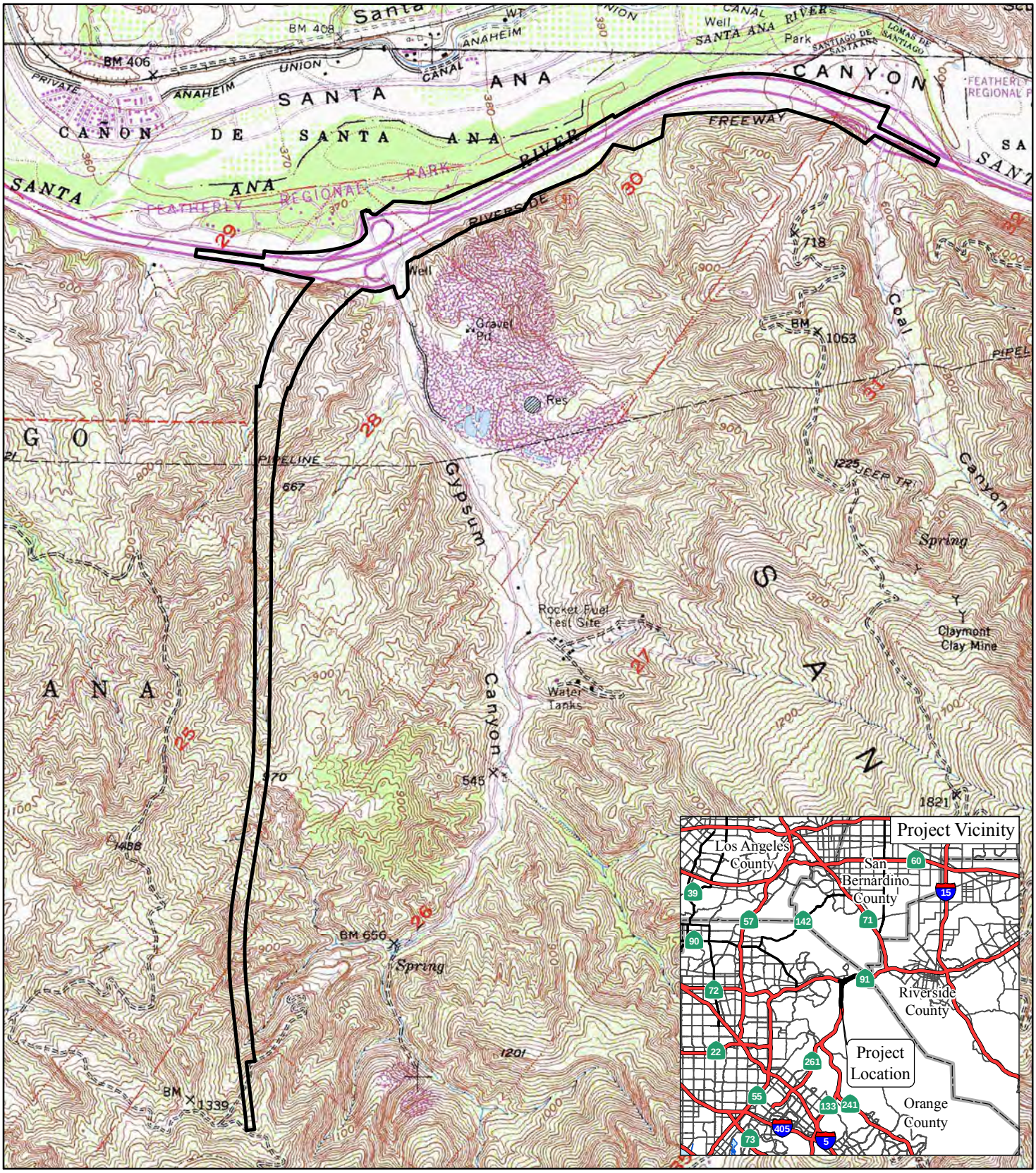
Legend

US: Federal Classifications
END Taxa listed as Endangered.
THR Taxa listed as Threatened.
P END Taxa proposed to be listed as Endangered.
P THR Taxa proposed to be listed as Threatened.
C Candidate for listing. Refers to taxa for which the USFWS has sufficient information to support a proposal to list as Endangered or Threatened; issuance of the proposal(s) is anticipated but precluded at this time.
CA: State Classifications
END Taxa State-listed as Endangered.
THR Taxa State-listed as Threatened.
C END State candidate (Endangered).
C THR State candidate (Threatened).
CSC California Species of Special Concern. Refers to taxa with populations declining seriously or otherwise highly vulnerable to human developments.
FP Taxa listed as Fully Protected by the California Department of Fish and Game
SA Special Animal. Refers to taxa of concern to the Natural Diversity Data Base regardless of their legal or protection status.
SP Special Plant. Refers to taxa of concern to the Natural Diversity Data Base regardless of their legal or protection status.
CNPS: California Native Plant Society Classifications
1A Plants presumed by CNPS to be extinct in California.
1B Plants considered by CNPS to be rare, threatened or endangered in California and elsewhere.
2 Plants considered by CNPS to be rare, threatened or endangered in California, but more common elsewhere.
3 Plants suggested by CNPS for consideration as endangered but about which more information is needed.
4 Plants of limited distribution whose status is monitored by CNPS.

FIGURES

Figure 1: Project Location Map

Figure 2: Study Area



LEGEND

Study Area

FIGURE 1

SR-91/SR-241 Express Lanes Direct Connector Project

Project Location

0 1000 2000

FEET

SOURCE: USGS 7.5' Quad., BLACK STAR CANYON ('88)

I:\RBF1101\GIS\ProjectLocation.mxd (8/16/2011)

LEGEND

- Study Area
- Existing Caltrans ROW
- Potential Wildlife Crossings
- Known Culverts/Wildlife Access Points
- LBVi Locations (SAWA 2003, Gonzalez 2007)

0 200 400
FEET

SOURCE: Bing Maps (c. 2008); RBF (3/2011); Parsons Brinckerhoff (9/2009)

I:\RBF1101\GIS\StudyArea.mxd (8/18/2011)

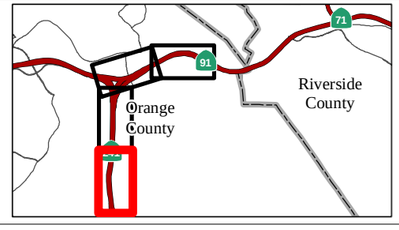
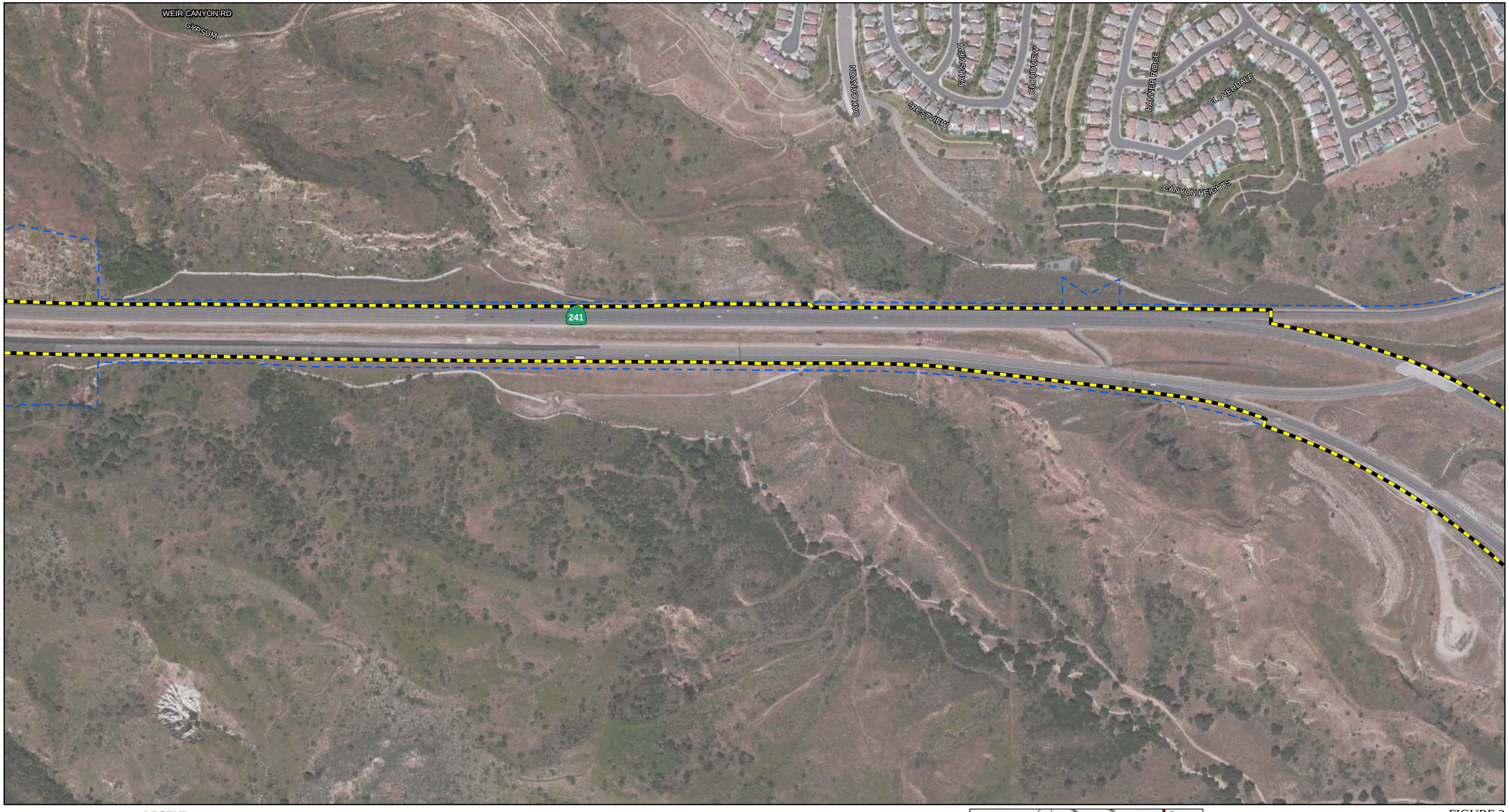


FIGURE 2
Sheet 1 of 4

SR-91/SR-241 Express Lanes Direct Connector Project

Study Area



LEGEND

- Study Area
- Existing Caltrans ROW
- Potential Wildlife Crossings
- Known Culverts/Wildlife Access Points
- LBVi Locations (SAWA 2003, Gonzalez 2007)

0 200 400
FEET

SOURCE: Bing Maps (c. 2008); RBF (3/2011); Parsons Brinckerhoff (9/2009)

I:\RBF1101\GIS\StudyArea.mxd (8/18/2011)

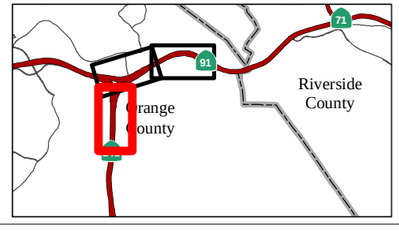


FIGURE 2
Sheet 2 of 4

SR-91/SR-241 Express Lanes Direct Connector Project

Study Area

GYPSUM CANYON

SANTA ANA CANYON

91

LEGEND

- Study Area
- Existing Caltrans ROW
- Potential Wildlife Crossings
- Known Culverts/Wildlife Access Points
- LBVi Locations (SAWA 2003, Gonzalez 2007)

N

0 200 400
FEET

SOURCE: Bing Maps (c. 2008); RBF (3/2011); Parsons Brinckerhoff (9/2009)

I:\RBF1101\GIS\StudyArea.mxd (8/18/2011)

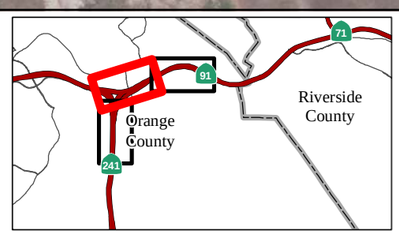


FIGURE 2
Sheet 3 of 4

SR-91/SR-241 Express Lanes Direct Connector Project

Study Area

LEGEND

- Study Area
- Existing Caltrans ROW
- Potential Wildlife Crossings
- Known Culverts/Wildlife Access Points
- LBVi Locations (SAWA 2003, Gonzalez 2007)

N

0 200 400
FEET

SOURCE: Bing Maps (c. 2008); RBF (3/2011); Parsons Brinckerhoff (9/2009)

I:\RBF1101\GIS\StudyArea.mxd (8/18/2011)

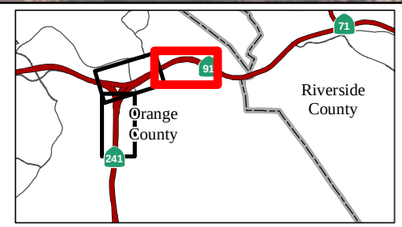


FIGURE 2
Sheet 4 of 4

SR-91/SR-241 Express Lanes Direct Connector Project

Study Area

Draft Cooperative Agreement

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

COOPERATIVE AGREEMENT

This agreement, effective on _____, 2011, is between the State of California, acting through its Department of Transportation, referred to as CALTRANS, and:

FOOTHILL/EASTERN TRANSPORTATION CORRIDOR AGENCY, a California Joint Powers Authority, referred to as TCA.

For the purpose of this agreement, the term PARTNERS collectively refers to CALTRANS and TCA (all signatory parties to this agreement). The term PARTNER refers to any one of those signatory parties individually.

RECITALS

1. California Streets and Highways Code sections 114 and 130 authorize PARTNERS to enter into a cooperative agreement for performance of work within the State Highway System (SHS) right of way.

2. This agreement outlines the terms and conditions of cooperation between PARTNERS to provide IQA to PROJECT for freeway improvement to construct a direct connector between the existing toll facilities of SR-241 and SR-91 Express Lanes to and from the east.

   For the purpose of this agreement, freeway improvement may include the construction of a direct connector between the existing toll facilities of SR-241 and SR-91 Express Lanes to and from the east will be referred to as PROJECT. All responsibilities assigned in this agreement to provide IQA to PROJECT will be referred to as OBLIGATIONS.

3. This agreement is separate from and does not modify or replace any other cooperative agreement or memorandum of understanding between PARTNERS regarding PROJECT.

4. This Agreement shall not be deemed to be a waiver or modification of any terms, conditions or covenants of the current Cooperative Agreement No. 12-081, for the Eastern Transportation Corridor, and all terms and conditions set forth in that document are hereby affirmed by STATE and AGENCY and shall remain in full force and effect.

5. No PROJECT deliverables have been completed prior to this agreement.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

6. The estimated date for OBLIGATION COMPLETION is December 31, 2017.

7. In this agreement capitalized words represent defined terms and acronyms. The Definitions section contains a complete definition for each capitalized term.

8. From this point forward, PARTNERS define in this agreement the terms and conditions under which they will accomplish OBLIGATIONS.

RESPONSIBILITIES

9. TCA is SPONSOR for 100% of PROJECT.

10. CALTRANS will provide IQA for the portions of WORK within existing and proposed SHS right of way. CALTRANS retains the right to reject noncompliant WORK, protect public safety, preserve property rights, and ensure that all WORK is in the best interest of the SHS. As NEPA and CEQA lead agency, CALTRANS will perform Quality Control Program (QCP) process review for environmental documentation.

11. TCA may provide IQA for the portions of WORK outside existing and proposed SHS right of way.

12. TCA is the only FUNDING PARTNER for this agreement. TCA's funding commitment is defined in the FUNDING SUMMARY.

13. CALTRANS is the CEQA lead agency for PROJECT.

14. CALTRANS is the NEPA lead agency for PROJECT.

15. TCA is IMPLEMENTING AGENCY for PA&ED.

SCOPE

Scope: General

16. PARTNERS will perform all OBLIGATIONS in accordance with federal and California laws, regulations, and standards; FHWA STANDARDS; and CALTRANS STANDARDS.

17. IMPLEMENTING AGENCY for a PROJECT COMPONENT will provide a Quality Management Plan (QMP) for that component as part of the PROJECT MANAGEMENT PLAN.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

18. Any PARTNER may, at its own expense, have representatives observe any OBLIGATIONS performed by another PARTNER. Observation does not constitute authority over those OBLIGATIONS.

19. Each PARTNER will ensure that all of its personnel participating in OBLIGATIONS are appropriately qualified, and if necessary licensed, to perform the tasks assigned to them.

20. PARTNERS will invite each other to participate in the selection and retention of any consultants who participate in OBLIGATIONS.

21. If WORK is done under contract (not completed by a PARTNER's own employees) and is governed by the California Labor Code's definition of "public works" (section 1720(a)(a)), that PARTNER will conform to sections 1720 – 1815 of the California Labor Code and all applicable regulations and coverage determinations issued by the Director of Industrial Relations.

22. IMPLEMENTING AGENCY for each PROJECT COMPONENT included in this agreement will be available to help resolve problems generated by that component for the entire duration of PROJECT.

23. CALTRANS will issue, upon proper application, the encroachment permits required for WORK within SHS right of way.

    Contractors and/or agents, and utility owners will not perform WORK without an encroachment permit issued in their name.

24. If any PARTNER discovers unanticipated cultural, archaeological, paleontological, or other protected resources during WORK, all WORK in that area will stop and that PARTNER will notify all PARTNERS within 24 hours of discovery. WORK may only resume after a qualified professional has evaluated the nature and significance of the discovery and a plan is approved for its removal or protection.

25. PARTNERS will hold all administrative draft and administrative final reports, studies, materials, and documentation relied upon, produced, created, or utilized for PROJECT in confidence to the extent permitted by law. Where applicable, the provisions of California Government Code section 6254.5(e) will govern the disclosure of such documents in the event that PARTNERS share said documents with each other.

    PARTNERS will not distribute, release, or share said documents with anyone other than employees, agents, and consultants who require access to complete PROJECT without the written consent of the PARTNER authorized to release them, unless required or authorized to do so by law.

26. If any PARTNER receives a public records request, pertaining to OBLIGATIONS, that PARTNER will notify PARTNERS within five (5) working days of receipt and make

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

PARTNERS aware of any disclosed public records. PARTNERS will consult with each other prior to the release of any public documents related to the PROJECT.

27. If HM-1 or HM-2 is found during a PROJECT COMPONENT, IMPLEMENTING AGENCY for that PROJECT COMPONENT will immediately notify PARTNERS.

28. CALTRANS, independent of PROJECT, is responsible for any HM-1 found within the existing SHS right of way. CALTRANS will undertake HM MANAGEMENT ACTIVITIES related to HM-1 with minimum impact to PROJECT schedule.

29. TCA, independent of PROJECT, is responsible for any HM-1 found within PROJECT limits and outside the existing SHS right of way. TCA will undertake or cause to be undertaken HM MANAGEMENT ACTIVITIES related to HM-1 with minimum impact to PROJECT schedule.

30. If HM-2 is found within PROJECT limits, the public agency responsible for the advertisement, award, and administration (AAA) of the PROJECT construction contract will be responsible for HM MANAGEMENT ACTIVITIES related to HM-2.

31. CALTRANS' acquisition or acceptance of title to any property on which any HM-1 or HM-2 is found will proceed in accordance with CALTRANS' policy on such acquisition.

32. PARTNERS will comply with all of the commitments and conditions set forth in the environmental documentation, environmental permits, approvals, and applicable agreements as those commitments and conditions apply to each PARTNER's responsibilities in this agreement.

33. IMPLEMENTING AGENCY for each PROJECT COMPONENT will furnish PARTNERS with written monthly progress reports during the implementation of OBLIGATIONS completed in that component.

34. Upon OBLIGATION COMPLETION, ownership or title to all materials and equipment constructed or installed for the operations and/or maintenance of the SHS within SHS right of way as part of WORK become the property of CALTRANS.

    CALTRANS will not accept ownership or title to any materials or equipment constructed or installed outside SHS right of way.

35. IMPLEMENTING AGENCY for a PROJECT COMPONENT will accept, reject, compromise, settle, or litigate claims of any non-agreement parties hired to do WORK in that component.

36. PARTNERS will confer on any claim that may affect OBLIGATIONS or PARTNERS' liability or responsibility under this agreement in order to retain resolution possibilities for

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

potential future claims. No PARTNER will prejudice the rights of another PARTNER until after PARTNERS confer on claim.

37. PARTNERS will maintain, and will ensure that any party hired by PARTNERS to participate in OBLIGATIONS will maintain, a financial management system that conforms to Generally Accepted Accounting Principles (GAAP), and that can properly accumulate and segregate incurred PROJECT costs, and provide billing and payment support.

38. PARTNERS will comply with the appropriate federal cost principles and administrative requirements outlined in the Applicable Cost Principles and Administrative Requirements table below. These principles and requirements apply to all funding types included in this agreement.

Applicable Cost Principles and Administration Requirements		
The federal cost principles and administrative requirements associated with each organization type apply to that organization.		
Organization Type	**Cost Principles**	**Administrative Requirements**
Federal Governments	2 CFR Part 225	OMB A-102
State and Local Government	2 CFR, Part 225	49 CFR, Part 18
Educational Institutions	2 CFR, Part 220	2 CFR, Part 215
Non-Profit Organizations	2 CFR, Part 230	2 CFR, Part 215
For Profit Organizations	48 CFR, Chapter 1, Part 31	49 CFR, Part 18
CFR (Code of Federal Regulations) **OMB (Office of Management and Budget)**		
Related URLs: • Various OMB Circular: http://www.whitehouse.gov/omb/grants_circulars • Code of Federal Regulations: http://www.gpoaccess.gov/CFR		

39. PARTNERS will maintain and make available to each other all OBLIGATIONS-related documents, including financial data, during the term of this agreement.

40. PARTNERS will retain all OBLIGATIONS-related records for three (3) years after the final voucher.

41. PARTNERS have the right to audit each other in accordance with generally accepted governmental audit standards.

CALTRANS, the state auditor, FHWA, and TCA will have access to all OBLIGATIONS-related records of each PARTNER, and any party hired by a PARTNER to participate in OBLIGATIONS, for audit, examination, excerpt, or transcription.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

The examination of any records will take place in the offices and locations where said records are generated and/or stored and will be accomplished during reasonable hours of operation. The auditing PARTNER will be permitted to make copies of any OBLIGATIONS-related records needed for the audit.

The audited PARTNER will review the draft audit, findings, and recommendations, and provide written comments within 30 calendar days of receipt.

Upon completion of the final audit, PARTNERS have 30 days to refund or invoice as necessary in order to satisfy the obligation of the audit.

Any audit dispute not resolved by PARTNERS is subject to dispute resolution. Any costs arising out of the dispute resolution process will be paid within 30 calendar days of the final audit or dispute resolution findings.

42. Any PARTNER that hires another party to participate in OBLIGATIONS will conduct a pre-award audit of that party in accordance with the *Local Assistance Procedures Manual*.

43. If WORK stops for any reason, IMPLEMENTING AGENCY will place all facilities impacted by WORK in a safe and operable condition acceptable to CALTRANS.

44. If WORK stops for any reason, each PARTNER will continue to implement all of its applicable commitments and conditions included in the PROJECT environmental documentation, permits, agreements, or approvals that are in effect at the time that WORK stops, as they apply to each PARTNER's responsibilities in this agreement, in order to keep PROJECT in environmental compliance until WORK resumes.

45. Each PARTNER accepts responsibility to complete the activities that it selected on the SCOPE SUMMARY. Activities marked with "N/A" on the SCOPE SUMMARY are not included in the scope of this agreement.

Scope: Environmental Permits, Approvals and Agreements

46. Each PARTNER identified in the Environmental Permits table below accepts the responsibility to complete the assigned activities.

Environmental Permits						
Permit	Coordinate	Prepare	Obtain	Implement	Renew	Amend
NPDES SWRCB	CT	TCA	TCA/CT	TCA/CT	TCA/CT	TCA/CT

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

Scope: Project Approval and Environmental Document (PA&ED)

47. CALTRANS is the CEQA lead agency for PROJECT. CALTRANS will determine the type of environmental documentation required and will cause that documentation to be prepared.

48. Any PARTNER involved in the preparation of CEQA environmental documentation will follow the CALTRANS STANDARDS that apply to the CEQA process including, but not limited to, the guidance provided in the Standard Environmental Reference available at www.dot.ca.gov/ser.

49. Pursuant to SAFETEA-LU Section 6004 and/or 6005, CALTRANS is the NEPA lead agency for PROJECT. CALTRANS will assume responsibility for NEPA compliance and will cause that documentation to be prepared.

50. Any PARTNER involved in the preparation of NEPA environmental documentation will follow FHWA STANDARDS that apply to the NEPA process including, but not limited to, the guidance provided in the FHWA Environmental Guidebook available at www.fhwa.dot.gov/hep/index.htm.

51. TCA / Contracted Consultants will prepare the appropriate CEQA environmental documentation to meet CEQA requirements.

52. TCA / Contracted Consultants will prepare the appropriate NEPA environmental documentation to meet NEPA requirements.

53. Any PARTNER preparing any portion of the CEQA environmental documentation, including any studies and reports, will submit that portion of the documentation to the CEQA lead agency for the QCP review, comment, and approval at appropriate stages of development prior to public availability.

54. Any PARTNER preparing any portion of the NEPA environmental documentation including any studies and reports will submit that portion of the documentation to CALTRANS for the QCP review, comment, and approval prior to public availability.

55. TCA will prepare, publicize, and circulate all CEQA-related public notices and will submit said notices to the CEQA lead agency for review, comment, and approval prior to publication and circulation.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

56. TCA will prepare, publicize, and circulate all NEPA-related public notices, and CALTRANS will submit any Federal Register notices to FHWA for publication. TCA will submit all notices to CALTRANS for review, comment, and approval prior to publication and circulation.

    CALTRANS will work with the appropriate federal agency to publish notices in the Federal Register.

57. The CEQA lead agency will attend all CEQA-related public meetings.

58. TCA will plan, schedule, prepare materials for, and host all CEQA-related public hearings/meetings and will submit all materials to the CEQA lead agency for review, comment, and approval.

59. The NEPA lead agency will attend all NEPA-related public meetings.

60. TCA will plan, schedule, prepare materials for, and host all NEPA-related public meetings. TCA will submit all materials to CALTRANS for CALTRANS' review, comment, and approval.

61. If a PARTNER who is not the CEQA or NEPA lead agency holds a public meeting about PROJECT, that PARTNER must clearly state its role in PROJECT and the identity of the CEQA and NEPA lead agencies on all meeting publications. All meeting publications must also inform the attendees that public comments collected at the meetings are not part of the CEQA or NEPA public review process.

    That PARTNER will submit all meeting advertisements, agendas, exhibits, handouts, and materials to the CEQA and/or NEPA lead agency for review, comment, and approval. If that PARTNER makes any changes to the materials, it will allow the lead agency to review, comment, and approve those changes.

    The CEQA lead agency maintains final editorial control with respect to text or graphics. The NEPA lead agency has final approval authority with respect to text or graphics.

62. The PARTNER preparing the environmental documentation, including the studies and reports, will ensure that qualified personnel remain available to help resolve environmental issues and perform any necessary work to ensure that PROJECT remains in environmental compliance.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

COST

Cost: General

63. The cost of any awards, judgments, or settlements generated by OBLIGATIONS is an OBLIGATIONS COST.

64. CALTRANS, independent of PROJECT, will pay all costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within the existing SHS right of way.

65. TCA, independent of PROJECT, will pay, or cause to be paid, all costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within PROJECT limits and outside of the existing SHS right of way.

66. HM MANAGEMENT ACTIVITIES costs related to HM-2 are CONSTRUCTION SUPPORT and CONSTRUCTION CAPITAL costs.

67. The cost to comply with and implement the commitments set forth in the environmental documentation is an OBLIGATIONS COST.

68. The cost to ensure that PROJECT remains in environmental compliance is an OBLIGATIONS COST.

69. The cost of any legal challenges to the CEQA or NEPA environmental process or documentation is an OBLIGATIONS COST.

70. Independent of OBLIGATIONS COST, CALTRANS will fund the cost of its own IQA for WORK done within existing or proposed future SHS right of way.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

71. Independent of OBLIGATIONS COST, TCA will fund the cost of its own IQA for WORK done outside existing or proposed future SHS right of way.

72. CALTRANS will provide encroachment permits to PARTNERS, their contractors, consultants and agents, at no cost.

73. Fines, interest, or penalties levied against a PARTNER will be paid, independent of OBLIGATIONS cost, by the PARTNER whose actions or lack of action caused the levy. That PARTNER will indemnify and defend each other PARTNER.

74. The cost of any engineering support performed by CALTRANS includes all direct and applicable indirect costs. CALTRANS calculates indirect costs based solely on the type of funds used to pay support costs. State and federal funds are subject the current Program Functional Rate. Local funds are subject to the current Program Functional Rate and the current Administration Rate. Caltrans periodically adjusts the Program Functional Rate and the Administration Rate.

75. If CALTRANS reimburses TCA for any costs later determined to be unallowable, TCA will reimburse those funds.

76. The cost to place PROJECT right of way in a safe and operable condition and meet all environmental commitments is an OBLIGATIONS cost.

77. Because IMPLEMENTING AGENCY is responsible for managing the scope, cost, and schedule of a project component, if there are insufficient funds available in this agreement to place the right of way in a safe and operable condition, the appropriate IMPLEMENTING AGENCY accepts responsibility to fund these activities until such time as PARTNERS amend this agreement.

    That IMPLEMENTING AGENCY may request reimbursement for these costs during the amendment process.

78. If there are insufficient funds in this agreement to implement applicable commitments and conditions included in the PROJECT environmental documentation, permits, agreements, and/or approvals that are in effect at a time that WORK stops, each PARTNER implementing commitments or conditions accepts responsibility to fund these activities, as they apply to each PARTNER's responsibilities, until such time are PARTNERS amend this agreement.

    Each PARTNER may request reimbursement for these costs during the amendment process.

79. PARTNERS will pay invoices within 30 calendar days of receipt of invoice.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

Cost: Environmental Permits, Approvals and Agreements

80. The cost of coordinating, obtaining, complying with, implementing, and if necessary renewing and amending resource agency permits, agreements, and/or approvals is an OBLIGATIONS COST.

Cost: Project Approval and Environmental Document (PA&ED)

81. The cost to prepare, publicize, and circulate all CEQA and NEPA-related public notices is an OBLIGATIONS COST.

82. The cost to plan, schedule, prepare, materials for, and host all CEQA and NEPA-related public hearings is an OBLIGATIONS COST.

SCHEDULE

83. PARTNERS will manage the schedule for OBLIGATIONS through the work plan included in the PROJECT MANAGEMENT PLAN.

GENERAL CONDITIONS

84. PARTNERS understand that this agreement is in accordance with and governed by the Constitution and laws of the State of California. This agreement will be enforceable in the State of California. Any PARTNER initiating legal action arising from this agreement will file and maintain that legal action in the Superior Court of the county in which the CALTRANS district office that is signatory to this agreement resides, or in the Superior Court of the county in which PROJECT is physically located.

85. All OBLIGATIONS of CALTRANS under the terms of this agreement are subject to the appropriation of resources by the Legislature, the State Budget Act authority, and the allocation of funds by the California Transportation Commission.

86. Any PARTNER performing IQA does so for its own benefit. No one can assign liability to that PARTNER due to its IQA activities.

87. Neither TCA nor any officer or employee thereof is responsible for any injury, damage or liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon CALTRANS under this agreement.

    It is understood and agreed that CALTRANS and/or its agents will fully defend, indemnify, and save harmless TCA and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories or

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

assertions of liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under this agreement.

88. Neither CALTRANS nor any officer or employee thereof is responsible for any injury, damage, or liability occurring by reason of anything done or omitted to be done by TCA and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon TCA under this agreement.

    It is understood and agreed that TCA and/or its agents will fully defend, indemnify, and save harmless CALTRANS and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories or assertions of liability occurring by reason of anything done or omitted to be done by TCA and/or its agents under this agreement.

89. PARTNERS do not intend this agreement to create a third party beneficiary or define duties, obligations, or rights in parties not signatory to this agreement. PARTNERS do not intend this agreement to affect their legal liability by imposing any standard of care for fulfilling OBLIGATIONS different from the standards imposed by law.

90. PARTNERS will not assign or attempt to assign OBLIGATIONS to parties not signatory to this agreement.

91. PARTNERS will not interpret any ambiguity contained in this agreement against each other. PARTNERS waive the provisions of California Civil Code section 1654.

92. A waiver of a PARTNER's performance under this agreement will not constitute a continuous waiver of any other provision. An amendment made to any article or section of this agreement does not constitute an amendment to or negate all other articles or sections of this agreement.

93. A delay or omission to exercise a right or power due to a default does not negate the use of that right or power in the future when deemed necessary.

94. If any PARTNER defaults in its OBLIGATIONS, a non-defaulting PARTNER will request in writing that the default be remedied within 30 calendar days. If the defaulting PARTNER fails to do so, the non-defaulting PARTNER may initiate dispute resolution.

95. PARTNERS will first attempt to resolve agreement disputes at the PROJECT team level. If they cannot resolve the dispute themselves, the CALTRANS district director and the executive officer of TCA will attempt to negotiate a resolution. If PARTNERS do not reach a resolution, PARTNERS' legal counsel will initiate mediation. PARTNERS agree to participate in mediation in good faith and will share equally in its costs.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

Neither the dispute nor the mediation process relieves PARTNERS from full and timely performance of OBLIGATIONS in accordance with the terms of this agreement. However, if any PARTNER stops fulfilling OBLIGATIONS, any other PARTNER may seek equitable relief to ensure that OBLIGATIONS continue.

Except for equitable relief, no PARTNER may file a civil complaint until after mediation, or 45 calendar days after filing the written mediation request, whichever occurs first.

PARTNERS will file any civil complaints in the Superior Court of the county in which the CALTRANS district office signatory to this agreement resides. The prevailing PARTNER will be entitled to an award of all costs, fees, and expenses, including reasonable attorney fees as a result of litigating a dispute under this agreement or to enforce the provisions of this article including equitable relief.

96. PARTNERS maintain the ability to pursue alternative or additional dispute remedies if a previously selected remedy does not achieve resolution.

97. If any provisions in this agreement are deemed to be, or are in fact, illegal, inoperative, or unenforceable, those provisions do not render any or all other agreement provisions invalid, inoperative, or unenforceable, and PARTNERS will automatically sever those provisions from this agreement.

98. PARTNERS intend this agreement to be their final expression and supersede any oral understanding or writings pertaining to OBLIGATIONS.

99. If during performance of WORK additional activities or environmental documentation is necessary to keep PROJECT in environmental compliance, PARTNERS will amend this agreement to include completion of those additional tasks.

100. PARTNERS will execute a formal written amendment if there are any changes to OBLIGATIONS.

101. This agreement will terminate upon OBLIGATION COMPLETION or an amendment to terminate this agreement, whichever occurs first.

    However, all indemnification, document retention, audit, claims, environmental commitment, legal challenge, and ownership articles will remain in effect until terminated or modified in writing by mutual agreement.

102. The following documents are attached to, and made an express part of this agreement: SCOPE SUMMARY, FUNDING SUMMARY.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

DEFINITIONS

CALTRANS – The California Department of Transportation

CALTRANS STANDARDS – CALTRANS policies and procedures, including, but not limited to, the guidance provided in the *Guide to Capital Project Delivery Workplan Standards* (previously known as WBS Guide) available at http://www.dot.ca.gov/hq/projmgmt/guidance.htm.

CEQA (California Environmental Quality Act) – The act (California Public Resources Code, sections 21000 et seq.) that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those significant impacts, if feasible.

CFR (Code of Federal Regulations) – The general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government.

COOPERATIVE AGREEMENT CLOSURE STATEMENT – A document signed by PARTNERS that verifies the completion of all OBLIGATIONS included in this agreement and in all amendments to this agreement.

COST – The responsibility for cost responsibilities in this agreement can take one of three assignments:

- **OBLIGATIONS COST** – A cost associated with fulfilling OBLIGATIONS that will be funded as part of this agreement. The responsibility is defined by the funding commitments in this agreement.
- **PROJECT COST** – A cost associated with PROJECT that can be funded outside of OBLIGATIONS. A PROJECT COST may not necessarily be part of this agreement. This responsibility is defined by the PARTNERS' funding commitments at the time the cost is incurred.
- **PARTNER cost** – A cost that is the responsibility of a specific PARTNER, independent of PROJECT.

FHWA – Federal Highway Administration

FHWA STANDARDS – FHWA regulations, policies and procedures, including, but not limited to, the guidance provided at www.fhwa.dot.gov/topics.htm.

FUNDING PARTNER – A PARTNER that commits a defined dollar amount to fulfill OBLIGATIONS. Each FUNDING PARTNER accepts responsibility to provide the funds identified on the FUNDING SUMMARY under its name.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

FUNDING SUMMARY – The table that designates an agreement's funding sources, types of funds, and the PROJECT COMPONENT in which the funds are to be spent. Funds listed on the FUNDING SUMMARY are "not-to-exceed" amounts for each FUNDING PARTNER.

GAAP (Generally Accepted Accounting Principles) – Uniform minimum standards and guidelines for financial accounting and reporting issued by the Federal Accounting Standards Advisory Board that serve to achieve some level of standardization. See http://www.fasab.gov/accepted.html.

HM-1 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law whether it is disturbed by PROJECT or not.

HM-2 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law only if disturbed by PROJECT.

HM MANAGEMENT ACTIVITIES – Management activities related to either HM-1 or HM-2 including, without limitation, any necessary manifest requirements and disposal facility designations.

IMPLEMENTING AGENCY – The PARTNER responsible for managing the scope, cost, and schedule of a PROJECT COMPONENT to ensure the completion of that component.

IQA (Independent Quality Assurance) – Ensuring that IMPLEMENTING AGENCY's quality assurance activities result in WORK being developed in accordance with the applicable standards and within an established Quality Management Plan (QMP). IQA does not include any work necessary to actually develop or deliver WORK or any validation by verifying or rechecking work performed by another partner.

NEPA (National Environmental Policy Act of 1969) – The federal act that establishes a national policy for the environment and a process to disclose the adverse impacts of projects with a federal nexus.

OBLIGATION COMPLETION – PARTNERS have fulfilled all OBLIGATIONS included in this agreement, and all amendments to this agreement, and have signed a COOPERATIVE AGREEMENT CLOSURE STATEMENT.

OBLIGATIONS – All responsibilities included in this agreement.

OBLIGATIONS COST – See COST.

OMB (Office of Management and Budget) – The federal office that oversees preparation of the federal budget and supervises its administration in Executive Branch agencies.

PA&ED (Project Approval and Environmental Document) – See PROJECT COMPONENT.

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

PARTNER – Any individual signatory party to this agreement.

PARTNERS – The term that collectively references all of the signatory agencies to this agreement. This term only describes the relationship between these agencies to work together to achieve a mutually beneficial goal. It is not used in the traditional legal sense in which one PARTNER's individual actions legally bind the other partners.

PROJECT – The undertaking to construct direct connector between the existing toll facilities of SR-241 and SR-91 Express Lanes to and from the east.

PROJECT COMPONENT – A distinct portion of the planning and project development process of a capital project as outlined in California Government Code, section 14529(b).

- **PID (Project Initiation Document)** – The activities required to deliver the project initiation document for PROJECT.
- **PA&ED (Project Approval and Environmental Document)** – The activities required to deliver the project approval and environmental documentation for PROJECT.
- **PS&E (Plans, Specifications, and Estimate)** – The activities required to deliver the plans, specifications, and estimate for PROJECT.
- **R/W (Right of Way) SUPPORT** –The activities required to obtain all property interests for PROJECT.
- **R/W (Right of Way) CAPITAL** – The funds for acquisition of property rights for PROJECT.
- **CONSTRUCTION SUPPORT** – The activities required for the administration, acceptance, and final documentation of the construction contract for PROJECT.
- **CONSTRUCTION CAPITAL** – The funds for the construction contract.

PROJECT COST – See COST.

PROJECT MANAGEMENT PLAN – A group of documents used to guide a project's execution and control throughout that project's lifecycle.

QCP (Quality Control Program) – Caltrans quality control procedures requiring five reviews for all environmental documents as described in the Jay Norvell Memo dated July 2, 2007. The five reviews are Resource/Technical Specialist Review, Internal Peer Review, Technical Editor Review, NEPA Quality Control Review and Environmental Branch Chief Review.

QMP (Quality Management Plan) – An integral part of the Project Management Plan that describes IMPLEMENTING AGENCY's quality policy and how it will be used.

SAFETEA-LU – Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

SCOPE SUMMARY – The attachment in which each PARTNER designates its commitment to specific scope activities within each PROJECT COMPONENT as outlined by the *Guide to*

DRAFT

This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.

Capital Project Delivery Workplan Standards (previously known as WBS Guide) available at http://www.dot.ca.gov/hq/projmgmt/guidance.htm.

SHS (State Highway System) – All highways, right of way, and related facilities acquired, laid out, constructed, improved, or maintained as a state highway pursuant to constitutional or legislative authorization.

SPONSOR – Any PARTNER that accepts the responsibility to establish scope of PROJECT and the obligation to secure financial resources to fund PROJECT. SPONSOR is responsible for adjusting the PROJECT scope to match committed funds or securing additional funds to fully fund the PROJECT scope. If a PROJECT has more than one SPONSOR, funding adjustments will be made by percentage (as outlined in Responsibilities). Scope adjustments must be developed through the project development process and must be approved by CALTRANS as the owner/operator of the SHS.

WORK – All scope activities included in this agreement.

CONTACT INFORMATION

The information provided below indicates the primary contact data for each PARTNER to this agreement. PARTNERS will notify each other in writing of any personnel or location changes. Contact information changes do not require an amendment to this agreement.

The primary agreement contact person for CALTRANS is:
Lisa Ramsey, Office Chief/Corridor Project Manager
3347 Michelson Dr., Suite 100
Irvine, California 92612
Office Phone: 949-724-2102
Mobile Phone: 949-279-8867
Email: lisa_ramsey@dot.ca.gov

The primary agreement contact person for TCA is:
Tom Wheeler, Corridor Manager-Design
125 Pacifica
Irvine, California 92618
Office Phone: 949-754-3430
Fax Number: 949-754-3491
Email: twheeler@thetollroads.com

DRAFT

This agreement is not approvable.
It must be sent to the HQ Office of Cooperative Agreements for review.

SIGNATURES

PARTNERS declare that:

1. Each PARTNER is an authorized legal entity under California state law.
2. Each PARTNER has the authority to enter into this agreement.
3. The people signing this agreement have the authority to do so on behalf of their public agencies.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

APPROVED

By:_____
ADNAN MAIAH
Acting Deputy District Director
Capital Projects Outlay Program

CERTIFIED AS TO FUNDS:

By:_____
NEDA SABER
District Budget Manager

FOOTHILL/EASTERN TRANSPORTATION
CORRIDOR AGENCY

APPROVED

By:_____
THOMAS E. MARGRO
Chief Executive Officer

By:_____
CAROLYN LeBAIL
Assistant Secretary of the Board

APPROVED AS TO FORM AND PROCEDURE

By:_____
ROBERT THORNTON
General Counsel

DRAFT

This agreement is not approvable.
It must be sent to the HQ Office of Cooperative Agreements for review.

SCOPE SUMMARY

4	5	6	7	8	Description	CALTRANS	TCA	N/A
2	160				Perform Preliminary Engineering Studies and Draft Project Report	X	X	
		05			Updated Project information		X	
		10			Engineering Studies		X	
		15			Draft Project Report		X	
		20			Engineering and Land Net Surveys		X	
		30			Environmental Study Request (ESR)		X	
		40			NEPA Delegation	X		
		45			Base Maps and Plan Sheets for Project Report and Environmental Studies		X	
2	165				Perform Environmental Studies and Prepare Draft Environmental Document		X	
		05			Environmental Scoping of Alternatives Identified for Studies in Project Initiation Document		X	
		10			General Environmental Studies		X	
		15			Biological Studies		X	
		20			Cultural Resource Studies		X	
		25			Draft Environmental Document or Categorical Exemption/Exclusion	X	X	
			10		Section 4(F) Evaluation	X	X	
			20		Environmental Quality Control and Other Reviews	X	X	
			25		Approval to Circulate Resolution	X		
			30		Environmental Coordination	X	X	
			99		Other Draft Environmental Document Products		X	
		30			NEPA Delegation	X		
2	170				Permits, Agreements, and Route Adoptions during PA&ED component	X	X	
		05			Required permits	X	X	
		15			Railroad Agreements		X	
		20			Freeway Agreements		X	
		25			Agreement for Material Sites		X	
		30			Executed Maintenance Agreement		X	
		40			Route Adoptions		X	
		45			MOU From Tribal Employment Rights Office (TERO)		X	
		55			NEPA Delegation	X		
2	175				Circulate Draft Environmental Document and Select Preferred Project Alternative Identification	X	X	
		05			DED Circulation		X	
			05		Master Distribution and Invitation Lists		X	
			10		Notices Regarding Public Hearing and Availability of Draft Environmental Document		X	
			15		DED Publication and Circulation		X	

This agreement is not approvable.
It must be sent to the HQ Office of Cooperative Agreements for review.

			20		Federal Consistency Determination (Coastal Zone)			X
			99		Other DED Circulation Products	X	X	
		10			Public Hearing		X	
			05		Need for Public Hearing Determination	X		
			10		Public Hearing Logistics		X	
			15		Displays for Public Hearing		X	
			20		Second Notices of Public Hearing and Availability of DED		X	
			25		Map Display and Public Hearing Plan		X	
			30		Display Public Hearing Maps		X	
			35		Public Hearing	X	X	
			40		Record of Public Hearing		X	
			99		Other Public Hearing Products		X	
		15			Public Comment Responses and Correspondence		X	
		20			Project Preferred Alternative	X		
		25			NEPA Delegation	X		
2	180				Prepare and Approve Project Report and Final Environmental Document	X	X	
		05			Final Project Report	X	X	
		10			Final Environmental Document	X	X	
			05		Approved Final Environmental Document	X	X	
				05	Draft Final Environmental Document Review	X	X	
				10	Revised Draft Final Environmental Document	X	X	
				15	Section 4(F) Evaluation	X	X	
				20	Findings	X	X	
				25	Statement of Overriding Considerations	X	X	
				30	CEQA Certification	X		
				40	Section 106 Consultation and MOA	X		
				45	Section 7 Consultation	X		
				50	Final Section 4(F) Statement	X	X	
				55	Floodplain Only Practicable Alternative Finding	X	X	
				60	Wetlands Only Practicable Alternative Finding	X	X	
				65	Section 404 Compliance	X	X	
				70	Mitigation Measures	X	X	
			10		Public Distribution of Final Environmental Document and Respond To Comments	X	X	
			15		Final Right of Way Relocation Impact Document	X	X	
			99		Other Final Environmental Document Products	X	X	
		15			Completed Environmental Document	X	X	
			05		Record of Decision (NEPA)	X	X	
			10		Notice of Determination (CEQA)	X	X	
			20		Environmental Commitments Record	X	X	
			99		Other Completed Environmental Document Products		X	
		20			NEPA Delegation	X		

This agreement is not approvable.
It must be sent to the HQ Office of Cooperative Agreements for review.

FUNDING SUMMARY

Funding Source	Funding Partner	Fund Type	PA&ED	Subtotal Support	Subtotal Capital	Total Funds Type
LOCAL	OCTA	Measure M	$2,000,000	$2,000,000	$0	$2,000,000
LOCAL	TCA	Local	$1,000,000	$1,000,000	$0	$1,000,000
		Subtotals by Component	$3,000,000	$3,000,000	$0	$3,000,000

DRAFT

Final Feasibility Study Report
(provided under separate cover)

Storm Water Data Report

(provided under separate cover)

COOPERATIVE AGREEMENT

This Agreement, effective on May 22, 2014, is between the State of California, acting through its Department of Transportation, referred to as CALTRANS, and:

Foothill/Eastern Transportation Corridor Agency, a California joint powers authority, referred to hereinafter as TCA.

RECITALS

1. PARTNERS are authorized to enter into a cooperative agreement for improvements to the state highway system (SHS) per the California Streets and Highways Code sections 114 and 130.

2. For the purpose of this Agreement, freeway improvements including a direct connector between the toll facilities of State Route 241 and State Route 91 Express Lanes to and from the east and will be referred to hereinafter as PROJECT.

3. All responsibilities assigned in this Agreement to complete the following PROJECT COMPONENTS will be referred to hereinafter as OBLIGATIONS:

   - Project Approval and Environmental Document (PA&ED)

4. PS&E (Plans, Specifications, and Estimate), R/W (Right of Way) CAPITAL, R/W (Right of Way) SUPPORT, CONSTRUCTION CAPITAL and CONSTRUCTION SUPPORT PROJECT COMPONENTS of PROJECT will be the subject of a separate future Agreement.

5. This Agreement is separate from and does not modify or replace any other cooperative agreement or memorandum of understanding between PARTNERS regarding the PROJECT. Cooperative Agreement 12-081 and its executed amendments are not superseded by this agreement.

6. Prior to this Agreement:

   - TCA developed the Project Initiation Document, Project Study Report/Project Development Support (PSR-PDS), for the PROJECT which was approved by CALTRANS on January 17, 2012.

7. In this Agreement capitalized words represent defined terms and acronyms. The Definitions section contains a complete definition for each capitalized term.

8. PARTNERS hereby set forth the terms, covenants, and conditions of this Agreement, under which they will accomplish OBLIGATIONS.

RESPONSIBILITIES

9. TCA is responsible for 100% of its OBLIGATIONS as set forth in this Agreement. CALTRANS is responsible for 100% of its OBLIGATIONS as set forth in this Agreement.

10. TCA and CALTRANS are FUNDING PARTNERS and the details of their funding commitments are documented in the latest FUNDING SUMMARY between PARTNERS. Each PARTNER is responsible for the costs of its OBLIGATIONS.

11. TCA is the IMPLEMENTING AGENCY for PA&ED.

12. CALTRANS is the CEQA lead agency for PROJECT, and will provide Quality Assurance/Quality Control for the development of the Environmental Document.

13. CALTRANS is the NEPA lead agency for PROJECT, and will provide Quality Assurance/Quality Control for the development of the Environmental Document.

14. CALTRANS will provide Independent Quality Assurance (IQA) for the portions of WORK within existing and proposed SHS right of way, except those mentioned above in Articles 12 and 13.

SCOPE

Scope: General

15. PARTNERS will perform all OBLIGATIONS in accordance with federal and California laws, regulations, and published standards; FHWA STANDARDS; and CALTRANS STANDARDS current as of the date of performance. TCA shall require its design consultant to (a) promptly respond to comments provided by reviewers and (b) revise design in response to any reviewer comments identifying failure of design to comply with aforesaid laws, regulations or published standards. TCA will consult with CALTRANS with regard to any comments submitted by CALTRANS reviewers that are not required to be incorporated under the foregoing criteria.

16. CALTRANS retains the right to reject noncompliant WORK, protect public safety, preserve property rights, and ensure that all WORK is in the best interest of the SHS. CALTRANS will perform applicable process review for environmental documentation or technical studies submitted for its review prior to approval of any documentation or studies.

17. Any PARTNER may, at its own expense, have representatives observe any OBLIGATIONS performed by another PARTNER. Observation does not constitute authority over those OBLIGATIONS.

18. Each PARTNER will ensure that personnel participating in OBLIGATIONS are appropriately qualified or licensed to perform the tasks assigned to them.

19. If WORK is done under contract (not completed by a PARTNER's own employees) and is governed by the California Labor Code's definition of "public works" (section 1720(a)), that PARTNER will conform to sections 1720 – 1815 of the California Labor Code and all applicable regulations and coverage determinations issued by the Director of Industrial Relations.

20. IMPLEMENTING AGENCY will be available to help resolve WORK related problems generated by the PA&ED PROJECT COMPONENT until construction of PROJECT is complete and PROJECT is open to the public.

21. Within 60 days of receipt by CALTRANS of proper application, CALTRANS will issue to TCA, their contractors, consultants and agents, the encroachment permits required for WORK within SHS right of way, at no cost to TCA, their contractors, consultants or agents. PARTNERS will not permit their contractors and/or agents, or utility owners to perform activities within the SHS right of way without an encroachment permit issued in their name.

22. If any PARTNER discovers unanticipated cultural, archaeological, paleontological, or other protected resources during WORK, all WORK in that area will stop and that PARTNER will notify all PARTNERS within 24 hours of discovery. WORK may only resume after a qualified professional has evaluated the nature and significance of the discovery and a plan is approved for its removal or protection.

23. PARTNERS will hold all administrative drafts and administrative final reports, studies, materials, and documentation relied upon, produced, created, or utilized for PROJECT in confidence to the extent permitted by law and where applicable, the provisions of California Government Code section 6254.5(e) shall protect the confidentiality of such documents in the event that said documents are shared between PARTNERS.

    PARTNERS will not distribute, release, or share said documents with anyone other than employees, agents, and consultants who require access to complete PROJECT without the prior written consent of the PARTNER authorized to release them, unless required or authorized to do so by law.

24. If a PARTNER receives a public records request pertaining to OBLIGATIONS, that PARTNER will use all reasonable efforts to notify the other PARTNER within five (5)

working days of receipt and make such PARTNER aware of any disclosed public documents. PARTNERS will consult with each other prior to the release of any public documents related to the PROJECT.

25. If HM-1 or HM-2 is found during performance of the WORK, IMPLEMENTING AGENCY will immediately notify the other PARTNER and responsible control agencies of such discovery.

26. CALTRANS, independent of PROJECT, is responsible for and shall pay directly all costs and expenses relating to any HM-1 found within the existing SHS right of way. CALTRANS will undertake HM MANAGEMENT ACTIVITIES related to HM-1 with minimum impact to PROJECT schedule.

27. If HM-1 is found within PROJECT limits and outside the existing SHS right of way, responsibility for such HM-1 rests with the owner(s) of the parcel(s) on which the HM-1 is found. TCA, in concert with the local agency having land use jurisdiction over such parcel(s), will ensure that HM MANAGEMENT ACTIVITIES related to HM-1 are undertaken with minimum impact to PROJECT schedule.

28. If HM-2 is found within PROJECT limits, TCA will determine HM MANAGEMENT ACTIVITIES related to HM-2 required for OBLIGATIONS of this PROJECT COMPONENT with minimum impact to PROJECT schedule.

29. The PARTNER delivering an OBLIGATION will be responsible for accepting, rejecting, compromising, settling, or litigating claims of any non-Agreement parties hired to do WORK with respect to that OBLIGATION.

30. PARTNERS will confer on any claim that may affect OBLIGATIONS or PARTNERS' liability or responsibility under this Agreement in order to retain resolution possibilities for potential future claims. No PARTNER will prejudice the rights of another PARTNER until after PARTNERS confer on claim.

31. PARTNERS will maintain, and will ensure that any party hired by PARTNERS to participate in OBLIGATIONS will maintain, a financial management system that conforms to Generally Accepted Accounting Principles (GAAP), and that can properly accumulate and segregate incurred PROJECT costs and billings.

32. If FUNDING PARTNER funds any part of OBLIGATIONS with state or federal funds, each PARTNER will comply, and will ensure that any party hired to participate in OBLIGATIONS will comply with the federal cost principles of 2 CFR, Part 225, and administrative requirements outlined in 49 CFR, Part 18. These principles and requirements apply to all funding types included in this Agreement.

33. PARTNERS will maintain and make available to each other all OBLIGATIONS-related documents, including financial data, during the term of this Agreement.

34. PARTNERS will retain all OBLIGATIONS-related records for three (3) years after IMPLEMENTING AGENCY makes final payment for the WORK.

35. PARTNERS have the right to audit each other in accordance with generally accepted governmental audit standards.

    CALTRANS, the state auditor, FHWA (if PROJECT utilizes federal funds), and TCA will have access to all OBLIGATIONS-related records of each PARTNER, and any party hired by a PARTNER to participate in OBLIGATIONS, for audit, examination, excerpt, or transcription.

    The examination of any records will take place in the offices and locations where said records are generated and/or stored and will be accomplished during reasonable hours of operation. The auditing PARTNER will be permitted to make copies of any OBLIGATIONS-related records needed for the audit.

    The audited PARTNER will review the draft audit, findings, and recommendations, and provide written comments within thirty (30) calendar days of receipt.

    Any audit dispute not resolved by PARTNERS is subject to mediation. Mediation will follow the process described in the General Conditions section of this Agreement.

36. If WORK stops for any reason, each PARTNER will continue to implement all of its applicable commitments and conditions included in the PROJECT environmental documentation, permits, agreements, or approvals that are in effect at the time that WORK stops, as they apply to each PARTNER's responsibilities in this Agreement, in order to keep PROJECT in environmental compliance until WORK resumes.

37. Each PARTNER accepts responsibility to complete the activities that it selected on the SCOPE SUMMARY. Activities marked with "N/A" on the SCOPE SUMMARY are not included in the scope of this Agreement.

38. CALTRANS will make available existing data and documents, including but not limited to, as-builts, Microstation files, traffic counts and historic traffic and accident data for these State Highway segments of PROJECT roadway upon proper written request by TCA or its consultants.

Scope: Environmental Permits, Approvals and Agreements

39. If PARTNERS later determine that an environmental permit, approval or agreement is necessary PARTNERS will ensure completion and implementation of all environmental permits, approvals, and agreements.

Scope: Project Approval and Environmental Document (PA&ED)

40. CALTRANS is the CEQA lead agency for PROJECT. CALTRANS will determine the type of environmental documentation required and will cause that documentation to be prepared.

41. Any PARTNER involved in the preparation of CEQA environmental documentation will follow the CALTRANS STANDARDS that apply to the CEQA process including the guidance provided in the Standard Environmental Reference (SER) available at www.dot.ca.gov/ser.

42. Pursuant to Chapter 3 of title 23, United States Code (23 U.S.C 326) and 23 U.S.C 327, CALTRANS is the NEPA lead agency for PROJECT. CALTRANS is responsible for NEPA compliance and will determine the type of environmental documentation required and will cause that documentation to be prepared.

43. Any PARTNER involved in the preparation of NEPA environmental documentation will follow FHWA and CALTRANS STANDARDS that apply to the NEPA process including, but not limited to, the guidance provided in the FHWA Environmental Guidebook (available at fhwa.dot.gov/hep/index.htm) and the Standard Environmental Reference (SER available at dot.ca.gov/ser).

44. TCA will prepare the appropriate CEQA environmental documentation to meet CEQA requirements, in coordination with CALTRANS as the CEQA lead agency.

45. TCA will prepare the appropriate NEPA environmental documentation (as determined by CALTRANS) to meet NEPA requirements, in coordination with CALTRANS as the NEPA lead agency.

46. Any PARTNER preparing any portion of the CEQA environmental documentation, including any studies and reports, will submit that portion of the documentation to the CEQA lead agency for review, comment, and approval at appropriate stages of development prior to public availability.

47. Any PARTNER preparing any portion of the NEPA environmental documentation (including, but not limited to, studies, reports, public notices, and public meeting materials, determinations, administrative drafts, and final environmental documents) will submit that

portion of the documentation to CALTRANS for CALTRANS' review, comment, and approval prior to public availability.

48. TCA will prepare, publicize, and circulate all CEQA-related public notices and will submit said notices to the CEQA lead agency for review, comment, and approval prior to publication and circulation.

49. TCA will prepare, publicize, and circulate all NEPA-related public notices, except Federal Register notices. TCA will submit all notices to CALTRANS for CALTRANS' review, comment, and approval prior to publication and circulation.

    CALTRANS will coordinate with the appropriate federal agency to publish notices in the Federal Register.

50. The CEQA lead agency will attend all CEQA-related public meetings.

51. The NEPA lead agency will attend all NEPA-related public meetings.

52. The scheduling and the preparation of draft and final materials for CEQA- and NEPA-related public meetings and public notices relating to such meetings shall be coordinated by PARTNERS.

53. If a PARTNER who is not the CEQA or NEPA lead agency holds a public meeting about PROJECT (excluding any properly noticed meetings of TCA's governing board or any committee of the board or any properly noticed meetings of the governing bodies of TCA's member agencies or committees of such governing bodies), that PARTNER must clearly state its role in PROJECT and the identity of the CEQA and NEPA lead agencies on all meeting publications. All meeting publications subject to the foregoing requirement must also inform the attendees that public comments collected at the meetings are not part of the CEQA or NEPA public review process.

    That PARTNER will submit all meeting advertisements, agendas, exhibits, handouts, and materials that are subject to the foregoing requirement to the appropriate lead agency for review, comment, and approval at least ten (10) working days prior to publication or use. If that PARTNER makes any changes to the materials, it will allow the appropriate lead agency to review, comment on, and approve those changes at least three (3) working days prior to the public meeting date.

    The CEQA lead agency maintains final editorial control with respect to text or graphics that could lead to public confusion over CEQA-related roles and responsibilities. The NEPA lead agency has final approval authority with respect to text or graphics that could lead to public confusion over NEPA-related roles and responsibilities.

54. The PARTNER preparing the environmental documentation, including the studies and reports, will ensure that qualified personnel remain available to help resolve environmental issues and perform any necessary work to ensure that PROJECT remains in environmental compliance.

COST

Cost: General

55. PARTNERS will document specific funding details in a FUNDING SUMMARY. The FUNDING SUMMARY is incorporated and made an express part of this agreement.

A valid FUNDING SUMMARY must be in place at all times until OBLIGATION COMPLETION.

PARTNERS will create a new FUNDING SUMMARY each time the funding details of PROJECT change. The FUNDING SUMMARY is only valid after each FUNDING PARTNER signs and dates the FUNDING SUMMARY. The most current fully executed FUNDING SUMMARY supersedes any previous FUNDING SUMMARY created for this Agreement.

Replacement of the FUNDING SUMMARY will not require an amendment to the body of this Agreement unless the rules of the new funds require it.

Each PARTNER will designate a legally authorized representative to sign the FUNDING SUMMARY on its behalf.

56. The cost of any awards, judgments, or settlements generated by OBLIGATIONS is an OBLIGATIONS cost.

57. CALTRANS, independent of PROJECT, will pay, or cause to be paid, all costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within the existing SHS right of way.

58. TCA, independent of PROJECT, will pay, or cause to be paid, all costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within PROJECT limits and outside of the existing SHS right of way.

59. TCA, independent of PROJECT, will pay, or cause to be paid, all costs for HM MANAGEMENT ACTIVITIES costs related to HM-2 if required for OBLIGATIONS of this PROJECT COMPONENT with minimum impact to PROJECT schedule.

60. The cost of any legal challenges to the CEQA or NEPA environmental process or documentation, including supporting technical studies, documentation, and if applicable, the mitigation, monitoring, or remedial actions which are required by the environmental documentation, PROJECT permits and/or agreements, is an OBLIGATIONS cost.

61. Independent of OBLIGATIONS cost, each PARTNER will fund the cost of its own IQA for WORK done within existing or proposed future SHS right of way.

    Independent of OBLIGATIONS cost, CALTRANS will fund the cost of its QC/QAP process review for environmental documentation.

62. CALTRANS will provide encroachment permits at no cost to PARTNERS, their contractors, consultants and agents. The term "no cost" is not intended to relieve the permittee from responsibility for compliance with insurance and other requirements of the permits, including the obligation to pay insurance premiums and other costs.

63. Evaluation of unanticipated cultural, archaeological, paleontological, or other protected resources found during WORK and development and implementation of plan for its removal or protection required for this PROJECT COMPONENT is an OBLIGATIONS cost.

64. Fines, interest, or penalties levied against a PARTNER will be paid, independent of OBLIGATIONS cost, by the PARTNER whose actions or lack of action caused the levy.

65. Fulfillment of public records requests pertaining to OBLIGATIONS will be paid, independent of OBLIGATIONS cost, by the PARTNER who received the request.

66. The cost to place PROJECT right of way in a safe and operable condition and meet all environmental commitments is an OBLIGATIONS cost.

67. Because IMPLEMENTING AGENCY is responsible for managing the scope, cost, and schedule of a project component, if there are insufficient funds available in this Agreement to place PROJECT right of way in a safe and operable condition, the appropriate IMPLEMENTING AGENCY accepts responsibility to fund these activities until such time as PARTNERS amend this Agreement.

68. TCA will fund all PROJECT COMPONENT costs, except for those costs associated with any CALTRANS OBLIGATIONS or WORK to be performed by CALTRANS under this Agreement. CALTRANS has no funds allocated to PROJECT and, except for CALTRANS' duty to provide or perform all OBLIGATIONS and WORK assigned herein at no cost to TCA, TCA will have no right to seek a CALTRANS contribution of funds under the term of this Agreement.

Cost: Environmental Permits, Approvals and Agreements

69. The cost of coordinating, obtaining, complying with, implementing, including renewing and amending resource agency permits, agreements, and approvals is an OBLIGATIONS cost.

Cost: Project Approval and Environmental Document (PA&ED)

70. The cost to prepare, publicize, and circulate all CEQA and NEPA-related public notices is an OBLIGATIONS cost.

71. The cost to plan, schedule, prepare, materials for, and host all CEQA and NEPA-related public meetings is an OBLIGATIONS cost.

SCHEDULE

72. PARTNERS will manage the schedule for OBLIGATIONS through monthly meetings and monthly written progress reports.

73. CALTRANS commits to review and provide written comments to all initial submittals within 30 calendar days and resubmittals within 30 calendar days of the date of transmittal to the District office for timely processing of PROJECT documents, including providing quality assurance reviews and approvals consistent with its existing policies, for all WORK.

    Whenever CALTRANS approval is required by the terms of this Agreement, that approval shall not be unreasonably withheld or delayed.

GENERAL CONDITIONS

74. PARTNERS understand that this Agreement is in accordance with and governed by the Constitution and laws of the State of California. This Agreement will be enforceable in the State of California. Any PARTNER initiating legal action arising from this Agreement will file and maintain that legal action in the Superior Court of the county in which the CALTRANS district office that is signatory to this Agreement resides, or in the Superior Court of the county in which PROJECT is physically located.

75. All OBLIGATIONS of CALTRANS under the terms of this Agreement are subject to the appropriation of resources by the Legislature, the State Budget Act authority, and the allocation of funds by the California Transportation Commission to CALTRANS for the purposes of fulfilling CALTRANS' OBLIGATIONS herein.

76. All OBLIGATIONS of TCA under the terms of this Agreement are subject to the TCA Board of Directors approval.

77. When CALTRANS performs IQA activities it does so for its own benefit. No one can assign liability to CALTRANS due to its IQA activities.

78. Neither TCA nor any officer or employee thereof is responsible for any injury, damage or liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon CALTRANS under this Agreement. It is understood and agreed that CALTRANS, to the extent permitted by law, will defend, indemnify, and save harmless TCA and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories or assertions of liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under this Agreement.

79. Neither CALTRANS nor any officer or employee thereof is responsible for any injury, damage, or liability occurring by reason of anything done or omitted to be done by TCA and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon TCA under this Agreement. It is understood and agreed that TCA, to the extent permitted by law, will defend, indemnify, and save harmless CALTRANS and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories or assertions of liability occurring by reason of anything done or omitted to be done by TCA and/or its agents under this Agreement.

80. PARTNERS do not intend this Agreement to create a third party beneficiary or define duties, obligations, or rights in parties not signatory to this Agreement. PARTNERS do not intend this Agreement to affect their legal liability by imposing any standard of care for fulfilling OBLIGATIONS different from the standards imposed by law.

81. PARTNERS will not assign or attempt to assign OBLIGATIONS to parties not signatory to this Agreement except to another entity formed pursuant to Government Code Section 66484.3(f) or (m) that assumes full responsibility for performance of the obligation of TCA under this Agreement.

82. This agreement shall not be deemed to be a waiver or modification of any terms, conditions or covenants of Cooperative Agreement No. 12-081 and its executed amendments, for the Eastern Transportation corridor, and all terms and conditions set forth in that document are hereby affirmed by CALTRANS and TCA and shall remain in full force and effect.

83. A waiver of a PARTNER's performance under this Agreement will not constitute a continuous waiver of any other provision. An amendment made to any article or section of this Agreement does not constitute an amendment to or negate all other articles or sections of this Agreement.

84. A delay or omission to exercise a right or power due to a default does not negate the use of that right or power in the future when deemed necessary.

85. If any PARTNER defaults in its OBLIGATIONS, a non-defaulting PARTNER will request in writing that the default be remedied within thirty (30) calendar days. If the defaulting PARTNER fails to do so, the non-defaulting PARTNER may initiate dispute resolution.

86. PARTNERS will first attempt to resolve Agreement disputes at the PROJECT team level. If they cannot resolve the dispute themselves, the CALTRANS district director and the executive officer of TCA will attempt to negotiate a resolution. If PARTNERS do not reach a resolution, PARTNERS' legal counsel will initiate mediation. PARTNERS agree to participate in mediation in good faith and will share equally in its costs.

    Neither the dispute nor the mediation process relieves PARTNERS from full and timely performance of OBLIGATIONS in accordance with the terms of this Agreement. However, if any PARTNER stops fulfilling OBLIGATIONS, any other PARTNER may seek equitable relief to ensure that OBLIGATIONS continue.

    Except for equitable relief, no PARTNER may file a civil complaint until after mediation, or forty-five (45) calendar days after filing the written mediation request, whichever occurs first.

    PARTNERS will file any civil complaints in the Superior Court of the county in which the CALTRANS district office signatory to this Agreement resides or in the Superior Court of the county in which PROJECT is physically located. The prevailing PARTNER will be entitled to an award of all costs, fees, and expenses, including reasonable attorney fees as a result of litigating a dispute under this Agreement or to enforce the provisions of this article including equitable relief.

87. PARTNERS maintain the ability to pursue alternative or additional dispute remedies if a previously selected remedy does not achieve resolution.

88. If any provisions in this Agreement are found by a court of competent jurisdiction to be, or are in fact, illegal, inoperative, or unenforceable, those provisions do not render any or all other Agreement provisions invalid, inoperative, or unenforceable, and those provisions will be automatically severed from this Agreement.

89. PARTNERS intend this Agreement to be their final expression and supersedes any oral understanding or writings pertaining to OBLIGATIONS.

90. If during performance of WORK additional activities or environmental documentation is necessary to keep PROJECT in environmental compliance, PARTNERS will amend this Agreement to include completion of those additional tasks.

91. Except as otherwise provided in the Agreement, PARTNERS will execute a formal written amendment if there are any changes to OBLIGATIONS or provisions contained herein.

92. PARTNERS agree to sign a COOPERATIVE AGREEMENT CLOSURE STATEMENT to terminate this Agreement. However, all indemnification, document retention, audit, claims, environmental commitment, legal challenge, maintenance and ownership articles will remain in effect until terminated or modified in writing by mutual agreement.

93. The following documents are attached to, and made an express part of this Agreement: SCOPE SUMMARY, FUNDING SUMMARY.

DEFINITIONS

CALTRANS – The California Department of Transportation.

CALTRANS STANDARDS – As used herein, the term "CALTRANS STANDARDS" shall mean and refer to those STATE documents including the FHWA STANDARDS, Caltrans Standard Specifications dated 2010, Caltrans manuals (including but not limited to the Right of Way Manual, Construction Manual, Highway Design Manual, etc.), technical memoranda, standards, guidelines, and modifications to such standards that are set forth in or expressly incorporated into this Agreement, or are in effect as of the effective date of this Agreement.

CEQA (California Environmental Quality Act) – The act (California Public Resources Code, sections 21000 et seq.) that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those significant impacts, if feasible.

CFR (Code of Federal Regulations) – The general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government

COOPERATIVE AGREEMENT CLOSURE STATEMENT – A document signed by PARTNERS that verifies the completion of all OBLIGATIONS included in this Agreement and in all amendments to this Agreement.

FHWA – Federal Highway Administration

FHWA STANDARDS – FHWA regulations, policies and procedures, including, but not limited to FHWA manuals, technical memoranda, standards, guidelines, and modifications to such standards, including the guidance provided at www.fhwa.dot.gov/topics.htm which are in effect as of the effective date of this Agreement.

FUNDING PARTNER – A PARTNER, designated in the FUNDING SUMMARY, that commits a defined dollar amount to fulfill OBLIGATIONS. Each FUNDING PARTNER accepts responsibility to provide the funds it commits in this Agreement.

FUNDING SUMMARY – An executed document that lists the funding, billing, and payment commitments. Commitments include, but are not limited to, FUNDING PARTNER(S), fund source, fund type, payment method, invoice frequency, deposit amounts, and PROJECT COMPONENT(S) in which funds are to be spent. Funds listed on the FUNDING SUMMARY are "not-to-exceed" amounts for each FUNDING PARTNER.

GAAP (Generally Accepted Accounting Principles) – Uniform minimum standards and guidelines for financial accounting and reporting issued by the Federal Accounting Standards

Advisory Board that serve to achieve some level of standardization. See http://www.fasab.gov/accepted.html.

HM-1 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law whether it is disturbed by PROJECT or not.

HM-2 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law only if disturbed by PROJECT.

HM MANAGEMENT ACTIVITIES – Management activities related to either HM-1 or HM-2 including, without limitation, any necessary manifest requirements and disposal facility designations.

IMPLEMENTING AGENCY – The PARTNER responsible for managing the scope, cost, and schedule of a PROJECT COMPONENT to ensure the completion of that component.

IQA (Independent Quality Assurance) – Ensuring that the IMPLEMENTING AGENCY's quality assurance activities result in WORK being developed in accordance with the applicable standards. IQA does not include any work necessary to actually develop or deliver WORK.

NEPA (National Environmental Policy Act of 1969) – This federal act establishes a national policy for the environment and a process to disclose the adverse impacts of projects with a federal nexus.

OBLIGATION COMPLETION – PARTNERS have fulfilled all OBLIGATIONS included in this Agreement, and all amendments to this Agreement, and have signed a COOPERATIVE AGREEMENT CLOSURE STATEMENT.

OBLIGATIONS – All responsibilities described in this Agreement to complete the PA&ED PROJECT COMPONENT.

PA&ED (Project Approval and Environmental Document) – See PROJECT COMPONENT.

PARTNER – Any individual signatory party to this Agreement.

PARTNERS – The term that collectively references all of the signatory agencies to this Agreement. This term only describes the relationship between these agencies to work together to achieve a mutually beneficial goal. It is not used in the traditional legal sense in which one PARTNER's individual actions legally bind the other PARTNER.

PROJECT – Improvements including a direct connector between the toll facilities of State Route 241 and State Route 91 Express Lanes to and from the east.

PROJECT COMPONENT – A distinct portion of the planning and project development process of a capital project as outlined in California Government Code, section 14529(b).

- **PID (Project Initiation Document)** – The activities required to deliver the project initiation document for PROJECT.
- **PSR-PDS (Project Study Report-Project Development Support)** – The activities required to gain approval of the project studies to move into the PA&ED phase for PROJECT and to estimate and program the capital outlay support cost necessary to complete the studies and work needed during PA&ED.
- **PA&ED (Project Approval and Environmental Document)** – The activities required to deliver the project approval and environmental documentation for PROJECT.
- **PS&E (Plans, Specifications, and Estimate)** – The activities required to deliver the plans, specifications, and estimate for PROJECT.
- **R/W (Right of Way) SUPPORT** –The activities required to obtain all property interests for PROJECT.
- **R/W (Right of Way) CAPITAL** – The funds for acquisition of property rights for PROJECT.
- **CONSTRUCTION SUPPORT** – The activities required for the administration, acceptance, and final documentation of the construction contract for PROJECT.
- **CONSTRUCTION CAPITAL** – The funds for the construction contract.

QC/QAP (QUALITY CONTROL/QUALITY ASSURANCE PROGRAM) - Caltrans quality control and quality assurance procedures for all environmental documents as described in the Jay Norvell Memos dated July 2, 2007 (available at http://www.dot.ca.gov/ser/memos.htm#LinkTarget_705). This also includes the independent judgment analysis and determination under CEQA or NEPA that the environmental documentation meets CEQA or NEPA requirements.

SCOPE SUMMARY – The attachment in which each PARTNER designates its commitment to specific scope activities within each PROJECT COMPONENT as outlined by the *Workplan Standards Guide for the Delivery of Capital Projects* available at http://www.dot.ca.gov/hq/projmgmt/guidance.htm.

SHS (State Highway System) – All highways, right of way, and related facilities acquired, laid out, constructed, improved, or maintained as a state highway pursuant to constitutional or legislative authorization.

STATE – refers to the State of California.

TCA – The Foothill/Eastern Transportation Corridor Agency, a California joint powers authority.

WORK – All scope activities included in this Agreement.

CONTACT INFORMATION

The information provided below indicates the primary contact information for each PARTNER to this Agreement. PARTNERS will notify each other in writing of any personnel or location changes. Contact information changes do not require an amendment to this Agreement.

The primary Agreement contact person for CALTRANS is:
Leo Chen, Project Manager
3347 Michelson Drive, Suite 100
Irvine, California 92612
Office Phone: (949) 223-5431
Mobile Phone: (949) 279-9363
Fax Number: (949) 440-4465
Email: Leo_Chen@dot.ca.gov

The primary Agreement contact person for TCA is:
David Lowe, Director, Design & Construction
125 Pacifica, Suite 100
Irvine, CA 92618-3304
Office Phone: (949) 754-3488
Fax Number: (949) 754-3491
Email: dlowe@thetollroads.com

SIGNATURES

PARTNERS declare that:

1. Each PARTNER is an authorized legal entity under California state law.
2. Each PARTNER has the authority to enter into this Agreement.
3. The people signing this Agreement have the authority to do so on behalf of their public agencies.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

By: _____
Adnan Maiah
Deputy District Director,
Capital Projects Outlay Program

CERTIFIED AS TO FUNDS:

By: _____
for Neda Saber
District Budget Manager

APPROVED AS TO FORM AND PROCEDURE:

By: _____
Glenn B. Mueller
Assistant Chief Counsel

FOOTHILL/EASTERN
TRANSPORTATION CORRIDOR
AGENCY

By: _____
Michael Kraman
Chief Executive Officer

ATTEST:

By: _____
Sherri McKaig
Assistant Secretary of the Board

APPROVED AS TO FORM AND PROCEDURE:

By: _____
E. George Joseph
General Counsel

SCOPE SUMMARY

4	5	6	7	8	Description	CALTRANS	TCA	N/A
2	160				Perform Preliminary Engineering Studies and Draft Project Report	X	X	
		05			Updated Project information		X	
			05		Approved Project Initiation Document Review		X	
			10		Geotechnical Information Review		X	
			15		Materials Information Review		X	
			20		Traffic Data and Forecasts Review		X	
			25		Geometrics Review		X	
			30		Project Scope Review		X	
			35		Project Cost Estimate Review		X	
			99		Other Project Information Products		X	
		10			Engineering Studies		X	
			10		Traffic Forecasts/Modeling		X	
			15		Geometric Plans for Project Alternatives		X	
			20		Value Analysis (*if applicable, refer to Deputy Directive DD-92-R1)		X*	
			25		Hydraulics/Hydrology Studies		X	
			30		Highway Planting Design Concepts		X	
			35		Traffic Operational Analysis		X	
			40		Updated Right of Way Data Sheet		X	
			45		Utility Locations Determined for Preliminary Engineering		X	
			50		Railroad Study			X
			55		Multi-Modal Study			X
			60		Park and Ride Study			X
			65		Right of Way Relinquishment and Vacation Study			X
			70		Traffic Studies		X	
			75		Updated Materials Information		X	
			80		Updated Geotechnical Information		X	
			85		Structures Advance Planning Study (APS) and Preliminary Engineering		X	
			90		High Occupancy Vehicle Report			X
			95		Updated Preliminary Transportation Management Plan		X	
			99		Other Engineering Studies		X	
		15			Draft Project Report		X	
			05		Cost Estimates for Alternatives		X	

4	5	6	7	8	Description	CALTRANS	TCA	N/A
			10		Fact Sheet for Exceptions to Design Standards		X	
			15		Approved Exceptions to Encroachment Policy		X	
			20		Draft Project Report		X	
			25		Draft Project Report Circulation, Review, and Approval		X	
			99		Other Draft Project Report Products		X	
		20			Engineering and Land Net Surveys		X	
			25		Existing Records		X	
			30		Land Net Surveys			X
			35		Land Net Map			X
			40		Right of Way Engineering Products		X	
			50		Control Surveys		X	
			55		Photogrammetric Maps and Products		X	
			60		Engineering Surveys		X	
			65		As-Built Centerline Surveys		X	
			70		Pavement Surveys		X	
		30			Environmental Study Request (ESR)		X	
			05		Maps for ESR		X	
			10		Surveys and Mapping for Environmental Studies		X	
			15		Property Access Rights for Environmental/Engineering Studies		X	
		40			NEPA Delegation	X		
		45			Base Maps and Plan Sheets for Project Report and Environmental Studies		X	
2	165				Perform Environmental Studies and Prepare Draft Environmental Document	X	X	
		05			Environmental Scoping of Alternatives Identified for Studies in Project Initiation Document			X
			05		Project Information Review	X	X	
			10		Public and Agency Scoping Process			X
			15		Alternatives for Further Study			X
			99		Other Environmental Scoping of Alternatives Identified for Studies in Project Initiation Document			X
		10			General Environmental Studies		X	
			15		Community Impact Analysis, Land Use, and Growth Studies			X
			20		Visual Impact Assessment and Scenic Resource Evaluation		X	
			25		Noise Study		X	
			30		Air Quality Study		X	
			35		Water Quality Studies		X	

4	5	6	7	8	Description	CALTRANS	TCA	N/A
			40		Energy Studies			X
			45		Summary of Geotechnical Report		X	
			55		Draft Right of Way Relocation Impact Document			X
			60		Location Hydraulic and Floodplain Study Report			X
			65		Paleontology Study		X	
			70		Wild and Scenic Rivers Coordination			X
			75		Environmental Commitments Record		X	
			80		Hazardous Waste Initial Site Assessments/Investigations		X	
			85		Hazardous Waste Preliminary Site Investigation		X	
			99		Other Environmental Studies		X	
		15			Biological Studies		X	
			05		Biological Assessment		X	
			10		Wetlands Study		X	
			15		Resource Agency Permit Related Coordination		X	
			20		Natural Environment Study Report		X	
			99		Other Biological Studies		X	
		20			Cultural Resource Studies		X	
			05		Archaeological Survey		X	
				05	Area of Potential Effects/Study Area Maps		X	
				10	Native American Consultation		X	
				15	Records and Literature Search		X	
				20	Field Survey		X	
				25	Archaeological Survey Report		X	
				99	Other Archaeological Survey Products		X	
			10		Extended Phase I Archaeological Studies			X
				05	Native American Consultation			X
				10	Extended Phase I Proposal			X
				15	Extended Phase I Field Investigation			X
				20	Extended Phase I Materials Analysis			X
				25	Extended Phase I Report			X
				99	Other Phase I Archaeological Study Products			X
			15		Phase II Archaeological Studies			X
				05	Native American Consultation			X
				10	Phase II Proposal			X
				15	Phase II Field Investigation			X

4	5	6	7	8	Description	CALTRANS	TCA	N/A
				20	Phase II Materials Analysis			X
				25	Phase II Report			X
				99	Other Phase II Archaeological Study Products			X
			20		Historical and Architectural Resource Studies		X	
				05	Preliminary Area of Potential Effects/Study Area Maps for Architecture		X	
				10	Historic Resources Evaluation Report - Archaeology			X
				15	Historic Resource Evaluation Report - Architecture (HRER)			X
				20	Bridge Evaluation			X
				99	Other Historical and Architectural Resource Study Products			X
			25		Cultural Resource Compliance Consultation Documents		X	
				05	Final Area of Potential Effects/Study Area Maps		X	
				10	PRC 5024.5 Consultation		X	
				15	Historic Property Survey Report/Historic Resources Compliance Report		X	
				20	Finding of Effect			X
				25	Archaeological Data Recovery Plan/Treatment Plan			X
				30	Memorandum of Agreement			X
				99	Other Cultural Resources Compliance Consultation Products			X
		25			Draft Environmental Document or Categorical Exemption/Exclusion	X	X	
			10		Section 4(F) Evaluation		X	
			15		Categorical Exemption/Categorical Exclusion (CE)			X
			20		Environmental Quality Control and Other Reviews	X	X	
			25		Approval to Circulate Resolution	X		
			30		Environmental Coordination	X	X	
			99		Other Draft Environmental Document Products		X	
		30			NEPA Delegation	X		
2	170				Permits, Agreements, and Route Adoptions during PA&ED component	X	X	
		05			Required permits	X	X	
		15			Railroad Agreements			X
			05		Plan Approval			X
			10		Special Provisions and Insurance Clauses			X
			15		Service Contract for Railroad Services			X
			20		Construction and Maintenance Agreement			X
			25		PUC Exhibits and Application			X
			99		Other Railroad Agreement Products			X

4	5	6	7	8	Description	CALTRANS	TCA	N/A
		20			Freeway Agreements			X
			05		Draft Freeway Agreement			X
			10		Draft Freeway Agreement Review			X
			15		Final Freeway Agreement			X
			20		Executed Freeway Agreement			X
			99		Other Freeway Agreement Products			X
		25			Agreement for Material Sites	X	X	
		30			Executed Maintenance Agreement	X	X	
		40			Route Adoptions		X	
			05		Route Adoption Map		X	
			10		New Connection Request and Route Adoption CTC Submittal		X	
			15		Route Adoption and Public Road Connection Placed on CTC Agenda		X	
			99		Other Route Adoption Products		X	
		45			MOU From Tribal Employment Rights Office (TERO)		X	
		55			NEPA Delegation	X		
2	175				Circulate Draft Environmental Document and Select Preferred Project Alternative Identification	X	X	
		05			DED Circulation	X	X	
			05		Master Distribution and Invitation Lists	X	X	
			10		Notices Regarding Public Hearing and Availability of Draft Environmental Document	X	X	
			15		DED Publication and Circulation	X	X	
			20		Federal Consistency Determination (Coastal Zone)		X	
			99		Other DED Circulation Products		X	
		10			Public Hearing	X	X	
			05		Need for Public Hearing Determination	X	X	
			10		Public Hearing Logistics		X	
			15		Displays for Public Hearing		X	
			20		Second Notices of Public Hearing and Availability of DED	X	X	
			25		Map Display and Public Hearing Plan		X	
			30		Display Public Hearing Maps		X	
			35		Public Hearing	X	X	
			40		Record of Public Hearing		X	
			99		Other Public Hearing Products		X	
		15			Public Comment Responses and Correspondence	X	X	
		20			Project Preferred Alternative	X	X	

4	5	6	7	8	Description	CALTRANS	TCA	N/A
		25			NEPA Delegation	X		
2	180				Prepare and Approve Project Report and Final Environmental Document	X	X	
		05			Final Project Report		X	
			05		Updated Draft Project Report		X	
			10		Approved Project Report	X	X	
			15		Updated Storm Water Data Report		X	
			99		Other Project Report Products		X	
		10			Final Environmental Document	X	X	
			05		Approved Final Environmental Document	X		
				05	Draft Final Environmental Document Review	X		
				10	Revised Draft Final Environmental Document	X		
				15	Section 4(F) Evaluation		X	
				20	Findings	X		
				25	Statement of Overriding Considerations			X
				30	CEQA Certification	X		
				35	FHWA Approval	X		
				40	Section 106 Consultation and MOA	X		
				45	Section 7 Consultation	X		
				50	Final Section 4(F) Statement			X
				55	Floodplain Only Practicable Alternative Finding			X
				60	Wetlands Only Practicable Alternative Finding	X		
				65	Section 404 Compliance	X	X	
				70	Mitigation Measures	X	X	
			10		Public Distribution of Final Environmental Document and Respond To Comments	X	X	
			15		Final Right of Way Relocation Impact Document			X
			99		Other Final Environmental Document Products		X	
		15			Completed Environmental Document	X	X	
			05		Record of Decision (NEPA)	X	X	
			10		Notice of Determination (CEQA)	X	X	
			20		Environmental Commitments Record	X	X	
			99		Other Completed Environmental Document Products		X	
		20			NEPA Delegation	X		

FUNDING SUMMARY Number 1

Project Number: 1200020097
Agreement: 12-643

Part I – FUNDING SUMMARY Table

Funding Source	Funding Partner	Fund Type	PA&ED Support	PS&E Support	R/W Capital	R/W Support	CON Capital	CON Support	Totals by Fund Type
IMPLEMENTING AGENCY - >			TCA						
LOCAL	TCA	Toll Revenue Funds	$3,020,000	$0	$0	$0	$0	$0	$3,020,000
		Totals by Component	$3,020,000	$0	$0	$0	$0	$0	$3,020,000

This table represents full funding of each PROJECT COMPONENT in Agreement 12-643.
Billing and payment details follow.

Part II – Billing and Payment Details

Cost: PA&ED (Project Approval and Environmental Document)

Each PARTNER listed below will do WORK for PA&ED as described in the SCOPE SUMMARY of this Agreement:

- TCA
- CALTRANS

Therefore, based on the funding types displayed in the FUNDING SUMMARY table for this PROJECT COMPONENT:

- TCA will fund one hundred percent (100%) of all WORK costs, except for costs of OBLIGATIONS and WORK to be performed by CALTRANS.
- CALTRANS will perform all OBLIGATIONS and WORK at no cost to TCA.
- CALTRANS, other than the duty to provide and perform all OBLIGATIONS and WORK assigned herein at no cost to TCA, has no funds allocated to PROJECT and TCA will have no right, under any circumstance, to seek a CALTRANS contribution of funds under the term of this Agreement

FUNDING SUMMARY Number 1

Project Number: 1200020097
Agreement: 12-643

Part III – Signature Page

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

By: Adnan A Maiah
Adnan Maiah
Deputy District Director
Capital Outlay Program

Date 5/22/14

By: for Neda Saber
Neda Saber
District Budget Manager

By: 5/21/14
HQ Accounting

FOOTHILL/EASTERN
TRANSPORTATION CORRIDOR
AGENCY

By:
David W. Lowe
Director, Design and Construction

Date 5-8-2014

COOPERATIVE AGREEMENT COVER SHEET

Work Description

Perform PS&E, Right-of-Way Support and Right-of-Way Capital Work necessary for construction of a direct connector between the toll facilities of State Route 241 and State Route 91 Express Lanes to and from the east.

Contact Information

CALTRANS

Leo Chen, Project Manager
1750 E. 4th Street, Suite 100
Santa Ana, CA 92705
Office Phone: (657) 328-6301
Email: leo.chen@dot.ca.gov

FOOTHILL/EASTERN TRANSPORTATION CORRIDOR AGENCY

Juliet Su, Corridor Manager
125 Pacifica, Suite 100
Irvine, CA 92618
Office Phone: (949) 754-3430
Email: Jsu@thetollroads.com

Table of Contents

RECITALS 1
RESPONSIBILITIES 2
Sponsorship 2
Funding 2
Implementing Agency 3
Independent Quality Assurance 3
CEQA Lead Agency 3
Environmental Permits, Approvals and Agreements 4
Plans, Specifications, and Estimate (PS&E) 4
Right of Way (R/W) 4
Schedule 6
Additional Provisions 7
GENERAL CONDITIONS 10
DEFINITIONS 14
SIGNATURES 18
FUNDING SUMMARY No. 01 1
FUNDING TABLE 1
Funding 2
Invoicing and Payment 2
Plans, Specifications, and Estimate (PS&E) 2
Right of Way Support (R/W SUPPORT) 2
Right of Way Capital (R/W CAPITAL) 2
Signatures 3

Please note:
1. TCA'S R/W Support work is not covered by the Spending Summary.

COOPERATIVE AGREEMENT

State Independent Quality Assurance

This AGREEMENT, effective on February 17, 2017, is between the State of California, acting through its Department of Transportation, referred to as CALTRANS, and:

Foothill/Eastern Transportation Corridor Agency, a California joint powers authority, referred to hereinafter as F/ETCA.

RECITALS

1. PARTNERS are authorized to enter into a cooperative agreement for improvements to the state highway system (SHS) per the California Streets and Highways Code sections 114 and 130.

2. For the purpose of this AGREEMENT, *improvements including a direct connector between the toll facilities of State Route 241 and State Route 91 Express Lanes to and from the east* will be referred to hereinafter as PROJECT.

3. All responsibilities assigned in this AGREEMENT to complete the following PROJECT COMPONENTS will be referred to hereinafter as OBLIGATIONS:

    - Plans, Specifications, and Estimate (PS&E)
    - Right of Way Support (R/W SUPPORT)
    - Right of Way Capital (R/W CAPITAL)

4. This AGREEMENT is separate from and does not modify or replace any other cooperative agreement or memorandum of understanding between PARTNERS regarding the PROJECT.

5. The following work associated with this PROJECT has been completed or is in progress:

   - F/ETCA developed the Project Initiation Document, Project Study Report/Project Development Support (PSR-PDS), for the PROJECT which was approved by CALTRANS on January 17, 2012.

   - F/ETCA is developing the Supplemental Environmental Impact Report/Supplemental Environmental Impact Statement (SEIR/SEIS) anticipated to be delivered on June 27, 2017 (Cooperative Agreement No. 12-643).

   - F/ETCA is developing the Project Report anticipated to be delivered on July 4, 2017 (Cooperative Agreement No. 12-643).

6. In this AGREEMENT capitalized words represent defined terms, initialisms, or acronyms. The Definitions section contains a complete definition for each capitalized term.

7. PARTNERS hereby set forth the terms, covenants, and conditions of this AGREEMENT, under which they will accomplish OBLIGATIONS.

RESPONSIBILITIES

Sponsorship

8. F/ETCA is the SPONSOR for the PROJECT COMPONENTS in this AGREEMENT.

Funding

9. Funding sources, funding amounts, and invoicing/payment details are documented in the FUNDING SUMMARY. The FUNDING SUMMARY is incorporated and made an express part of this AGREEMENT.

   PARTNERS will execute a new FUNDING SUMMARY each time the funding details change. The FUNDING SUMMARY will be executed by a legally authorized representative of the respective PARTNERS. The most current fully executed FUNDING SUMMARY supersedes any previous FUNDING SUMMARY created for this AGREEMENT.

   Replacement of the FUNDING SUMMARY will not require an amendment to the body of this AGREEMENT unless the funding changes require it.

10. Each PARTNER is responsible for and shall pay directly all of the costs and expenses it incurs in performing the OBLIGATIONS of this AGREEMENT unless otherwise stated in this AGREEMENT.

Implementing Agency

11. F/ETCA is the IMPLEMENTING AGENCY for PS&E.

12. F/ETCA is the IMPLEMENTING AGENCY for RIGHT OF WAY.

13. The IMPLEMENTING AGENCY for a PROJECT COMPONENT will provide a Quality Management Plan (QMP) for that component as part of the PROJECT MANAGEMENT PLAN. The Quality Management Plan describes the IMPLEMENTING AGENCY's quality policy and how it will be used. The Quality Management Plan is subject to CALTRANS review and approval.

14. Any PARTNER responsible for completing WORK shall make its personnel and consultants that prepare WORK available to help resolve WORK-related problems and changes for the entire duration of the PROJECT including PROJECT COMPONENT work that may occur under separate agreements or memoranda.

Independent Quality Assurance

15. CALTRANS will provide Independent Quality Assurance for the portions of WORK within the existing and proposed SHS right-of-way.

    CALTRANS' Independent Quality Assurance efforts are to ensure that F/ETCA's quality assurance activities result in WORK being developed in accordance with the applicable standards and within an established Quality Management Plan. Independent Quality Assurance does not include any efforts necessary to develop or deliver WORK or any validation by verifying or rechecking work performed by another party.

    When CALTRANS performs Independent Quality Assurance it does so for its own benefit. No one can assign liability to CALTRANS due to its Independent Quality Assurance.

CEQA Lead Agency

16. CALTRANS is the California Environmental Quality Act (CEQA) Lead Agency for the PROJECT.

17. CALTRANS is the National Environmental Policy Act of 1969 (NEPA) lead agency for PROJECT, and will provide Quality Assurance/Quality Control for the development of the Environmental Document.

Environmental Permits, Approvals and Agreements

18. PARTNERS will comply with the commitments and conditions set forth in the environmental documentation, environmental permits, approvals, and applicable agreements as those commitments and conditions apply to each PARTNER's responsibilities in this AGREEMENT.

19. Unless otherwise assigned in this AGREEMENT, the IMPLEMENTING AGENCY for a PROJECT COMPONENT is responsible for all PROJECT COMPONENT WORK associated with coordinating, obtaining, implementing, renewing, and amending the PROJECT permits, agreements, and approvals whether they are identified in the planned project scope of work or become necessary in the course of completing the PROJECT.

Plans, Specifications, and Estimate (PS&E)

20. As IMPLEMENTING AGENCY for PS&E, F/ETCA is responsible for all PS&E WORK except those PS&E activities and responsibilities that are assigned to another PARTNER in this AGREEMENT and those activities that may be specifically excluded.

21. F/ETCA will prepare Utility Conflict Maps identifying the accommodation, protection, relocation, or removal of any existing utility facilities that conflict with construction of the PROJECT or that violate CALTRANS' encroachment policy.

    F/ETCA will provide CALTRANS a copy of Utility Conflict Maps for CALTRANS' concurrence prior to issuing the Notices to Owner and executing the Utility Agreement. All utility conflicts will be addressed in the PROJECT plans, specifications, and estimate.

Right of Way (R/W)

22. As the RIGHT OF WAY IMPLEMENTING AGENCY for R/W, F/ETCA is responsible for all R/W WORK except those activities and responsibilities that are assigned to another party in this AGREEMENT and those activities that may be specifically excluded.

23. The selection of personnel performing RIGHT-OF-WAY WORK will be in accordance with federal and California laws and regulations, and CALTRANS' policies, procedures, standards, practices, and applicable agreements.

24. F/ETCA will make all necessary arrangements with utility owners for the timely accommodation, protection, relocation, or removal of any existing utility facilities that conflict with construction of the PROJECT or that violate CALTRANS' encroachment policy.

25. F/ETCA will provide CALTRANS a copy of conflict maps, relocation plans, proposed notices to owner, reports of investigation, and utility agreements (if applicable) for CALTRANS' concurrence prior to issuing the notices to owner and executing the utility agreements. All utility conflicts will be fully addressed prior to Right of Way Certification and all arrangements for the protection, relocation, or removal of all conflicting facilities will be completed prior to construction contract award and included in the PROJECT plans, specifications, and estimate.

26. F/ETCA to provide all Right of Way Engineering (RWE) services for the project including but not limited to acquire Title Reports, prepare Land Net Map, prepare Right of Way and Record of Surveys Maps, prepare Acquisition Documents, prepare Resolution of Necessity and Plats, prepare Director's Deed and Plats, and prepare Parcel Files, as required for the PROJECT. All work shall be in accordance with State law and local regulation (the "Laws"), and surveying and mapping work affecting the STATE *Right of* Way in the PROJECT area shall be in accordance with the procedures and instructions contained in the *Caltrans District 12 R/W Engineering Requirements for the Preparation of Documents and Maps,* (the "Requirements"), published by Caltrans District 12, *R/'W* Engineering (D12 RWE), which by this reference are incorporated into this document and made a part hereof. A copy of the "Requirements" can be obtained from the Chief of D12RWE. Work shall not be considered complete until the Chief of D12RWE has approved the work for inclusion into D12RWE files.

27. F/ETCA will determine the cost to positively identify and locate, protect, relocate, or remove any utility facilities whether inside or outside SHS right-of-way in accordance with federal and California laws and regulations, and CALTRANS' policies, procedures, standards, practices, and applicable agreements including but not limited to Freeway Master Contracts as defined in Caltrans Right of Way Manual, Chapter 13 Utility Section 13.04.03.00.

28. F/ETCA will provide a land surveyor licensed in the State of California to be responsible for surveying and right-of-way engineering. All survey and right-of-way engineering documents will bear the professional seal, certificate number, registration classification, expiration date of certificate, and signature of the responsible surveyor.

29. F/ETCA will utilize a public agency currently qualified by CALTRANS or a properly licensed consultant for all right-of-way activities. A qualified right-of-way agent will administer all right-of-way consultant contracts.

    F/ETCA will submit a draft Right of Way Certification document to CALTRANS six (6) weeks prior to the scheduled Right of Way Certification milestone date for review.

    F/ETCA will submit a final Right of Way Certification to CALTRANS for approval prior to the advertising the construction contract.

30. Physical and legal possession of right-of-way must be completed prior to construction advertisement, unless PARTNERS mutually agree to other arrangements in writing. Right of way conveyances must be completed prior to OBLIGATION COMPLETION, unless PARTNERS mutually agree to other arrangements in writing.

31. If F/ETCA acquires any right-of-way to be incorporated into the State Highway System, F/ETCA shall first acquire in its own name. Title the State Highway System right-of-way shall ultimately be vested in the State.

32. CALTRANS' acceptance of right-of-way title is subject to review of an Updated Preliminary Title Report provided by F/ETCA verifying that the title is free of all encumbrances and liens in writing. Upon acceptance, F/ETCA will provide CALTRANS with a Policy of Title Insurance in CALTRANS' name.

    F/ETCA agrees to first acquire any necessary rights-of-way for the PROJECT it its own name. Prior to the closeout of this AGREEMENT, F/ETCA shall transfer title to said rights-of-way to CALTRANS, free and clear of all encumbrances and liens, except as to those items which CATRANS agrees are not in conflict with CALTRANS' use for highway proposes. CALTRANS' acceptance of right-of-way title is subject to review of an updated preliminary title report provided by F/ETCA. The PARTNERS shall cooperate and use their best efforts to ensure the transfer of title of properties incorporated into the SHS right of way is accomplished no more than 90 days after presentation of properties for acceptance. Upon acceptance, F/ETCA will provide CALTRANS with a policy of title insurance in CALTRANS' name.

33. F/ETCA certifies that it is authorized to hear and, if appropriate, adopt Resolutions of Necessity for PROJECT. F/ETCA agrees to be responsible for hearing and adopting Resolutions of Necessity for PROJECT. F/ETCA is responsible for all work associated with hearing and adopting Resolutions of Necessity for PROJECT.

    F/ETCA shall follow its standard policies and procedures for acquisitions of real property necessary for the PROJECT in accordance with all applicable state and federal laws, rules, and requirements.

Schedule

34. PARTNERS will manage the schedule for OBLIGATIONS through the work plan included in the PROJECT MANAGEMENT PLAN.

35. CALTRANS shall review and provide written comments to all initial submittals within 21 calendar days and resubmittals within 21 calendar days of the date of transmittal to the District office for timely processing of PROJECT documents, including providing quality assurance review and approvals consistent with its existing policies, for all WORK.

    Whenever CALTRANS approval is required by the terms of this Agreement, that approval shall not be unreasonably withheld or delayed.

Maintenance

36. The maintenance responsibility of PROJECT, on State Route 241 and up to the point where the direct connector joins State Route 91 Express Lanes, will be per Cooperative Agreement 12-081.

Additional Provisions

37. PARTNERS will perform all OBLIGATIONS in accordance with federal and California laws, regulations, and published standards; FHWA STANDARDS; and CALTRANS STANDARDS current as of the date of performance. Approvals required hereunder shall not be withheld unreasonably. F/ETCA will consult with CALTRANS with regard to any comments submitted by CALTRANS reviewers that are not required to be incorporated in any PROJECT deliverables under the foregoing criteria.

38. CALTRANS retains the right to reject noncompliant WORK, protect public safety, preserve property rights, and ensure that all WORK is in the best interest of the SHS.

39. Each PARTNER will ensure that personnel participating in OBLIGATIONS are appropriately qualified or licensed to perform the tasks assigned to them.

40. PARTNERS will invite each other to participate in the selection of any consultants who participate in OBLIGATIONS.

41. Within 28 calendar days of receipt by CALTRANS of proper application, CALTRANS will issue the encroachment permits required for WORK within SHS right-of-way. PARTNERS will not permit their contractors and/or agents, or utility owners to perform work within the SHS right-of-way without an encroachment permit issued in their name. CALTRANS will provide encroachment permits to PARTNERS, their contractors, consultants and agents, at no cost. If the encroachment permit and this AGREEMENT conflict, the requirements of this AGREEMENT shall prevail.

42. The IMPLEMENTING AGENCY for a PROJECT COMPONENT will coordinate, prepare, obtain, implement, renew, and amend any encroachment permits needed to complete the PROJECT COMPONENT WORK.

43. If any PARTNER discovers unanticipated cultural, archaeological, paleontological, or other protected resources during WORK, all WORK in that area will stop and that PARTNER will notify all PARTNERS within one (1) working day of discovery. WORK may only resume after a qualified professional has evaluated the nature and significance of the discovery and a plan is approved for its removal or protection.

44. PARTNERS will hold all administrative drafts and administrative final reports, studies, materials, and documentation relied upon, produced, created, or utilized for the PROJECT in confidence to the extent permitted by law and where applicable, the provisions of California Government Code section 6254.5(e) shall protect the confidentiality of such documents in the event that said documents are shared between PARTNERS.

    PARTNERS will not distribute, release, or share said documents with anyone other than employees, agents, and consultants who require access to complete the PROJECT without the written consent of the PARTNER authorized to release them, unless required or authorized to do so by law.

45. If a PARTNER receives a public records request pertaining to OBLIGATIONS, that PARTNER will notify the other PARTNER within five (5) working days of receipt and make such PARTNER aware of any disclosed public documents. PARTNERS will consult with each other prior to the release of any public documents related to the PROJECT.

46. If HM-1 or HM-2 is found during performance of the WORK, the IMPLEMENTING AGENCY will immediately notify the other PARTNER.

47. CALTRANS, independent of the PROJECT, is responsible for any HM-1 found within the existing SHS right-of-way. CALTRANS will undertake, or cause to be undertaken, HM MANAGEMENT ACTIVITIES related to HM-1 with minimum impact to the PROJECT schedule.

    CALTRANS, independent of the PROJECT will pay, or cause to be paid, the cost of HM MANAGEMENT ACTIVITIES related to HM-1 found within the existing SHS right-of-way.

48. If HM-1 is found within the PROJECT limits and outside the existing SHS right-of-way, responsibility for such HM-1 rests with the owner(s) of the parcel(s) on which the HM-1 is found. F/ETCA, in concert with the local agency having land use jurisdiction over such parcel(s), will ensure that HM MANAGEMENT ACTIVITIES related to HM-1 are undertaken with minimum impact to PROJECT schedule.

    The costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within the PROJECT limits and outside the existing SHS right-of-way will be the responsibility of the owner(s) of the parcel(s) where the HM-1 is located.

49. If HM-2 is found within the PROJECT limits, the public agency responsible for the advertisement, award, and administration (AAA) of the PROJECT construction contract will be responsible for HM MANAGEMENT ACTIVITIES related to HM-2.

50. CALTRANS' acquisition or acceptance of title to any property on which any HM-1 or HM-2 is found will proceed in accordance with CALTRANS' policy on such acquisition.

51. F/ETCA will accept, reject, compromise, settle, or litigate claims of any non-AGREEMENT parties hired to complete OBLIGATIONS.

52. PARTNERS will confer on any potential future claim that may affect OBLIGATIONS or PARTNERS' liability or responsibility under this AGREEMENT in order to retain resolution possibilities for potential future claims. No PARTNER will prejudice the rights of another PARTNER until after PARTNERS confer on the claim.

53. If the PROJECT expends state or federal funds, each PARTNER will comply with the federal Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards of 2 CFR, Part 200. PARTNERS will ensure that any for-profit party hired to participate in the OBLIGATIONS will comply with the requirements in 48 CFR, Chapter 1, Part 31. When state or federal funds are expended on the PROJECT these principles and requirements apply to all funding types included in this AGREEMENT.

54. Each PARTNER that expends state or federal funds on the PROJECT will undergo an annual audit in accordance with the Single Audit Act and the federal Office of Management and Budget (OMB) Circular A-133.

55. If federal funds are expended for the PROJECT, any PARTNER that hires an Architectural & Engineering (A&E) consultant to perform WORK on any part of the PROJECT will ensure that the procurement of the consultant and the consultant overhead costs are in accordance with Chapter 10 of the *Local Assistance Procedures Manual*.

56. If WORK stops for any reason, IMPLEMENTING AGENCY will place the PROJECT right-of-way in a safe and operable condition acceptable to CALTRANS.

57. If WORK stops for any reason, each PARTNER will continue to implement all of its applicable commitments and conditions included in the PROJECT environmental documentation, permits, agreements, or approvals that are in effect at the time that WORK stops, as they apply to each PARTNER's responsibilities in this AGREEMENT, in order to keep the PROJECT in environmental compliance until WORK resumes.

58. Fines, interest, or penalties levied against a PARTNER will be paid by the PARTNER whose action or lack of action caused the levy.

59. If there are insufficient funds available in this AGREEMENT to place PROJECT right-of-way in a safe and operable condition, the appropriate IMPLEMENTING AGENCY will fund these activities until such time as PARTNERS amend this AGREEMENT and fund activities necessary to place the PROJECT right-of-way in a safe and operable condition acceptable to CALTRANS, and the PARTNERS shall undertake to amend this AGREEMENT to address the funding shortfall.

60. F/ETCA will furnish CALTRANS with the Project History Files related to the PROJECT facilities on SHS within sixty (60) days following the completion of each PROJECT COMPONENT. F/ETCA will prepare the Project History Files in accordance with the Project Development Procedures Manual, Chapter 7. All material will be submitted neatly in a three-ring binder and on a CD ROM in PDF format.

GENERAL CONDITIONS

61. PARTNERS understand that this AGREEMENT is in accordance with and governed by the Constitution and laws of the State of California. This AGREEMENT will be enforceable in the State of California. Any PARTNER initiating legal action arising from this AGREEMENT will file and maintain that legal action in the Superior Court of the county in which the CALTRANS district office that is signatory to this AGREEMENT resides, or in the Superior Court of the county in which the PROJECT is physically located.

62. All CALTRANS' OBLIGATIONS under this AGREEMENT are subject to the appropriation of resources by the Legislature, the State Budget Act authority, and the allocation of funds by the California Transportation Commission.

63. Neither F/ETCA nor any officer or employee thereof is responsible for any injury, damage or liability occurring by reason of anything done or omitted to be done by CALTRANS, its contractors, sub-contractors, and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon CALTRANS under this AGREEMENT. It is understood and agreed that CALTRANS, to the extent permitted by law, will defend, indemnify, and save harmless F/ETCA and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories and assertions of liability occurring by reason of anything done or omitted to be done by CALTRANS, its contractors, sub-contractors, and/or its agents under this AGREEMENT.

64. Neither CALTRANS nor any officer or employee thereof is responsible for any injury, damage, or liability occurring by reason of anything done or omitted to be done by F/ETCA, its contractors, sub-contractors, and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon F/ETCA under this AGREEMENT. It is understood and agreed that F/ETCA, to the extent permitted by law, will defend, indemnify, and save harmless CALTRANS and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories and assertions of liability occurring by reason of anything done or omitted to be done by F/ETCA, its contractors, sub-contractors, and/or its agents under this AGREEMENT.

65. PARTNERS do not intend this AGREEMENT to create a third party beneficiary or define duties, obligations, or rights in parties not signatory to this AGREEMENT. PARTNERS do not intend this AGREEMENT to affect their legal liability by imposing any standard of care for fulfilling OBLIGATIONS different from the standards imposed by law.

66. PARTNERS will not assign or attempt to assign OBLIGATIONS to parties not signatory to this AGREEMENT without an amendment to this AGREEMENT.

67. F/ETCA waives the provisions of California Civil Code section 1654. A waiver of a PARTNER's performance under this AGREEMENT will not constitute a continuous waiver of any other provision.

68. A delay or omission to exercise a right or power due to a default does not negate the use of that right or power in the future when deemed necessary.

69. If any PARTNER defaults in its OBLIGATIONS, a non-defaulting PARTNER will request in writing that the default be remedied within thirty (30) calendar days. If the defaulting PARTNER fails to do so, the non-defaulting PARTNER may initiate dispute resolution.

70. PARTNERS will first attempt to resolve AGREEMENT disputes at the PROJECT team level. If they cannot resolve the dispute themselves, the CALTRANS district director and the chief executive officer of F/ETCA will attempt to negotiate a resolution. If PARTNERS do not reach a resolution, PARTNERS' legal counsel will initiate mediation. PARTNERS agree to participate in mediation in good faith and will share equally in its costs.

    Neither the dispute nor the mediation process relieves PARTNERS from full and timely performance of OBLIGATIONS in accordance with the terms of this AGREEMENT. However, if any PARTNER stops fulfilling OBLIGATIONS, any other PARTNER may seek equitable relief to ensure that OBLIGATIONS continue.

    Except for equitable relief, no PARTNER may file a civil complaint until after mediation, or forty-five (45) calendar days after filing the written mediation request, whichever occurs first.

    PARTNERS will file any civil complaints in the Superior Court of the county in which the CALTRANS district office signatory to this AGREEMENT resides or in the Superior Court of the county in which the PROJECT is physically located. The prevailing PARTNER will be entitled to an award of all costs, fees, and expenses, including reasonable attorney fees as a result of litigating a dispute under this AGREEMENT or to enforce the provisions of this article including equitable relief.

71. PARTNERS maintain the ability to pursue alternative or additional dispute remedies if a previously selected remedy does not achieve resolution.

72. If any provisions in this AGREEMENT are found by a court of competent jurisdiction to be, or are in fact, illegal, inoperative, or unenforceable, those provisions do not render any or all other AGREEMENT provisions invalid, inoperative, or unenforceable, and those provisions will be automatically severed from this AGREEMENT.

73. If during performance of WORK additional activities or environmental documentation is necessary to keep the PROJECT in environmental compliance, PARTNERS will amend this AGREEMENT to include completion of those additional tasks.

74. Except as otherwise provided in the AGREEMENT, PARTNERS will execute a formal written amendment if there are any changes to OBLIGATIONS.

75. When WORK performed on the PROJECT is done under contract and falls within the Labor Code section 1720(a)(1) definition of "public works" in that it is construction, alteration, demolition, installation, or repair; or maintenance work under Labor Code section 1771, PARTNERS shall conform to the provisions of Labor Code sections 1720 through 1815, and all applicable provisions of California Code of Regulations found in Title 8, Division 1, Chapter 8, Subchapter 3, Articles 1-7. PARTNERS shall include prevailing wage requirements in contracts for public work and require contractors to include the same prevailing wage requirements in all subcontracts. Work performed by a PARTNER's own employees is exempt from the Labor Code's Prevailing Wage requirements.

76. If WORK is paid for, in whole or part, with federal funds and is of the type of work subject to federal prevailing wage requirements, PARTNERS shall conform to the provisions of the Davis-Bacon and Related Acts, 40 U.S.C. § 276(a).

    When applicable, PARTNERS shall include federal prevailing wage requirements in contracts for public work. WORK performed by a PARTNER's employees is exempt from federal prevailing wage requirements.

77. PARTNERS agree to sign a CLOSURE STATEMENT to terminate this AGREEMENT. However, all indemnification, document retention, audit, claims, environmental commitment, legal challenge, maintenance and ownership articles will remain in effect until terminated or modified in writing by mutual agreement or expire by the statute of limitations.

78. PARTNERS intend this AGREEMENT to be their final expression that supersedes any oral understanding or writings pertaining to the OBLIGATIONS. The requirements of this agreement shall preside over any conflicting requirements in any documents that are made an express part of this AGREEMENT.

DEFINITIONS

AGREEMENT – This agreement including any attachments, exhibits, and amendments.

CALTRANS STANDARDS – CALTRANS policies and procedures, including, but not limited to, the guidance provided in the Project Development Procedures Manual (PDPM) and the CALTRANS Workplan Standards Guide for the Delivery of Capital Projects (WSG) [which contains the CALTRANS Work Breakdown Structure (WBS) and was previously known as the WBS Guide] and is available at http://www.dot.ca.gov/hq/projmgmt/guidance.htm.

CEQA (California Environmental Quality Act) – The act (California Public Resources Code, sections 21000 et seq.) that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those significant impacts, if feasible.

CFR (Code of Federal Regulations) – The general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government.

CLOSURE STATEMENT – A document signed by PARTNERS that verifies the completion of all OBLIGATIONS included in this AGREEMENT and in all amendments to this AGREEMENT.

FHWA – Federal Highway Administration.

FHWA STANDARDS – FHWA regulations, policies and procedures, including, but not limited to, the guidance provided at www.fhwa.dot.gov/topics.htm.

FUNDING PARTNER – A PARTNER that commits funds in this AGREEMENT to fulfill OBLIGATIONS. A FUNDING PARTNER accepts the responsibility to provide the funds it commits in this Agreement.

FUNDING SUMMARY – An executed document that includes a FUNDING TABLE and invoicing and payment methods.

FUNDING TABLE – The table that designates funding sources, types of funds, and the PROJECT COMPONENT in which the funds are to be spent. Funds listed on the FUNDING TABLE are "not-to-exceed" amounts for each FUNDING PARTNER.

GAAP (Generally Accepted Accounting Principles) – Uniform minimum standards and guidelines for financial accounting and reporting issued by the Federal Accounting Standards Advisory Board that serve to achieve some level of standardization. See http://www.fasab.gov/accepted.html.

HM-1 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law whether it is disturbed by the PROJECT or not.

HM-2 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law only if disturbed by the PROJECT.

HM MANAGEMENT ACTIVITIES – Management activities related to either HM-1 or HM-2 including, without limitation, any necessary manifest requirements and disposal facility designations.

IMPLEMENTING AGENCY – The PARTNER responsible for managing the scope, cost, and schedule of a PROJECT COMPONENT to ensure the completion of that component.

IQA (Independent Quality Assurance) – CALTRANS' efforts to ensure that another PARTNER's quality assurance activities are in accordance with the applicable standards and the PROJECT's Quality Management Plan (QMP). When CALTRANS performs Independent Quality Assurance it does not develop, produce, validate, verify, re-check, or quality control another PARTNER's work products.

NEPA (National Environmental Policy Act of 1969) – This federal act establishes a national policy for the environment and a process to disclose the adverse impacts of projects with a federal nexus.

OBLIGATIONS – All WORK responsibilities and their associated costs.

OBLIGATION COMPLETION – PARTNERS have fulfilled all OBLIGATIONS included in this AGREEMENT and have signed a COOPERATIVE AGREEMENT CLOSURE STATEMENT.

PARTNER – Any individual signatory party to this AGREEMENT.

PARTNERS – The term that collectively references all of the signatory agencies to this AGREEMENT. This term only describes the relationship between these agencies to work together to achieve a mutually beneficial goal. It is not used in the traditional legal sense in which one PARTNER's individual actions legally bind the other PARTNER.

PROJECT COMPONENT – A distinct portion of the planning and project development process of a capital project as outlined in California Government Code, section 14529(b).

- PID (Project Initiation Document) – The work required to deliver the project initiation document for the PROJECT in accordance with CALTRANS STANDARDS.
    - PA&ED (Project Approval and Environmental Document) – The work required to deliver the project approval and environmental documentation for the PROJECT in accordance with CALTRANS STANDARDS.
    - PS&E (Plans, Specifications, and Estimate) – The work required to deliver the plans, specifications, and estimate for the PROJECT in accordance with CALTRANS STANDARDS.
    - R/W (Right of Way) –The project components for the purpose of acquiring real property interests for the PROJECT in accordance with CALTRANS STANDARDS.
- R/W (Right of Way) SUPPORT –The work required to obtain all property interests for the PROJECT.
- R/W (Right of Way) CAPITAL – The funds for acquisition of property rights for the PROJECT.
- CONSTRUCTION – The project components for the purpose of completing the construction of the PROJECT in accordance with CALTRANS STANDARDS.
- CONSTRUCTION SUPPORT – The work required for the administration, acceptance, and final documentation of the construction contract for the PROJECT.
- CONSTRUCTION CAPITAL – The funds for the construction contract.

PROJECT MANAGEMENT PLAN – A group of documents used to guide the PROJECT's execution and control throughout that project's lifecycle.

PS&E (Plans, Specifications, and Estimate) – See PROJECT COMPONENT.

QMP (Quality Management Plan) – An integral part of the PROJECT MANAGEMENT PLAN that describes IMPLEMENTING AGENCY's quality policy and how it will be used.

R/W (Right of Way) CAPITAL – See PROJECT COMPONENT.

R/W (Right of Way) SUPPORT – See PROJECT COMPONENT.

SHS (State Highway System) – All highways, right-of-way, and related facilities acquired, laid out, constructed, improved, or maintained as a state highway pursuant to constitutional or legislative authorization.

SPONSOR – Any PARTNER that accepts the responsibility to establish scope of the PROJECT and the obligation to secure financial resources to fund the PROJECT COMPONENTS in this AGREEMENT. A SPONSOR is responsible for adjusting the PROJECT scope to match committed funds or securing additional funds to fully fund the PROJECT COMPONENTS in this AGREEMENT. If this AGREEMENT has more than one SPONSOR, funding adjustments will be made by percentage (as outlined in Responsibilities). Scope adjustments must be developed through the project development process and must be approved by CALTRANS as the owner/operator of the SHS.

WORK – All efforts to complete the responsibilities included in this AGREEMENT as described by the activities in the CALTRANS Workplan Standards Guide for the Delivery of Capital Projects (WSG).

SIGNATURES

PARTNERS are empowered by California Streets and Highways Code section 114 and 130 to enter into this AGREEMENT and have delegated to the undersigned the authority to execute this AGREEMENT on behalf of the respective agencies and covenants to have followed all the necessary legal requirements to validly execute this AGREEMENT.

Signatories may execute this AGREEMENT through individual signature pages provided that each signature is an original. This AGREEMENT is not fully executed until all original signatures are attached.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Adnan Maiah
Deputy District Director
Capital Outlay Program

Certified as to funds:

for Neda Saber
District Budget Manager

APPROVED AS TO FORM AND PROCEDURE:

By: _____

FOOTHILL/EASTERN TRANSPORTATION CORRIDOR AGENCY

Michael Kraman
Chief Executive Officer

Attest:

Martha M. Ochoa,
Clerk of the Board

Approved as to form and procedure:

E. George Joseph
General Counsel

FUNDING SUMMARY

v. 12

FUNDING TABLE

		IMPLEMENTING AGENCY →	F/ETCA	F/ETCA		
Source	FUNDING PARTNER	Fund Type	PS&E	R/W SUPPORT	R/W CAPITAL	Totals
Local	F/ETCA	Local	25,000,000	0	500,000	25,500,000
		Totals	25,000,000	0	500,000	25,500,000

Funding

F/ETCA will fund one hundred percent (100%) of all WORK costs, except for costs associated with any CALTRANS OBLIGATIONS or WORK to be performed by CALTRANS under this AGREEMENT.

CALTRANS will perform all OBLIGATIONS and WORK to be performed by it at no cost to F/ETCA.

CALTRANS, other than the duty to provide and perform all OBLIGATIONS and WORK assigned to it herein at no cost to F/ETCA, has no funds allocated to PROJECT and F/ETCA will have no right to seek a CALTRANS contribution of funds under the terms of this AGREEMENT.

Invoicing and Payment

Plans, Specifications, and Estimate (PS&E)

1. No invoicing or reimbursement will occur for the PS&E PROJECT COMPONENT.

Right of Way Support (R/W SUPPORT)

2. No invoicing or reimbursement will occur for the R/W SUPPORT PROJECT COMPONENT.

Right of Way Capital (R/W CAPITAL)

3. No invoicing or reimbursement will occur for the R/W CAPITAL PROJECT COMPONENT.

Signatures

PARTNERS are empowered by California Streets and Highways Code sections 114 and 130 to enter into this AGREEMENT and have delegated to the undersigned the authority to execute this FUNDING SUMMARY on behalf of the respective agencies and represent that they have followed all the necessary legal requirements to validly execute this FUNDING SUMMARY.

Signatories may execute this FUNDING SUMMARY through individual signature pages provided that each signature is an original. This FUNDING SUMMARY is not fully executed until all original signatures are attached.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Adnan Maiah

Adnan Maiah
Deputy District Director
Capital Outlay Program

Date 2/17/2017

FOOTHILL/EASTERN TRANSPORTATION CORRIDOR AGENCY

David W. Lowe
Chief Engineer

Date 1/31/17

for Neda Saber
District Budget Manager
For Darwin Salmas

HQ Accounting

Summary

S.1 NEPA Assignment

California participated in the "Surface Transportation Project Delivery Pilot Program" (Pilot Program) pursuant to 23 United States Code (USC) 327, for more than 5 years, beginning July 1, 2007, and ending September 30, 2012. MAP-21 (P.L. 112-141), signed by President Obama on July 6, 2012, amended 23 USC 327 to establish a permanent Surface Transportation Project Delivery Program. As a result, the California Department of Transportation (Caltrans) entered into a Memorandum of Understanding (MOU) pursuant to 23 USC 327 (National Environmental Policy Act [NEPA] Assignment MOU) with the Federal Highway Administration (FHWA). The NEPA Assignment MOU became effective October 1, 2012, and was renewed on December 23, 2016, for a term of 5 years. In summary, Caltrans continues to assume FHWA responsibilities under NEPA and other federal environmental laws in the same manner as was assigned under the Pilot Program, with minor changes. With NEPA Assignment, FHWA assigned, and Caltrans assumed, all of the United States Department of Transportation (USDOT) Secretary's responsibilities under NEPA. This assignment includes projects on the State Highway System and Local Assistance Projects off of the State Highway System within the State of California, except for certain categorical exclusions that FHWA assigned to Caltrans under the 23 USC 326 Categorical Exclusion Assignment MOU, projects excluded by definition, and specific project exclusions.

S.2 Joint CEQA/NEPA Document

The Proposed Project is a joint project by Caltrans and the FHWA, and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and NEPA. Caltrans is the lead agency under both CEQA and NEPA. In addition, FHWA's responsibility for environmental review, consultation, and any other action required by applicable Federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 USC 327 and the MOU dated December 23, 2016, and executed by FHWA and Caltrans.

Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA. Because NEPA is concerned with the

significance of the Project as a whole, often a "lower level" document is prepared for NEPA.

This Final Supplemental Environmental Impact Report/Environmental Impact Statement (EIR/EIS) includes responses to comments received on the Draft Supplemental EIR/EIS (Chapter 5) and identifies the Preferred Alternative (the Build Alternative). Locations in this Final Supplemental EIR/EIS where changes were made to the document following publication of the Draft Supplemental EIR/EIS are underlined and shown with a vertical line in the side margin.

As the owner-operator and lead agency, Caltrans is the approving agency for the Proposed Project. Upon approval of the Proposed Project, a Notice of Determination will be published for compliance with CEQA. With respect to the National Environmental Policy Act (NEPA), Caltrans, as assigned by the FHWA, will document and explain its decision regarding the selected alternative, project impacts, and mitigation measures in a Record of Decision (ROD).

Caltrans, in cooperation with the Foothill/Eastern Transportation Corridor Agency (F/ETCA) (responsible agency pursuant to the *State CEQA Guidelines* Section 15381 and sponsoring agency), proposes the State Route 241 (SR-241)/State Route 91 (SR-91) Tolled Express Lanes Connector Project (Proposed Project) to construct a median-to-median connector between SR-241 and the tolled lanes in the median of SR-91 (*91 Express Lanes*). SR-241 is a tolled facility, starting at the Oso Parkway interchange, in south Orange County, to its terminus at SR-91. The Orange County Transportation Authority (OCTA) *91 Express Lanes* is a tolled facility, two lanes in each direction, located in the median of SR-91, from State Route 55 (SR-55), to the Orange/Riverside County Line (east of the SR-241 interchange). The existing junction of SR-241 and SR-91 connects all lanes of northbound SR-241 to the non-tolled, general-purpose lanes of eastbound and westbound SR-91 and the eastbound and westbound SR-91 to southbound SR-241. There is currently no direct connection between the SR-241 and the *91 Express Lanes*.

S.3 Project Background/History

In May 1994, F/ETCA, in cooperation with Caltrans/FHWA, prepared and approved a Final EIR and Final EIS to construct the Eastern Transportation Corridor (ETC) (SR-241) as a limited access highway (tollway), starting at the Santa Ana Freeway (Interstate 5/State Route 133 [I-5/SR-133)]) interchange, to its terminus at SR-91.

The Systems Management Concept (SMC)[1] for the ETC projected that each Build Alternative would be staged, incorporating general-purpose traffic and eventually high-occupancy vehicle (HOV) "carpool" lanes, to meet the forecasted demand. Under the SMC, ETC construction would be completed in one stage, with three or more phases.

The Preferred Alternative selected for the ETC as documented in the Final EIR and Final EIS included a single alignment called the North Leg through Gypsum and Blind Canyons transitioning to the East Leg south of Santiago Canyon Road. The East Leg crosses Loma Ridge near Rattlesnake Canyon, extends southeasterly toward Siphon Reservoir where the ETC interchanges with the Foothill Transportation Corridor (FTC) and then extends southerly along the Orange County Great Park to the I-5/SR-133 interchange. Construction of the ETC began in 1996 and finished in 1998.

The Proposed Project is a later phase of the ETC. It was originally evaluated as an SR-241/SR-91 HOV direct connector in the 1991 ETC Draft EIR/EIS, the 1992 ETC Final EIR, and the 1994 ETC Final EIS.

To implement this later phase of the ETC, this Supplemental EIR/EIS has been prepared to:

- Focus on the northern end of the original project
- Address changes to environmental conditions and regulatory requirements
- Address the extended Project Limits on SR-91 to the east; and
- Comply with 23 Code of Federal Regulations (CFR) 771.129(b): *A written evaluation of the final EIS will be required before further approvals may be granted if major steps to advance the action (e.g., authority to undertake final design, authority to acquire a significant portion of the right-of-way, or approval of the plans, specifications, and estimates) have not occurred within three years after the approval of the final EIS.*…Because the SR-241/SR-91 Express Lanes Connector design was postponed longer than 3 years after the ETC Final EIS approval, the median-to-median connector is required to be re-evaluated in compliance with NEPA.

[1] The SMC defines the environment in which the freeway is to operate, and the needs of the users. It is a tool by which regions, agencies, and traffic management centers identify the optimal solution on their preferred approach, capabilities, and constraints.

S.4 Purpose and Need

The Project Purpose is a set of objectives the Proposed Project is intended to meet. The Project Need is the range of transportation deficiencies that the Proposed Project was initiated to address.

S.4.1 Purpose of the Proposed Project

In addition to the originally intended objectives of the ETC, changed circumstances at the junction of SR-241 and SR-91 have led to the following objectives for the Proposed Project:

- Implement the build out of the ETC, as approved in 1994
- Attain compatibility with the SR-91 mainline and SR-91 Express Lanes
- Improve traffic flow and operations by reducing weaving across multiple general-purpose lanes between the SR-91 Express Lanes and the SR-241 general-purpose lane connectors
- Enhance the efficiency of the tolled system, thereby reducing congestion on the non-tolled system on the SR-91

S.4.2 Need for the Proposed Project

There is a need for improved access between SR-241 and SR-91. Roadway deficiencies are described below:

- Demand exceeds capacity on the northbound SR-241 connector to the eastbound SR-91 and on the westbound SR-91 connector to the southbound SR-241
- Northbound vehicles on SR-241 cannot access the eastbound SR-91 Express Lanes.
- Westbound SR-91 Express Lanes motorists cannot access southbound SR-241.
- The weaving between the general-purpose connectors and the median lanes is an issue because it degrades the level of service due to increased vehicle density. In addition, the weaving operations contribute to sideswipe accidents.

S.5 Project Description

The Proposed Project proposes to improve access and reduce congestion at the SR-241/SR-91 interchange by providing a direct connector between SR-241 and the *91 Express Lanes*. The Proposed Project, located in the cities of Anaheim, Yorba Linda, and Corona, and the counties of Orange and Riverside is proposed to be a tolled facility with a total length of approximately 8.7 miles (mi).

The improvements for the connector include 5.9 mi in the cities of Anaheim and Yorba Linda and unincorporated areas of Orange and Riverside counties, from south of Windy Ridge Wildlife Undercrossing on SR-241 to Coal Canyon Undercrossing on SR-91. The remaining 2.8 mi of the Proposed Project include signage improvements (advance signage) in the cities of Anaheim (1.2 mi), Yorba Linda (0.1 mi), and Corona (1.5 mi) and unincorporated Orange and Riverside counties, with exact placement of the signage pending the Final Design process. The Proposed Project is mostly within existing Caltrans right-of-way, with one partial acquisition required adjacent to eastbound SR-91. Construction access and staging areas would occur within existing Caltrans right-of-way. The area where the partial acquisition would be located, adjacent to eastbound SR-91, would be used for construction access but not for construction staging. The partial acquisition would not result in the displacement or relocation of any residents or businesses.

This Supplemental EIR/EIS includes a No Build Alternative and only one Build Alternative (Preferred Alternative) for the median-to-median connector for the following reasons:

- The median-to-median connector is a component of a previously approved project and alternative selected during the 1992 EIR Certification and 1994 ROD for the original ETC project;
- Various alternatives were studied for the previously approved project that included consideration of a reasonable range of potentially feasible alternatives; and
- There are limited locations for a median-to-median connector between SR-241 and SR-91.

S.5.1 Build Alternative (Two-Lane Tolled Express Lanes Connector) (Preferred Alternative)

The Build Alternative would construct a two-lane tolled express lane median-to-median connector between SR-241 and SR-91, which would connect lanes from the median of northbound SR-241 to the existing eastbound median *91 Express Lanes*. The reverse movement would also be accommodated, from the westbound median *91 Express Lanes* to the median of southbound SR-241.

The Build Alternative would merge into the existing *91 Express Lanes* at Coal Canyon Undercrossing. The Riverside County Transportation Commission's (RCTC) SR-91 CIP Initial Phase extended the express lanes on SR-91 east to Interstate 15

(I-15) and opened to traffic on March 20, 2017. The Build Alternative is compatible with the approved SR-91 CIP for both the initial and ultimate configurations, including the number and widths of the express lanes, express auxiliary lanes, and general-purpose lanes.

On March 24, 2016, the Project Development Team evaluated the Build Alternative and the No Build Alternative to develop a recommendation to Caltrans for the Preferred Alternative. Due to the fact that there was only one Build Alternative, no systematic criteria were developed to compare the Build Alternative to the No Build Alternative. However, the reasons for selecting the Build Alternative as the Preferred Alternative include:

- Meeting the Proposed Project's Purpose and Need
- Consistency with the planned facility
- Consistency with regional transportation and air quality planning

In addition, the environmental impacts of the Build Alternative were in an acceptable range (all substantial environmental impacts can be avoided, minimized, or mitigated) when compared to the No Build Alternative. The Build Alternative would implement the selected alternative in the ETC Final EIR and ROD for the Final EIS. While the Build Alternative meets the Proposed Project's Purpose and Need, the identification of it as the Preferred Alternative was also based upon the following factors:

- Various alternatives were studied for the previously approved project that included consideration of a reasonable range of potentially feasible alternatives; and
- There are limited locations for a median-to-median connector between SR-241 and SR-91.

The following sections describe the permanent and temporary features of the Build Alternative. Additional details and a corresponding figure are provided in Chapter 2.

S.5.1.1 Permanent Project Features

New Lanes and Roadway Alignment

Improvements on Southbound SR-241

On southbound SR-241, an additional lane and shoulder would be provided by widening Windy Ridge Wildlife Undercrossing into the existing median and improving the highway median for approximately 10,000 feet (ft) to the north.

Improvements on Northbound SR-241

Starting approximately 3,700 ft north of the Windy Ridge Wildlife Undercrossing, an additional lane and shoulder would be provided by widening into the existing highway median for approximately 5,000 ft. The two express (northbound and southbound) connector lanes would converge in the existing SR-241 median on fill for approximately 800 ft. The connector then spans over the existing northbound SR-241 to the westbound SR-91 general-purpose lane connector and the SR-91/ Gypsum Canyon Road interchange on two new bridge structures approximately 570 ft and 1,590 ft in length, respectively (to merge in the median of SR-91).

Improvements on Eastbound SR-91

To accommodate the addition of the median-to-median connector, eastbound SR-91 would be realigned to the south. The northbound SR-241 to eastbound 91 Express Lanes connector would continue on eastbound SR-91, ending approximately 1,000 ft west of Coal Canyon Undercrossing. An eastbound auxiliary express lane would be constructed within the 91 Express Lanes. The proposed auxiliary express lane would begin approximately 2,000 ft east of Gypsum Canyon Road Undercrossing to Coal Canyon Undercrossing joining the initial phase of the SR-91 CIP at Coal Canyon Undercrossing. These improvements would provide a four-lane express lane facility, tapering down to three lanes between the connector and Coal Canyon Undercrossing. The number of existing eastbound SR-91 general-purpose lanes would be maintained within the project limits. The eastbound 91 Express Lanes would have a 4 ft buffer on the right separating the general-purpose lanes, and a 4 ft buffer to the left separating the express connector lane. The buffers would transition to 0 ft to join the SR-91 CIP at the eastern terminus of the Project Limits. Approximately 4,500 ft west of Coal Canyon Undercrossing, grading into an existing slope on the south side of SR-91 would be required to accommodate the realigned eastbound SR-91 lanes. The grading would span approximately 1,300 ft along eastbound SR-91. A maintenance access road would be provided along the edge of slope grading. The purpose of the access road is to maintain the slope and facilitate a smooth and seamless transition where natural and built slopes intersect. These improvements would provide a four-lane express lane facility, tapering down to three lanes between the connector and Coal Canyon Undercrossing.

Improvements on Westbound SR-91

At the eastern terminus of the Project, the westbound *91 Express Lanes* would be restriped and the median widened to accommodate the addition of the express connector lane within the *91 Express Lanes* to the southbound SR-241 median-to-

median connector. The connector lane would begin approximately 1,000 ft west of Coal Canyon Undercrossing and extend west for approximately 4,500 ft in the SR-91 median ending at the express lanes connector. The auxiliary express lane at the SR-91 CIP connection would be extended in the westbound direction ending 2,000 ft west of Coal Canyon Undercrossing. These improvements would provide a four-lane overlap section along westbound SR-91 for approximately 1,000 ft. This 1,000 ft overlap would accommodate weaving between traffic accessing the southbound SR-241 median-to-median connector and the westbound *91 Express Lanes*. The existing eastbound SR-91 lanes would be shifted to the south.

Striped Buffers and Channelizers

The Build Alternative would provide a striped buffer with surface mounted channelizers to separate the SR-91 general-purpose lanes from the *91 Express Lanes* and a new striped buffer to separate the eastbound express lane connector lane from the *91 Express Lanes*. The eastbound express lane buffers would taper from 0 to 4 ft and the westbound express lane buffers would taper from 0 to 2 ft.

Ramp Realignment

The SR-91/Gypsum Canyon Road interchange on- and off-ramps and the northbound SR-241 to eastbound SR-91 general-purpose connector would be realigned to accommodate the median-to-median connector. A design variation for this interchange is a roundabout configuration.

Bridge Structures and Bridge Widening

Two new overcrossing structures would be constructed and two existing bridges would be widened as follows:

- **SR-241/SR-91 Connector Overcrossing Structures:** Two new structures would connect traffic from northbound SR-241 to eastbound SR-91 and from westbound SR-91 to southbound SR-241.
- **Gypsum Canyon Undercrossing Widening:** On eastbound SR-91, the existing Gypsum Canyon Undercrossing would be widened to the south.
- **Windy Ridge Wildlife Undercrossing Widening:** On southbound SR-241, the Windy Ridge Wildlife Undercrossing would be widened to the east.

All structures would be constructed using a cast-in-place, pre-stressed, concrete box girder.

Graded Slopes

Manufactured fill slopes would not exceed a 4:1 ratio. Manufactured cut slopes would not exceed a 2:1 ratio. Graded slopes would be contoured consistent with the existing topography, and would be seeded with native plant species consistent with existing vegetation.

Guard Rails/Barriers

Additional pavement would be added between the existing northbound SR-241/ eastbound SR-91 and the northbound SR-241/westbound SR-91 general-purpose connectors to accommodate a future concrete barrier separation to prevent vehicles traveling on the northbound SR-241/westbound SR-91 general-purpose connector to "queue jump" into the eastbound SR-91 general-purpose connector. This feature would improve traffic flow on SR-241 and would be added in a later phase of the Proposed Project if queue jumping continues after pavement marking and striping are implemented in this area.

Guard rails would be constructed along the new SR-241/SR-91 median-to-median connector embankments and structures.

An existing barrier along the inside shoulder of north SR-241 (just south of the Windy Ridge Undercrossing) would be removed to allow for advance signage.

Retaining Walls

Four retaining walls are required for the Proposed Project. One wall would be constructed in the median of SR-241 to support median widening and to accommodate the future addition of a southbound lane per the ETC Ultimate Project. This wall would be approximately 2,900 ft long and up to 15 ft high. Two Mechanically Stabilized Earth (MSE) retaining walls would be constructed in the median of SR-91 to support the connector as it transitions to an elevated structure. These walls would be approximately 1,350 ft long and up to 15 ft high, but views would be blocked by the existing structures associated with the junction of SR-241 and SR-91. One retaining wall would be constructed adjacent to eastbound SR-91, approximately 2,200 ft west of the Coal Canyon Undercrossing and would be approximately 1,025 ft long and up to 28 ft high. However, this retaining wall would face vacant land to the south; only the top 3 ft of the retaining wall cap would be visible from SR-91.

Advance Signage

On SR-241 at the southern end of the Proposed Project, signage would be modified approximately 0.2 mi south of the Windy Ridge Wildlife Undercrossing. In addition, signage improvements would also be made on SR-91 between Coal Canyon Undercrossing and Green River Road and west of SR-241 within the existing SR-91 median and highway footprint.

Water Quality Best Management Practices

Design Pollution Prevention best management practices (BMPs) proposed as part of the Proposed Project include dikes, overside drains, ditches, berms, swales, modifications to the existing storm drain system, the preservation of existing vegetation, and replanting new slopes with appropriate native vegetation. Proposed Treatment BMPs include five biofiltration swales and strips and two media filters along eastbound SR-91.

Drainage Improvements

New drainage features would be constructed and existing features would be modified along SR-241 and within the SR-241/SR-91 interchange. The improvements include the construction of new drop inlets with connecting pipes, new guard rails with dikes, median drainage, and deck drains; modification of existing drop inlets; replacement of edge drains; and removal or abandonment of existing drop inlets and existing culverts. The proposed drainage improvements would be linked to the existing drainage system and would preserve the existing drainage patterns as much as possible, including draining all storm water to the Santa Ana River.

Landscaping

Replacement landscaping will be provided in the following areas: (1) the area between the SR-241 general-purpose connector (northbound SR-241 to eastbound SR-91) and the SR-241 general-purpose connector (westbound SR-91 to southbound SR-241); and (2) the slope and other vegetated areas on the south side of SR-91, within the disturbance limits.

Transportation System Management (TSM)/Transportation Demand Management (TDM) Features

TSM elements include ramp metering, auxiliary lanes, and traffic signal coordination. In addition, the Build Alternative proposes to have dynamic traffic management technology (toll pricing varies based on express lanes demand). Toll operations are being coordinated among the F/ETCA, OCTA, and RCTC and are being evaluated in

a separate Concept of Operations report, which will be completed during Final Design.

The addition of a median-to-median toll connector included in the Build Alternative is a TDM feature in and of itself because it would provide additional capacity for HOVs and buses. The Build Alternative would improve travel time, increase the efficiency of the freeway system within the traffic Study Area, and reduce congestion and delay.

Noise Attenuation

No feasible noise attenuation (sound barrier) has been identified for the Proposed Project.

Right-of-Way Acquisition

The Build Alternative would be constructed mostly within existing Caltrans right-of-way. However, one partial acquisition adjacent to eastbound SR-91 would be required. Approximately 5 acres (ac) of land on the slope approximately 3,600 ft west of Coal Canyon, on Assessor's Parcel Number 085-071-56 would be acquired. This parcel is currently part of the Irvine Ranch National Natural Landmark, owned by the County of Orange with a Conservation Easement held by The Nature Conservancy. The Conservation Easement allows for "necessary infrastructure improvement." A maintenance access road would be constructed on this slope.

Design Exceptions (Bold and Underline)

The Build Alternative would require design exceptions. Design exceptions are necessary when the proposed design deviates from the standard design features in the Caltrans *Highway Design Manual*. For example, the design standard for a freeway travel lane is 12 ft; design exceptions would be requested for locations where the lane widths would be 11 ft to match the lane widths approved for the SR-91 CIP. The Build Alternative would require design exceptions (both bold and underline features) for stopping sight distance, superelevation rate, travelway width, minimum shoulder width, and minimum ramp to local road intersection distance, for superelevation transition, single lane connector through lane, and side slopes.

S.5.1.2 Temporary Project Features

Temporary Restriping

The existing number of through lanes on the mainlines of SR-241 and SR-91 would be maintained during construction by restriping the existing lanes using reduced lane widths and shifting traffic within those corridors to maintain the existing capacity.

The *91 Express Lanes* would also be temporarily restriped to maintain two lanes in the eastbound direction.

The eastbound off-ramp and eastbound loop on-ramp at Gypsum Canyon Road would be restriped to allow construction of the two realigned eastbound ramps. One lane would be provided on the off-ramp, and two lanes would be provided on the loop on-ramp. In addition, the existing northbound SR-241 to the eastbound SR-91 connector would be restriped to provide two lanes during construction of the eastbound SR-91 widening, as well as construction of the realigned northbound SR-241 to the eastbound SR-91 connector.

Construction Barriers

During construction, all work areas would be protected by temporary safety devices, such as Temporary Railing (Type K), Temporary Crash Cushions, and other safety features in accordance with federal, State, and local agency requirements.

Detours and Closures

Temporary detours and weekend or nighttime closures would be required at the Gypsum Canyon Road interchange on- and off-ramps and the northbound SR-241 to eastbound SR-91 connector.

Construction Access and Staging Areas

Construction access and staging areas would be located within the junction of SR-241 and SR-91 in existing Caltrans right-of-way. As discussed above, the partial property acquisition adjacent to SR-91 would be used for construction access but not for construction staging. Access would also be required to the SR-91 median at Coal Canyon (only limited daytime access), at Gypsum Canyon, and for scheduled maintenance.

S.5.2 No Build (No Action) Alternative

The No Build Alternative would maintain the current configurations of SR-241 and SR-91 in the Project Area. The SR-91 CIP Initial Phase extended the existing OCTA *91 Express Lanes* east from the Orange/Riverside County line to I-15 in the City of Corona. With completion of the SR-91 CIP Initial Phase on March 20, 2017, SR-91 now has continuous express lanes between SR-55 and I-15. The No Build Alternative would not include a direct connector between the SR-241 and the *91 Express Lanes*; therefore, the gap between SR-241 and the *91 Express Lanes* would not be closed. As a result, motorists traveling north on SR-241 would have to use the general-purpose lane connector to SR-91 and then weave across several lanes to access the eastbound

RCTC SR-91 Express Lanes at the merge area near Green River Road. Similarly, motorists traveling west in the RCTC SR-91 Express Lanes would have to exit at Green River Road, merge across lanes, and use the general-purpose lane connector to southbound SR-241. In addition, under the No Build Alternative, motorists would not be prevented from inappropriately "queue jumping" during congested traffic periods, thereby disrupting traffic flow on the northbound SR-241 connector to the eastbound SR-91 general-purpose lanes during PM peak hours.

Although smaller localized projects could be considered, approved, and implemented on their own merits, no other major corridor improvements would be implemented on the project segments of SR-241 and SR-91 under the No Build Alternative.

Because the No Build Alternative does not include the improvements proposed as part of the Build Alternative, the No Build Alternative provides a benchmark by which the public and decision-makers can compare the magnitude of the effects of the Build Alternative.

S.6 Project Impacts

Table S-1 summarizes the potential impacts of the Proposed Project and the No Build Alternative and identifies avoidance and minimization measures. Where applicable, some of these measures are sometimes also mitigation measures, as discussed in Chapter 4 of this Supplemental EIR/EIS. For detailed information regarding the impacts of each alternative, see Chapters 3 and 4 of this Supplemental EIR/EIS and the associated technical studies.

S.7 Coordination with Public and Other Agencies

Early and continuing coordination with the general public and appropriate public agencies is an essential part of the environmental process. It helps planners determine the necessary scope of environmental documentation and level of analysis required, and to identify potential impacts, mitigation measures, and related environmental requirements. Agency consultation and public participation for this project has been accomplished through a variety of formal and informal methods, including Project Development Team meetings, Conceptual Operations Meetings, interagency coordination/consultation meetings, and public announcements placed in local newspapers, the *Federal Register*, at the Orange County Clerk's office, and in public libraries. Chapter 5 discusses the results of Caltrans' efforts to fully identify, address, and resolve project-related issues through early and continuing coordination.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Cost	Not applicable	$120 million	Not applicable
Construction Duration	Not applicable	24 months	Not applicable
Land Use	**Land Use Conversion** • No impacts **Land Use Consistency** • Inconsistent with several plans and policies to improve regional mobility. **Parks and Recreational Effects and Section 4(f) Use** • No impacts	**Land Use Conversion** • Permanent conversion, through acquisition, of approximately 5 acres of land designated as parkland/reserve to transportation. • No temporary impacts. **Land Use Consistency** • Consistent with the goals, objectives, and policies of all surrounding communities' General Plans; the 2016 RTP/SCS; 2017 FTIP; the Orange County Central and Coastal NCCP/HCP; the Western Riverside MSHCP; the Orange County MPAH; and the Orange County LRTP. • No temporary impacts. **Parks and Recreational Effects and Section 4(f) Use** • Noise levels during operation would increase by 3 A-weighted decibels (dBA) or less, which is barely perceptible to the human ear. *Gypsum Canyon Nature Preserve* • Permanent use: approximately 5 acres (preliminary de minimis finding for the use). • Temporary use: none. • Temporary minimal visual, dust, and noise proximity effects. *Weir Canyon Nature Preserve* • No temporary or permanent use.	Effects to parks and recreation and Section 4(f) resources will be minimized by implementation of Measures AQ-1 through AQ-5, provided in Section 3.12, Air Quality, and Measures N-1 and N-2, provided in Section 3.13, Noise, as well as Measure LU-1, Uniform Act and Park Preservation Act Compliance, provided in Section 3.1, Land Use.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		• Temporary minimal visual, dust, and noise proximity effects. *Chino Hills State Park* • No temporary or permanent use. • Temporary minimal visual, dust, and noise proximity effects. *Santa Ana River Trail/Bike Lane* • No temporary or permanent use. • Temporary minimal visual, dust, and noise proximity effects. *Featherly Regional Park* • No temporary or permanent use. • Temporary minimal visual, dust, and noise proximity effects. *Green River Golf Club* • No temporary or permanent use. • Temporary minimal visual, dust, and noise proximity effects. *Brush Canyon Park* • No temporary or permanent use. *Santiago Oaks Regional Park* • No temporary or permanent use. *Running Springs Elementary School Recreational Facilities* • No temporary or permanent use. *Other Trails and Fire Roads* • No temporary or permanent use. • Temporary minimal visual, dust, and noise proximity effects.	

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Growth	No impacts	No impacts	None
Community Impacts	**Community Character and Cohesion** • Accessibility to and mobility in the SR-241/SR-91 interchange area would continue to deteriorate. **Relocations and Real Property Acquisition** • No Impacts **Environmental Justice** • Similar to the overall communities, environmental justice populations would receive no benefits by the reduction in access and mobility in the Project Area.	**Community Character and Cohesion** *Temporary Impacts* • Minimal impacts due to construction noise and dust. • Closure of one lane in each direction on SR-241 and SR-91 at various times to construct the median-to-median connector and install advance signage. • Detours and weekend or nighttime closures at the SR-91/Gypsum Canyon Road interchange ramps to realign the ramps and construct bridge supports for the new connector. • Detours and weekend or nighttime closures at the existing northbound SR-241 to eastbound SR-91 connector to widen SR-91 to the south. • Construction lighting. *Permanent Impacts* • Long-term visual changes because of permanent alteration of existing visual environment at the junction of SR-241 and SR-91 (retaining walls, piers/ supports, and buffers. • Noise levels would increase by 3 A-weighted decibels (dBA) or less, which is barely perceptible to the human ear. • Improved access and circulation along SR-241 and SR-91 in the Project Area by providing a direct connection between SR-241 and the *91 Express Lanes.*	• Measure TR-1 in Section 3.5 (implementation of a TMP) would minimize temporary impacts to community character and cohesion. • Temporary air quality impacts would be minimized based on implementation of Measures AQ-1 through AQ-5, which are provided in Section 3.12, Air Quality. • Temporary noise impacts would be minimized based on implementation of Measure N-1, which is provided in Section 3.13, Noise. Measures V-1 through V-7, found in Section 3.6.5, will be implemented to minimize potential impacts to visual resources. These measures include lighting fixtures, context-sensitive design, architectural treatments, and landscaping. • Operational noise impacts would be minimized based on implementation of Measure N-2, which is provided in Section 3.13, Noise.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		Relocations and Real Property Acquisition *Temporary Impacts* • No impacts. *Permanent Impacts* • Partial acquisition of one undeveloped County of Orange-owned property (Assessor's Parcel Number 085-071-56). • No displacement or relocation of any residents or businesses. **Environmental Justice** *Temporary Impacts* • With implementation of Measures N-1, AQ-1 through AQ-5, TR-1, and V-1 through V-7, construction of the Build Alternative would not result in adverse impacts that are appreciably more severe or greater in magnitude on environmental justice populations than the adverse effects experienced by non-environmental justice populations. Therefore, the Build Alternative would not cause disproportionately high and adverse temporary effects on minority or low-income populations, as listed above. *Permanent Impacts* • Similar to the overall communities, environmental justice populations would receive the benefits of an increase in access and mobility in the Project Area. Operation of the Build Alternative would not result in adverse impacts that are appreciably more severe or greater in magnitude on environmental justice populations than the adverse effects experienced by non-environmental justice populations.	• Temporary noise impacts would be minimized based on implementation of Measure N-1, which is provided in Section 3.13, Noise. • Temporary air quality impacts would be minimized based on implementation of Measures AQ-1 through AQ-5, which are provided in Section 3.12, Air Quality. • Measure TR-1 in Section 3.5 (implementation of a TMP) would minimize temporary impacts to community character and cohesion. • Temporary visual impacts to environmental justice communities would be minimized based on implementation of Measures V-1 through V-7.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Utilities and Emergency Services	**Utilities** • No impacts **Emergency Services** • Providers would not benefit from improved mobility and reduced traffic congestion.	**Utilities** *Temporary Impacts* • Utility disruptions could occur. *Permanent Impacts* • No impacts to utilities. **Emergency Services** *Temporary Impacts* • Delay in response time for emergency services. *Permanent Impacts* • May improve response times for emergency services using SR-241 and SR-91. • Emergency service providers would be able to use the express lanes connector when the general-purpose lane connector is experiencing heavy traffic volumes and slow travel speeds.	**Minimization Measure UES-1: Utilities.** During final design, utility protection-in-place plans will be prepared in consultation with the affected utility providers/owners for those utility facilities anticipated to be relocated, removed, and protected in-place. Final design will focus on avoiding utility relocations. If relocation is necessary, final design will focus on relocating utilities within the State right-of-way or within other existing public rights-of-way and/or easements. If relocation outside of existing or the additional public rights-of-way and/or easements required for the Proposed Project is necessary, final design will focus on relocating those facilities in such a manner as to minimize environmental impacts as a result of project construction and ongoing maintenance and repair activities. The utility relocation plans will be included in the project specifications. Prior to and during construction F/ETCA will ensure that the components of any utility relocation plans provided in the project specifications are properly implemented by the construction contractor. **Minimization Measure UES-2: Law Enforcement, Fire Protection, and Emergency Medical Service Providers.** Prior to and during construction, F/ETCA will require the construction contractor to coordinate all temporary ramp and lane closures and detour plans with law enforcement, fire protection, and emergency medical service providers to minimize temporary delays in emergency response times.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			The plans shall be developed in coordination with the affected agencies and shall include the identification of alternative routes and access to construction areas for emergency vehicles. **Minimization Measure UES-3: Law Enforcement, Fire Protection, and Emergency Medical Service Providers.** Prior to operation of the connector, an emergency call box shall be placed along the alignment in compliance with OCTA Call Box placement policies. **ETC Final EIR and Final EIS Measure U-2**. *In conjunction with Final Design, the TCA shall explore the joint use of Corridor maintenance roads, if needed, by the County and utility companies. (North and East Legs)* **ETC Final EIR and Final EIS Measure PS-2.** *The impact on other law enforcement agencies is considered to be minor. Implementation of several measures by the TCA shall assist law enforcement agencies in fulfilling their responsibilities and in avoiding confusion in providing service to their jurisdictions. These measures are: clear identification of jurisdictional boundaries along the Corridor, clearly signed and well lit intersections, and distance location markers along the Corridor. (North and East Legs)*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Traffic and Transportation	*Temporary Impacts* • No impacts *Permanent Impacts* • Overall, increased travel time, reduced speed, increased vehicle hours traveled, and increased queues in the SR-91 corridor study area.	*Temporary Impacts* • Detours and closures are expected to result in some delays to the traveling public. *Permanent Impacts* • Vehicle throughput in the SR-91 corridor would improve, vehicles miles traveled would increase, and travel time would decrease. • Traffic would shift from other regional routes (SR-91 between SR-55 and SR-241, SR-55, and surface streets) to SR-241 as a result of the additional capacity of the new connector. • The length of the northbound SR-241 to the eastbound SR-91 queue on the general-purpose ramp would shorten in the PM peak period. • The length of the queues would shorten at the SR-91 westbound mainline bottleneck between the Green River Road interchange and the *91 Express Lanes* ingress in the AM peak period. • There would be a reduction in friction due to fewer vehicles weaving from the northbound SR-241 to the eastbound SR-91 general-purpose ramp to the RCTC SR-91 Express lanes. • There would be an increase in friction on eastbound SR-91, because more vehicles must exit the *91 Express Lanes* and enter the general-purpose lanes and fewer cars can leave the general-purpose lanes and enter the RCTC SR-91 Express Lanes due to the increase in traffic volumes on the express lanes connector.	**Minimization Measure TR-1: Transportation Management Plan.** Ensure that a Transportation Management Plan (TMP) is completed in consultation with the California Department of Transportation (Caltrans) and included in the Plans, Specifications, and Estimates for implementation by the contractor prior to and during construction of any project improvements. The TMP will be consistent with the Caltrans *Transportation Management Plan Guidelines* (November 2015), which include coordination with affected jurisdictions, transportation agencies, and public outreach. The TMP will be prepared by a qualified traffic engineer and will address traffic impacts from temporary detours and weekend or nighttime closures to reduce traveler delays and enhance traveler safety during project construction. The TMP may include the following elements: • Public awareness campaign • Highway advisory radio • Portable changeable message signs • Temporary loop sensor/signals • Bus or shuttle service • Construction Zone Enhanced Enforcement Program • Incident management • Staging construction • Traffic control plan • Freeway service patrol • Transportation management team (TMT) **ETC Final EIR and Final EIS Measure T-13.** *During final design, the TCA shall establish ETC bridge structure clearances to provide an absolute minimum construction false work vertical clearance of 14.0 feet over existing and planned arterial undercrossing identified in the Orange County Master Plan of Arterial Highways.*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			ETC Final EIR and Final EIS Measure C-15. *All traffic control measures shall conform with applicable local and State Regulations*.
Visual and Aesthetics	No impacts	*Temporary Impacts* • Sensitive viewers, including motorists and residents, would be exposed to views of cleared vegetation, graded slopes, construction vehicles, equipment, and other materials. • Periodic nighttime construction, safety/security lighting would be used during some stages of construction. *Permanent Impacts* • The proposed median-to-median connector would appear similar to the existing general-purpose lane connectors at the SR-241/SR-91 interchange because the new structure would be of similar profile as the existing structures and would be in the Caltrans right-of-way between the existing SR-241/SR-91 northbound-to-southbound connectors. • Motorists traveling on SR-91 would experience views of the express lane bridge connector and retaining walls, but views of open space and other visual resources in the vicinity of the SR-241/ SR-91 interchange would not be obstructed. • Residents with high viewer sensitivity with views of the Project Area would experience permanent views of the proposed express lanes connector but the existing views of hillsides, ridgelines, and open space would not be obstructed.	**Minimization Measure V-1: Lighting Fixtures.** In conjunction with Final Design, proposed lighting fixtures shall be hooded where feasible and lighting shall be directed on the site to minimize potential intrusion of light and glare onto nearby land uses. Lighting shall be designed consistent with the existing lighting along the State Route 241 corridor. **Minimization Measure V-2: Hillsides.** To avoid visual impacts resulting from cut hillsides and filled topography, hills should be preserved where possible. All disturbed areas associated with cut-and-fill activities should appear similar in color to existing topography. Manufactured fill slopes should not exceed a four-to-one ratio. Manufactured cut slopes should not exceed a two-to-one ratio. Rounding of manufactured slopes should be applied. **Minimization Measure V-3: Architectural Treatments.** To maintain consistency with the existing infrastructure (i.e., bridges and walls, etc.) in the Project Area, landscape and/or architectural treatments (i.e., color, texture, etc.) for the structure elements of the Proposed Project shall be determined in consultation with the District Landscape Architect during the Final Design process. **Minimization Measure V-4: Landscaping.** To maintain the context of the Project Area (color, form, and texture) the Proposed Project shall install landscaping that is compatible with the existing landscape along the freeway. The landscape concept and plant palette shall be determined in consultation with the District

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		• Grading for the Proposed Project features would remove vegetation and modify slopes.	Landscape Architect during the Final Design process. Erosion control plant species utilized shall be determined by the District Landscape Architect to ensure that the mix and application strategy is appropriate for the specific soil composition of the area. Drought-tolerant native species shall be used adjacent to areas of native habitat. Enhanced plantings shall occur adjacent to wildlife crossings. **Minimization Measure V-5: Construction Lighting.** For all nighttime construction activities, necessary lighting for safety and construction purposes shall be contained and directed toward the specific area of construction. **Measure V-6: Context-Sensitive Solutions.** Context-sensitive solutions will be used. Slopes graded for the Build Alternative will be contoured consistent with the existing topography, and all disturbed soil areas will be seeded with drought-tolerant native plant species consistent with existing vegetation. **Measure V-7: Tree Planting.** Permanently impacted Coast live oak, California walnut, and sycamore trees will be replaced at a minimum 2:1 ratio. Heritage oaks (oaks greater than 36 inches in diameter at breast height) will be replaced at a minimum 3:1 ratio. **ETC Final EIR and Final EIS Measure C-19.** *Where appropriate and feasible, construction staging areas shall be located inconspicuously to minimize adverse visual effects on residential and recreation areas. They shall be located to avoid any additional impacts on biological, historical or cultural resources. (Construction Staging, North and East Legs)*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Cultural Resources	No impacts	*Temporary Impacts* • Not applicable. *Permanent Impacts* • No impacts to known archaeological or historic resources. • Potential for impacts to previously unknown buried cultural materials or human remains.	**Avoidance and Minimization Measure CR-1: Cultural Materials.** If cultural materials are discovered during construction, all earthmoving activity within and around the immediate discovery area will be diverted until a qualified archaeologist can assess the nature and significance of the find. At that time, the Caltrans District 12 Environmental Branch Chief will be contacted to ensure that Section 106 compliance is maintained. Section 106 compliance could include: excavation in accordance with a data recovery plan and standard archaeological field methods and procedures; laboratory and technical analyses; report of findings; curation at an appropriate facility for future research and/or display; an interpretive display at a local school, museum, or library; and public lectures at local schools and/or historical societies on the findings and significance of the site and recovered archaeological materials. **Avoidance and Minimization Measure CR-2: Human Remains.** If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities will cease in any area or nearby area suspected to overlie remains, and the County Coroner will be contacted. Pursuant to Public Resources Code (PRC) Section 5097.98, if the remains are thought to be Native American, the Coroner will notify the Native American Heritage Commission (NAHC), who will designate the Most Likely Descendent (MLD). At this time, the Caltrans District 12 Environmental Branch Chief will be contacted so that they may work with the MLD on the respectful treatment and disposition of the remains. The MLD recommendations may include scientific removal and nondestructive analysis, preservation in place, relinquishment to the descendants for treatment, or any other culturally appropriate

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			treatment. Further provisions of PRC 5097.98 are to be followed as applicable.
Water Quality and Storm Water Runoff	• No impacts	*Temporary Impacts* • Potential for soil erosion, sediment transport, release of hazardous materials, increased pollutants in runoff, groundwater dewatering. *Permanent Impacts* • Increase in impervious area by approximately 20.5 acres. • Potential increased pollutants in runoff due to increased impervious area and volume of runoff. • Proposed treatment BMPs would reduce pollutants.	**Minimization Measure WQ-1: Construction General Permit.** The Proposed Project will comply with the requirements prescribed in the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) Order No. 2009-009-DWQ, as amended, or any future replacement permit. The Proposed Project shall comply with the Construction General Permit by preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP) to address all construction-related activities, equipment, and materials that have the potential to impact water quality for the appropriate Risk Level. The SWPPP will identify the sources of pollutants that may affect the quality of storm water and include Best Management Practices (BMPs) to control the pollutants, such as Sediment Control, Catch Basin Inlet Protection, Construction Materials Management and Nonstorm Water BMPs. All work shall conform to the Construction Site BMP requirements specified in the latest edition of the Caltrans *Storm Water Quality Handbooks: Construction Site Best Management Practices Manual* to control and minimize the impacts of construction and construction-related activities, materials, and pollutants on the watershed. These include, but are not limited to, temporary sediment control, temporary soil stabilization, waste management and materials pollution control, wind erosion control, and other nonstorm water BMPs. **Minimization Measure WQ-2: Caltrans Permit.** The Proposed Project will comply with the provisions of the National Pollutant Discharge Elimination System

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			(NPDES) Statewide Storm Water Permit, *Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation*, Order No. 2012-0011-DWQ, NPDES No. CAS000003 (Caltrans Permit), as amended, or any future replacement permit. **Minimization Measure WQ-3: Design Pollution Prevention Best Management Practices.** Caltrans-approved Design Pollution Prevention BMPs will be implemented to the maximum extent practicable (MEP) consistent with the requirements of the *Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation*, Order No. 2012-0011-DWQ, NPDES No. CAS000003 (Caltrans Permit) and the Caltrans Project Planning and Design Guide. Design Pollution Prevention BMPs include preservation of existing vegetation, slope/surface protection systems (erosion control/reseeding and replanting of vegetation) dikes, overside drains, and concentrated flow conveyance systems such as ditches, berms, and biofiltration swales and strips. **Minimization Measure WQ-4: Treatment Best Management Practices.** Caltrans-approved Treatment BMPs will be implemented to the MEP consistent with the requirements of the Caltrans Permit, which is described in Measure WQ-2 and the Project Planning and Design Guide. Treatment BMPs may include biofiltration swales, biofiltration strips, and media filters. **Minimization Measure WQ-5: Groundwater Dewatering.** If groundwater dewatering is required, the Proposed Project will comply with the provisions of General Waste Discharge Requirements for Discharges to Surface Waters that Pose an

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Insignificant (De Minimus) Threat to Water Quality, Order No. R8-2015-0004, NPDES No. CAG998001, as they relate to discharge of non-storm water dewatering wastes for the Proposed Project. **ETC Final EIR and Final EIS Measure W-12.** *In conjunction with final design, entry into drainages shall be avoided during site preparation, grading and construction, except where required for construction. Activity in drainages shall be limited to crossings rather than using the lengths of drainage courses for access or for parking automobiles, trucks, and construction equipment. In addition, these areas will be marked for "limited access" on construction plans.* **ETC Final EIR and Final EIS Measure W-14.** *During site preparation, grading, and construction, vehicles and equipment shall not be parked in washes or other drainages.* **ETC Final EIR and Final EIS Measure W-15.** *During site preparation, grading and construction, overwatering shall be avoided in washes and other drainages.* **ETC Final EIR and Final EIS Measure WQ-2.** *The TCA will ensure that all herbicides used in landscaping and weed control are handled, stored, applied, and disposed of consistent with all applicable federal, state, and local regulations.* **ETC Final EIR and Final EIS Measure WQ-3.** *Whenever feasible, construction vehicles will be rinsed before leaving the construction area to remove mud and other materials before the vehicles leave the site.*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			ETC Final EIR and Final EIS Measure E-1. *In conjunction with final design, the TCA shall map native vegetation outside the right-of-way on grading and construction plans to indicate vegetation to protect from use as vehicle travel or parking areas, storage of equipment and storage of debris or building materials.* **ETC Final EIR and Final EIS Measure E-3.** *During final design, the TCA shall ensure that all proposed grading shall conform to the Caltrans Highway Design Manual and the TCA Project Manual Guidelines. All applicable policies and guidelines shall be listed in the grading plans.* **ETC Final EIR and Final EIS Measure E-6.** *In conjunction with final design, the TCA shall ensure that cut and fill slopes shall not be steeper than 2:1. Where steeper slopes are indicated, TCA shall, in conjunction with final design, prepare geologic and engineering analyses. These analyses shall determine the safety of those slopes and proposed erosion control measures consistent with Caltrans design standards.* **ETC Final EIR and Final EIS Measure E-9.** *As part of final design, TCA shall ensure that all slopes shall conform to slope criteria developed by TCA and Caltrans. All slope criteria shall be noted on final plans.* **ETC Final EIR and Final EIS Measure E-10.** *Fills shall not encroach on natural watercourses or improved channels except as shown on the approved project plans.*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			ETC Final EIR and Final EIS Measure E-11. *Fills placed against watercourses shall have suitable protection against erosion during storm flows, such as riprap, protective walls, and culverts.* **ETC Final EIR and Final EIS Measure E-12.** *During site preparation, grading, and construction, the TCA shall ensure that excavated materials shall not be deposited or stored in or alongside watercourses where the materials can be washed away by high water or storm runoff.* **ETC Final EIR and Final EIS Measure E-13.** *During site preparation and grading, the TCA shall ensure that all land shall be graded to drain and dispose of surface water without ponding, except where approved by Caltrans or the affected responsible public agency.*
Geology, Soils, Seismic, and Topography	No impacts	*Temporary Impacts* • Ground motion from seismic activities, liquefaction, and landslides. • Potential for unstable slopes and erosion. *Permanent Impacts* • Potential for seismic impacts to structures. • Potential for unstable slopes and erosion. • Potential for liquefaction. • Minor changes to topography.	**Minimization Measure GEO-1: Final Geotechnical Report.** During Final Design, a qualified geotechnical engineer will conduct a comprehensive geologic and geotechnical investigation and prepare a design-level geotechnical report. This report will document geology-related constraints and hazards such as fault-induced ground rupture, slope instability, settlement, liquefaction, or related secondary seismic impacts that may be present along the alignment of the Build Alternative. The performance standard for this report will be the California Department of Transportation's (Caltrans) Geotechnical Manual (2012 or most recent version) standards as they apply to the project features and structures. The measures recommended in the design-level geotechnical report will be incorporated into the Final Design and project specifications. The construction contractor will implement the measures recommended in the design-level geotechnical reports as included in the project

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			design and specifications. **Minimization Measure GEO-2: Quality Assurance/Quality Control Plan.** During Final Design, a quality assurance/quality control (QA/QC) plan will be prepared and implemented during construction. The QA/QC plan will include observing, monitoring, and testing by the Project Geotechnical Engineer and/or the Project Geologist prior to and during construction to confirm that the geotechnical/ geologic recommendations from the design-level geotechnical report and standard design and construction practices are fulfilled by the contractor, or if different site conditions are encountered, appropriate changes are made to accommodate such issues. Weekly reports will be prepared during all project-related grading, excavation, and construction activities.
Paleontology	No impacts	*Temporary Impacts* • Not applicable. *Permanent Impacts* • Potential to impact scientifically valuable fossils and fossil-bearing formations.[1]	**Mitigation Measure PAL-1: Paleontological Mitigation Plan.** During Final Design, a Paleontological Mitigation Plan (PMP) will be prepared and adhered to during construction. The PMP will follow the guidelines of the Society of Vertebrate Paleontologists (SVP) and Caltrans. The PMP requires inclusion of, but is not limited to, the following items a through h: a. Attendance at the pregrade meeting by a qualified paleontologist or representative; b. Preconstruction field survey by the paleontological mitigation team; c. Monitoring during construction excavation by the paleontological mitigation team;

[1] This impact is less than significant with mitigation under CEQA.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			d. Collection of representative samples from geologic formations; e. Sieving of bulk samples for microfossil recovery; f. Preparation of specimens to the point of identification and permanent preservation; g. Curation of fossils into a repository with permanent retrievable storage that meets Caltrans' requirements; and h. Preparation of a Paleontological Mitigation Report documenting the implementation of the Paleontological Mitigation Plan.
Hazardous Wastes and Materials	No impacts	*Temporary Impacts* • Potential to encounter aerially deposited lead (unpaved areas adjacent to SR-91), asbestos-containing materials (Gypsum Canyon bridge structure 55-0506), chemically treated wood waste (guardrails, and landscape timber, etc.), and lead-based paint in traffic striping (SR-241 and SR-91). • Potential to rupture an unused petroleum pipeline with an unspecified location that may contain residual material that would need disposal. • Due to historical uses in the area, there is a potential to encounter unrecorded hazardous waste during construction. *Permanent Impacts* • No impacts other than routine use of hazardous materials associated with maintenance of a transportation facility.	**Minimization Measure HAZ-1: Aerially Deposited Lead.** Consistent with Minimization Measure MW-3 of the State Route 91 Corridor Improvement Project Final Environmental Impact Report/Environmental Impact Statement (SR-91 CIP 2012 Final EIR/EIS), dated August 2012, the Project Engineer will ensure that a qualified consultant conducts a new soil Aerially Deposited Lead (ADL) evaluation and/or investigation for this project at the Design Phase. The previous ADL test results may be used if applicable along with any new ADL test results. The new soil ADL evaluation and/or investigation will be consistent with the new DTSC Lead Agreement contaminant concentration limits. In addition, new DTSC Lead Agreement soil reuse requirements and restrictions will apply. A Lead Compliance Plan will be prepared to address workers' health and safety. **Minimization Measure HAZ-2: Asbestos-Containing Materials.** During the design phase, a certified specialist will confirm the presence or absence of asbestos in the Gypsum Canyon Road Undercrossing, if demolition/renovation of the bridge structure will occur as part of the Proposed Project. If

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			asbestos is present, the certified asbestos abatement specialist should monitor the disposal of the asbestos-containing materials as they are uncovered. The construction contractor will comply with the Caltrans Standard Specifications Section 14-9.02 pertaining to air pollution control compliance with rules, regulations, ordinances, and statues during renovation and demolition activities.
			Minimization Measure HAZ-3: Treated Wood Waste. During construction, the construction contractor will comply with Caltrans Standard Specifications Section 14-10 pertaining to the handling and disposal of treated wood waste. **Minimization Measure HAZ-4: Traffic Striping.** During construction, the construction contractor will comply with Caltrans Standard Specifications Section 14-11 pertaining to the testing, removal, and disposal of any traffic striping and pavement-marking materials. **Minimization Measure HAZ-5: Petroleum Pipeline.** During construction, the construction contractor will comply with Caltrans Standard Specifications pertaining to excavation. The contractor shall notify the regional notification center, ensuring that all utility owners within the project disturbance limits identify the locations of underground transmission lines and facilities (including underground petroleum pipelines). **Minimization Measure HAZ-6: Construction Contingency Plan.** Prior to the start of construction, the construction contractor will prepare a Construction Contingency Plan (CCP) in accordance with Caltrans Unknown Hazards Procedures for Construction, in the Caltrans Construction Manual. The CCP will include

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			provisions for emergency response in the event that unidentified hazardous materials, petroleum hydrocarbons, or hazardous or solid wastes are discovered during construction activities. The CCP will address field screening, contaminant materials testing methods, mitigation and contaminate management requirements, and health and safety requirements for construction workers. The construction contractor will implement the CCP during all construction activities. During construction, the Resident Engineer will require the construction contractor to cease work immediately if an unexpected release of hazardous substances is found in reportable quantities. If an unexpected release of hazardous substances is found in reportable quantities, the Resident Engineer will require the construction contractor to notify the National Response Center by calling 1-800-424-8802. The construction contractor will perform clean up of unexpected releases under the appropriate federal, State, and local agency oversight. **ETC Final EIR and Final EIS Measure HW-2.** *Hazardous substances are strictly regulated by the Environmental Protection Agency (U.S. EPA), the California and National Occupational Safety and Health Administration (OSHA) and the United States Department of Transportation (DOT). The DOT specifies the procedures for safely transporting hazardous materials, as well as the procedures to follow in case of accidental spills during transport, in the 49 Code of Federal Regulations (CFR) series of regulations (parts 100 through 177). U.S. EPA specifies the requirements for proper labeling and placarding of hazardous substances. The American National Standards Institute recommends safety procedures for handling and storing hazardous*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			materials, and OSHA specifies the procedures required for using and storing hazardous materials. These procedures shall be followed during all ETC site preparation, grading, construction, operations, and maintenance.
Air Quality	• May have an incremental detrimental effect due to no reduction of congestion on roadway links in the Proposed Project vicinity.	*Temporary Impacts* • Short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other construction activities. *Permanent Impacts* • No new regional vehicular emission impacts. • May have a beneficial effect in helping to reduce congestion on roads in the Proposed Project vicinity.	**Minimization Measure AQ-1: Fugitive Dust Source Controls.** During clearing, grading, earthmoving, and excavation operations, excessive fugitive dust emissions will be controlled by regular watering or other dust preventive measures using the following procedures, as specified in the South Coast Air Quality Management District (SCAQMD) Rule 403. • All material excavated or graded will be sufficiently watered to prevent excessive amounts of dust. • Watering will occur at least twice daily with complete coverage, preferably in the late morning and after work is done for the day. • All material transported on site or off site will be either sufficiently watered or securely covered to prevent excessive amounts of dust. The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized so as to prevent excessive amounts of dust. • These control techniques will be indicated in project specifications. Visible dust beyond the property line emanating from the Proposed Project will be prevented to the maximum extent feasible. **Minimization Measure AQ-2: Ozone Precursor Emission Controls.** Project grading plans will show the duration of construction. Ozone precursor emissions from construction equipment vehicles will

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			be controlled by maintaining equipment engines in good condition and in proper tune per manufacturers' specifications. **Minimization Measure AQ-3: Prevention of Spills onto Public Streets.** All trucks hauling excavated or graded material on site will comply with State Vehicle Code Section 23114, with special attention to Sections 23114(b)(F), (e)(2), and (e)(4), as amended, regarding the prevention of such material spilling onto public streets and roads. **Minimization Measure AQ-4: Caltrans Standard Specifications for Construction.** The contractor will adhere to Caltrans Standard Specifications for Construction (Sections 14.9 02 and 14 9.03). **Minimization Measure AQ-5: Construction Vehicles Prohibition.** All construction vehicles both on- and off-site shall be prohibited from idling in excess of 5 minutes.
Noise	No impacts	*Temporary Impacts* • Noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. However, construction noise would be short-term, intermittent, and overshadowed by local traffic noise. *Permanent Impacts* • Noise levels would increase by 3 dBA or less, which is barely perceptible to the human ear.	**Minimization Measure N-1: Control of Construction Noise Levels.** The control of noise from construction activities will conform to the California Department of Transportation (Caltrans) Standard Specifications, Section 14-8.02, "Noise Control." The nighttime noise level from the contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., will not exceed 86 A-weighted decibels (dBA) one-hour A weighted equivalent continuous sound level ($L_{eq}(h)$) at a distance of 50 feet. **Measure N-2: Deck Specifications.** To ensure that noise impacts are minimized, the deck texture on the direct connector ramps will be constructed using the new quieter longitudinally-tined Groove and Grind

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			deck specifications, instead of a transversely-tined texture.
Energy	• Temporary indirect impacts from the manufacture of vehicles that operate on SR-241 and SR-91. • Increase in VHT in 2017 and 2040, which will increase energy consumption when compared to the Build Alternative.	*Temporary Impacts* • Indirect energy impacts from the manufacture of vehicles that would operate on the project facilities and be used for project construction. However, the Proposed Project would not, on its own, increase the manufacture of vehicles; therefore, the per-vehicle indirect energy impacts for the baseline (No Build), the Build Alternative, and the existing condition would all be the same. • Energy costs associated with construction of roads and structures. *Permanent Impacts* • Total net change in VHT in 2017 would decrease by 726 VHT, indicating a slight increase in efficiency compared to the No Build Alternative. Therefore, vehicle fuel/energy consumption would be reduced. • A 0.3 percent reduction in direct energy use annually in 2040 due to reduction in VMT. • A 1.5 percent increase in maintenance-related permanent indirect energy consumption in 2040 due to increase in VMT.	None

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Natural Communities	No impacts	*Temporary Impacts* • Impacts to 31.26 acres of coastal sage scrub within the NCCP/HCP Plan Area. • Impacts to 0.02 acre of coastal sage scrub outside the NCCP/HCP Plan Area. • Impacts to 8 coast live oak and 15 sycamore trees. • Impacts to Windy Ridge Wildlife Undercrossing. *Permanent Impacts* • Impacts to 13.66 acres of coastal sage scrub within the NCCP/HCP Plan Area. • Impacts to 6 coast live oak trees.	**Minimization Measure NC-1: Coastal California Gnatcatcher Environmentally Sensitive Areas.** Prior to the commencement of grading operations or other activities involving substantial soil disturbance, all areas of CSS habitat to be avoided under the provisions of the NCCP/HCP shall be identified with temporary fencing or other markers clearly visible to construction personnel. Additionally, prior to the commencement of grading operations or other activities involving disturbance of CSS, a survey will be conducted to locate CAGN and cactus wrens within 100 ft of the outer extent of projected soil disturbance activities. The locations of any such species shall be clearly marked and identified on the construction/grading plans. **Minimization Measure NC-2: Nesting Coastal California Gnatcatchers.** During clearing or construction, to the maximum extent practicable, no grading of CSS habitat that is occupied by nesting CAGN will occur during the breeding season (February 15 through July 15). It is expressly understood that this provision and the remaining provisions of these "construction-related minimization measures" are subject to public health and safety considerations. These considerations include unexpected slope stabilization, erosion control measures, and emergency facility repairs. In the event of such public health and safety circumstances, landowners or public agencies/utilities will provide USFWS/CDFW with the maximum practicable notice (or such notice as is specified in the NCCP/HCP) to allow for capture of CAGN, cactus wrens (Campylorhynchus brunneicapillus), and any other CSS Identified Species that are not otherwise flushed and will carry out the following measures only to the extent practicable in the context of the public health

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			and safety considerations. (Note: While this text is taken directly from NCCP/HCP Construction Minimization Measures, to preserve their integrity, the capture and relocation of birds is not encouraged or authorized by the USFWS.) The breeding season is now considered to be from February 15 through August 31; therefore, these dates are applicable to this measure. **Minimization Measure NC-3: Biological Monitor.** A monitoring biologist acceptable to USFWS/CDFW will be on site during any clearing of CSS. The landowner or relevant public agency/utility will advise USFWS/ CDFW at least 7 calendar days (preferably 14 calendar days) prior to the clearing of any habitat occupied by Identified Species to allow USFWS/ CDFW to work with the monitoring biologist in connection with bird flushing/capture activities. The monitoring biologist will flush Identified Species (avian or other mobile Identified Species) from occupied habitat areas immediately prior to brush-clearing and earth-moving activities. If birds cannot be flushed, they will be captured in mist nets, if feasible, and relocated to areas of the site to be protected or to the NCCP/HCP Reserve System. (Note: While this text is taken directly from NCCP/HCP Construction Minimization Measures, to preserve their integrity, the capture and relocation of birds is not encouraged or authorized by the USFWS.) It will be the responsibility of the monitoring biologist to ensure that Identified Species will not be directly impacted by brush-clearing and earth-moving equipment in a manner that also allows for construction activities on a timely basis. **Minimization Measure NC-4: Coastal Sage Scrub Environmentally Sensitive Area.** Following the

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			completion of initial grading/earth movement activities, all areas of CSS habitat to be avoided by construction equipment and personnel will be marked with temporary fencing or other appropriate markers clearly visible to construction personnel. No construction access, parking, or storage of equipment or materials will be permitted within such marked areas. **Minimization Measure NC-5: Coastal Sage Scrub Access Restrictions.** In areas bordering the NCCP/HCP Reserve System or Special Linkage/ Special Management areas containing substantial CSS identified in the NCCP/HCP for protection, vehicle transportation routes between cut-and-fill locations will be restricted to a minimum number during construction consistent with project construction requirements. Waste dirt or rubble will not be deposited on adjacent CSS identified in the NCCP/HCP for protection. Preconstruction meetings involving the monitoring biologist, construction supervisors, and equipment operators will be conducted and documented to ensure maximum practicable adherence to these measures. **Minimization Measure NC-6: Coastal Sage Scrub Dust Control.** CSS identified in the NCCP/HCP for protection and located within the likely dust drift radius of construction areas shall be periodically sprayed with water to reduce accumulated dust on the leaves as recommended by the monitoring biologist. **Minimization Measure NC-7: Coast Live Oak Tree Environmentally Sensitive Areas.** Prior to clearing or construction, highly visible barriers and, as needed, silt fencing will be installed around the protected zone of any oak tree or oak habitat. Such areas will be

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			designated on the project specifications as Environmentally Sensitive Areas (ESAs) to be preserved. The ESAs will extend 5 ft outside the dripline or 15 ft from the trunk of each tree, whichever is greater, unless the area includes a road shoulder or existing asphalt. In those instances, safety requires the road shoulder or existing asphalt not be included in the ESA and the boundary of the ESA will be modified accordingly. These modified ESAs are included because impacts to oaks may occur within these road shoulder and asphalt areas if roots become exposed, soil surrounding roots is excessively compacted, material is deposited over roots, or branches or roots are broken or damaged. In addition, to avoid breaking overhanging branches, branch trimming may be required. Proper tree pruning procedures will be followed. No grading or fill activity of any type will be permitted within the ESAs for trees that are expected to be preserved. In addition, heavy equipment, including motor vehicles, will not be allowed to operate in the ESAs. All construction equipment will be operated in such a manner as to prevent accidental damage to nearby oaks. No structure of any kind, or incidental storage of equipment or supplies, will be allowed in the ESAs. Silt fence barriers will be installed at the ESA boundaries to prevent accidental deposition of fill material in areas where trees are immediately adjacent to planned construction activities. **Minimization Measure NC-8: Coast Live Oak Tree Replacement.** During Final Design, the TCA will develop a revegetation program to help compensate for lost oak trees with spacing criteria to be determined by the Project Biologist. Senate

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Concurrent Resolution No. 17 (filed with the Secretary of State on September 1, 1989) requests all State agencies to preserve and protect native oak woodlands to the maximum extent feasible or to provide for replacement plantings. Impacts to any oak trees (excluding California scrub oaks) with trunk sizes greater than 8 inches diameter at breast height (dbh), but less than 36 inches dbh, will be replaced at a minimum mitigation-to-impact ratio of 1:1. Heritage oaks (oaks greater than 36 inches dbh) will be replaced at a minimum mitigation-to-impact ratio of 3:1. Replacement resources will include a combination of plantings such as acorns, 5-gallon, and 15-gallon trees and/or transplantation where feasible. Replacement plantings may take place in TCA or Caltrans right-of-way or suitable areas in proximity to the project limits. **Minimization Measure NC-9: Existing Wildlife Fencing.** If necessary for construction access, the existing wildlife fencing will be removed only after installation of temporary fencing to protect against wildlife-vehicle incidents during construction. Temporary fencing will be the same or greater height than the existing wildlife fencing and must be maintained and functional throughout project construction. After construction, any temporary fencing will be replaced with new permanent fencing consistent with the existing wildlife fencing. **Minimization Measure NC-10: Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing Revegetation.** Following the completion of the project construction, all disturbed habitat adjacent to Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be restored with native vegetation consistent with the

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			1994 Biological Opinion and the 2019 Biological Opinion, as applicable. **Minimization Measure NC-11: Construction Lighting and Staging.** Construction equipment maintenance, lighting, and staging must be in designated areas, away from Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing. **Minimization Measure NC-12: Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing Avoidance.** During construction, Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be avoided as much as is feasible. Activity that must take place at the Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be done as quickly as possible and only during daylight hours. Noise levels generated from construction activities at Coal Canyon Undercrossing shall not exceed 5 A-weighted decibels (dBA) above the ambient noise level within 100 ft from the edge of roadway. **Minimization Measure NC-13: Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing Access.** Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be kept clear of all equipment or structures that could potentially serve as barriers to wildlife passage. **Minimization Measure NC-14: Windy Ridge Wildlife Undercrossing Construction Staging.** Within Windy Ridge Wildlife Undercrossing, structures required for bridgework will be erected as to not block the main underpass. Scaffolding and false work will be restricted to the sides of the underpass to maintain the functionality of the crossing for wildlife movement.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Minimization Measure NC-15: Western Riverside County Multiple Species Habitat Conservation Plan Construction Guidelines. Construction activities in the SR-91 Advanced Signage Area in Riverside County will comply with the objectives, policies, procedures, and guidelines from Section 7.5.3, Construction Guidelines, as well as BMPs outlined in Appendix C (WR-MSHCP Volume 1) of the Western Riverside County Multiple Species Habitat Conservation Plan (WR-MSHCP). The applicable guidelines from Section 7.5.3: Construction Guidelines are: • When work is conducted during the fire season (as identified by the Riverside County Fire Department) adjacent to coastal sage scrub or chaparral vegetation, appropriate fire-fighting equipment (e.g., extinguishers, shovels, and water tankers) shall be available on the site during all phases of project construction to help minimize the chance of human-caused wildfires. Shields, protective mats, and/or additional fire preventative methods shall be used during grinding, welding, and other spark-inducing activities. Personnel trained in fire hazards, preventative actions, and responses to fires shall advise contractors regarding fire risk from all construction-related activities. • Waste, dirt, rubble, or trash shall not be deposited in the Conservation Area or on native habitat. The applicable practices from the 15 practices listed in Appendix C: Standard Best Management Practices are:

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			• The footprint of disturbance shall be minimized to the maximum extent feasible. Access to sites shall be via pre-existing access routes to the greatest extent possible. • To avoid attracting predators of the species of concern, the project site shall be kept clean of debris. All food-related trash items shall be enclosed in sealed containers and regularly removed from the project site. • Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project construction activities and shall be specified in the construction plans. Construction limits will be fenced with orange snow screen. Exclusion fencing should be maintained until the completion of all construction activities. Employees shall be instructed that their activities are restricted to the construction areas. • The Permittee shall have the right to access and inspect any sites of approved projects including any restoration/enhancement area for compliance with project approval conditions including these BMPs. **Avoidance and Minimization Measure NC-16: Sensitive Species and Habitats.** In conjunction with the final design and prior to site preparation, all sensitive species and special habitats within 300 feet of the Project Area shall be mapped on the grading plans by a qualified biologist. Sensitive and candidate species and special habitats shall be defined as:

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			• Coastal California gnatcatcher • Cactus wren • Designated critical habitat for Coastal California gnatcatcher • Thread-leaved brodiaea • Designated critical habitat for Braunton's milk-vetch • Least Bell's vireo • Southwestern willow flycatcher • Drainages and streambeds • Coastal sage scrub • Coast Live Oak Woodland **Avoidance and Minimization Measure NC-17: Cactus.** Prior to clearing and grubbing and construction, cactus will be saved where feasible, for use in revegetation efforts. **ETC Final EIR and Final EIS Measure B-2.** *Prior to grading and site preparation, all native oak, sycamore, and willow trees of 4 inches in diameter at breast height (DBH-4.5 ft from mean ground level) within the Project limits and within 20 ft of grading and construction operations shall be tagged and numbered with permanent tags. The tag numbers of the trees to be protected and those to be removed shall be noted. Records of these numbers shall be kept by TCA, the Resource Management Coordinator/ Monitor and the Orange County Environmental Management Agency/Environmental Planning Division for use in mitigation/replacement and monitoring of tree resources before, during and after grading and construction activities.* **ETC Final EIR and Final EIS Measure B-3.** *Prior to grading and site preparation, all trees subject to*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			removal shall be marked with a red "X" on the trunk. Trees to be preserved shall be marked with yellow flagging visible from all direction. **ETC Final EIR and Final EIS Measure B-4.** *In conjunction with grading, site preparation and construction, short term soil stabilization using accepted soil protection techniques and native species shall be conducted under the direction of a qualified biologist, where determined to be appropriate to protect sage scrub communities.* **ETC Final EIR and Final EIS. Measure B-8.** *For the period covering all site preparation, grading and construction, a resource management coordinator shall monitor wildlife* [and plant] *habitat preservation to ensure that the ESAs and areas outside the Caltrans right-of-way are not adversely impacted. The monitor shall be on site before, during, and after the completion of site preparation, grading and construction.* **ETC Final EIR and Final EIS Measure B-11.** *Prior to site preparation, grading and construction, the TCA shall implement procedures for protecting sensitive and candidate species and special habitats* [particularly Braunton's milk-vetch critical habitat] *identified and mapped on grading plans during site preparation, grading, construction and maintenance activities by following Caltrans Environmentally Sensitive Area procedures* **ETC Final EIR and Final EIS Measure B-25.** *During site preparation and grading, the TCA shall phase operations around important habitat areas to allow for completion of nesting and breeding activities for the*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			coastal California gnatcatcher and raptor species occurring in oak woodland. This measure will be conducted and overseen by a qualified biologist.
Wetlands and Other Waters	No impacts	*Temporary Impacts* • Impacts to less than 0.53 acre of non-wetland USACE waters inside Caltrans right-of-way and less than 0.01 acres outside Caltrans right-of-way. • Potential for indirect impacts to functions and values of on-site drainages and downstream areas. • Impacts to approximately 1.01 acres of CDFW jurisdictional areas inside Caltrans right-of-way and approximately 0.03 acre outside Caltrans right-of-way. • Impacts to less than 0.53 acre of RWQCB jurisdictional areas inside Caltrans right-of-way and less than 0.01 acre outside Caltrans right-of-way. *Permanent Impacts* • Impacts to approximately 0.45 acre of USACE jurisdictional non-wetland waters inside Caltrans right-of-way and approximately 0.02 acre outside Caltrans right-of-way. • Impacts to approximately 0.66 acre of CDFW jurisdictional areas inside Caltrans right-of-way and approximately 0.20 acre outside Caltrans right-of-way. • Impacts to approximately 0.45 acre of RWQCB jurisdictional areas inside Caltrans right-of-way and approximately 0.02 acre outside Caltrans right-of-way.	**Minimization Measure WET-1: Nationwide Permit.** Prior to initiation of construction, a permit will be obtained through the United States Army Corps of Engineers (USACE) pursuant to Section 404 of the Clean Water Act. As part of coordination with the USACE, a Nationwide Permit will be pursued, if appropriate. **Minimization Measure WET-2: Streambed Alteration Agreement.** Prior to initiation of construction, a Streambed Alteration Agreement (SAA) with the California Department of Fish and Wildlife will be obtained and any specifications in the SAA will be implemented. **Minimization Measure WET-3: Water Quality Certification.** Prior to initiation of construction, a Section 401 Water Quality Certification from the Santa Ana Regional Water Quality Control Board will be obtained and any specifications in the Certification will be implemented. **ETC Final EIR and Final EIS Measure B-13.** *In conjunction with final design, the TCA shall, to the extent feasible, construct stream bank reinforcements of ungrouted riprap gabions or other appropriate material at the shallowest possible slope (2:1 or less), allowing for the replacement of soil and the subsequent revegetation of these areas with riparian plant species.*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Plant Species	No impacts	*Temporary Impacts* • Potential indirect impacts to California black walnut trees near the Gypsum Canyon off-ramp due to the potential for fuel spills from construction equipment and activities of construction equipment or personnel outside designated construction areas and ESAs in the vicinity of the trees. • Potential direct impacts to Coulter's Matilija poppy and potential temporary indirect impacts due to the potential for fuel spills from construction equipment and activities of construction equipment or personnel outside designated construction areas and ESAs. *Permanent Impacts* • Potential direct impacts to 3 California black walnut saplings. • Coulter's Matilija poppies in the slope area south of SR-91 would be removed.	**Minimization Measure PS-1: California Black Walnut Environmentally Sensitive Areas.** Prior to clearing or construction, highly visible barriers (such as orange construction fencing) will be installed around the protected zone of any southern California black walnut tree and designated as an Environmentally Sensitive Area (ESA) to be preserved for those trees not within the footprint of project structures or areas of ground disturbance. The protected zone will extend 5 feet (ft) outside of the drip line or 15 ft from the trunk of the tree, whichever is greater. No grading or fill activity of any type will be permitted within the ESA. In addition, no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner so as to prevent accidental damage to nearby California black walnut trees. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESA. Silt fence barriers will be installed at the ESA boundary to prevent accidental deposition of fill material in areas where trees are immediately adjacent to planned grading activities. **Minimization Measure PS-2: California Black Walnut Sapling Relocations.** The California black walnut saplings in the median of the SR-241/SR-91 interchange will be assessed at the time of construction and relocated within Caltrans right-of-way, if feasible. If not feasible, replacement planting of the California black walnut saplings will be done at a minimum 2:1 ratio. **Minimization Measure PS-3: Coulter's Matilija Poppies Environmentally Sensitive Areas.** Prior to clearing or construction, highly visible barriers (such as orange construction fencing)

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			will be installed around the protected zone of any Coulter's Matilija poppies and designated as an ESA to be preserved to the extent feasible. The protected zone will extend 5 ft outside of the vegetation edge. No grading or fill activity of any type will be permitted within the ESA. In addition, no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner so as to prevent accidental damage to nearby Coulter's Matilija poppies. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESA. Silt fence barriers will be installed at the ESA boundary to prevent accidental deposition of fill material in areas where Coulter's Matilija poppies are adjacent to planned grading activities.
Animal Species	No impacts	*Temporary Impacts* • May redirect foraging golden eagles away from the borders of the BSA during construction. • Potential indirect impacts to species that occupy the coastal sage scrub and chaparral natural communities through the disturbance of potentially suitable habitat. • Impacts to special-status bat species including noise, dust, night lighting, and human encroachment, and reduced access to roost sites in the crevices of bridges and overhead structures. • Potential indirect impacts to grassland and open space species through the disturbance of approximately 14.1 acres of potential habitat. • Direct impacts to nesting birds through vegetation clearing, grading, and tree removal.	**Minimization Measure AS-1: Nesting Birds.** Prior to clearing or construction, to avoid impacts to nesting birds, any native vegetation removal or tree- (native or exotic) trimming activities will occur outside of the bird nesting season (February 15 through August 31). In the event that vegetation clearing is necessary during the nesting season or if construction activities or access have the potential to impact nesting birds, a qualified biologist will conduct a preconstruction survey to identify the locations of nests. Should nesting birds be found, an exclusionary buffer will be established by the qualified biologist. This buffer will be clearly marked in the field by construction personnel under guidance of the qualified biologist, and construction or clearing will not be conducted within this zone until the qualified biologist determines that the young have fledged or the nest is no longer active. Construction of the Coal Canyon Undercrossing access ramp and widening of Windy Ridge Wildlife

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		• Potential indirect impacts to nesting birds due to disturbances near trees occupied by nesting birds if tree-trimming activities were to occur during the nesting season. *Permanent Impacts* • Indirect impacts to species that occupy coastal sage scrub and chaparral through the removal of potential suitable habitat. • Indirect impacts to special-status grassland animal species through potential habitat loss. • Potential indirect impacts to nesting birds due to loss of foraging and nesting habitat as a result of loss of vegetation or changes in habitat types.	Undercrossing will be conducted outside the bird nesting season (February 15 through August 31). Periodic monitoring by the project biologist will be conducted as needed to ensure that construction activities do not impact bridge-nesting birds at Coal Canyon Undercrossing and Windy Ridge Wildlife Undercrossing. **Minimization Measure AS-2: Bat Maternity Roosting Survey.** A qualified bat biologist will survey the Project Area during the maternity roosting period, typically in June, to assess the potential for its use as a maternity roost because maternity roosts are generally formed in late spring. The qualified bat biologist will also perform preconstruction surveys because bat roosts can change seasonally. The surveys will include a combination of structure inspection, sampling, exit counts, and acoustic surveys. **Minimization Measure AS-3: Bridgework Schedule.** To prevent impacts to bridge and crevice-roosting bats, all bridgework will be scheduled between September 1 and November 30 to avoid hibernating bats and the maternity season. If this is not feasible, temporary bat eviction and exclusion devices will be installed between September 1 and November 20 prior to the initiation of construction activities and under the supervision of a qualified bat biologist. Exclusion devices will be installed during the fall, or as otherwise directed by a qualified biologist, to avoid trapping flightless young inside during the summer months or hibernating individuals during the winter. Such exclusion efforts will be continued to keep the structures free of bats until the completion of construction on those structures, at which time the

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			devices will be removed to allow the bats to resume roosting in the structure and prevent any permanent loss of bat-roosting habitat. All bat exclusion techniques will be coordinated between the District Biologist and the resource agencies. **Avoidance and Minimization Measure AS-4: Construction Work Activities.** To avoid or minimize impacts to bats at a night roost, work activities are not to occur within 100 feet of the structure between sunset and sunrise. If construction work must be performed at night in the vicinity of the bridge structure containing a night roost, noise and direct lighting will be directed away from the structure or lighting will be specifically focused on the section of the bridge actively under construction to minimize impacts to night-roosting bats. **Avoidance and Minimization Measure AS-5: Bird Exclusion Netting.** Airspace access to and from a bridge structure containing a night roost will not be restricted. Bird exclusion netting will not be used unless made from thick plastic and installed with no exposed overlap joints. Clearing of vegetation in the vicinity of the structure will also be minimized to the greatest extent practicable. **Minimization Measure AS-6: Unfilled Expansion.** Subject to public health and safety considerations, existing unfilled expansion joints will remain unfilled and unobstructed to prevent permanent loss of existing day- and/or night-roosting habitat. Habitat for bats may be enhanced in the project limits by leaving newly created expansion joints unrubberized so that they are available to bats for day roosting after construction is complete.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Avoidance Measure AS-7: Burrowing Owl Survey. In accordance with the California Department of Fish and Wildlife survey guidelines for burrowing owl, a take avoidance survey shall be conducted no less than 14 days prior to initiating ground-disturbance activities and, if time lapses between project activities, a final survey may be conducted within 24 hours prior to ground disturbance.
Threatened and Endangered Species	No impacts	*Temporary Impacts* • Potential indirect impacts through the accumulation of dust on the leaves of any Braunton's milk-vetch plants in designated critical habitat. • Potential to impact thread-leaved brodiaea. • Potential to redirect foraging bald eagles, least Bell's vireo, and southwestern willow flycatcher away from the BSA. • Indirect impacts to coastal California gnatcatcher due to increased exposure to noise, vibration, dust, nighttime lighting, and human presence. • Direct impacts to coastal California gnatcatcher through habitat disturbance and removal. • Impacts to 11.85 acres of coastal California gnatcatcher occupied habitat in the median of the SR-241/SR-91 interchange in the NCCP/HCP Plan Area. • Impacts to 12.8 acres of designated coastal California gnatcatcher critical habitat in the NCCP/HCP Plan Area. • Impacts to 7.96 acres of designated coastal California gnatcatcher habitat outside the NCCP/HCP Plan Area in Caltrans right-of-way.	**Avoidance Measure TE-1: Construction Work Limits Review.** During Final Design, the construction work limits will be reviewed to ensure that the lateral work limits are reduced to avoid designated Braunton's milk-vetch critical habitat and that construction staging areas are located in areas that have been previously disturbed or developed. All designated critical habitat for Braunton's milk-vetch adjacent to and outside the project disturbance limits will be delineated on the project specifications as environmentally sensitive areas (ESAs) prior to any construction activities near those areas. **Avoidance Measure TE-2: Thread-Leaved Brodiaea Preconstruction Surveys and Environmentally Sensitive Areas.** Preconstruction surveys will be conducted to determine if thread-leaved brodiaea is present in the Project Area. If this species is found in the Project Area, prior to clearing or construction, highly visible barriers (such as orange construction fencing) will be installed around the protected zone of any thread-leaved brodiaea individuals and designated as an ESA to be preserved to the extent feasible. The protected zone will extend 5 feet (ft) outside of the vegetation edge. No grading or fill activity of any type will be permitted within the ESA. In addition, no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		Permanent Impacts • Potential minor impacts to thread-leaved brodiaea habitat. • Indirect impacts to coastal California gnatcatcher as a result of increased exposure to noise, vibration, and dust. • Take of coastal California gnatcatcher in the NCCP/HCP Plan Area through the permanent loss of 2.98 acres of occupied habitat in the median of the existing junction of SR-241 and SR-91.[1] • Take of designated coastal California gnatcatcher critical habitat in the NCCP/HCP Plan Area through the permanent loss of approximately 19.72 acres.[1] • Take of designated coastal California gnatcatcher habitat outside the NCCP/HCP Plan Area as a result of impacts to 1.18 acres in Caltrans right-of-way.[1] • Potential loss of a minimal amount (approximately 1 acre of chaparral) of potential foraging habitat for least Bell's vireo and southwestern willow flycatcher.	so as to prevent accidental damage to nearby thread-leaved brodiaea. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESA. Silt fence barriers will be installed at the ESA boundary to prevent accidental deposition of fill material in areas where thread-leaved brodiaea is adjacent to planned grading activities. **Avoidance Measure TE-3: Coastal California Gnatcatcher Survey.** Prior to the commencement of grading operations or other activities involving disturbance of coastal sage scrub or areas of coastal California gnatcatcher designated critical habitat (with constituent elements), a survey will be conducted to locate coastal California gnatcatcher within 100 ft of the outer extent of projected soil disturbance activities and the locations of coastal California gnatcatchers shall be clearly marked and identified on the construction/grading plans. The 100 ft buffer outside the project soil disturbance limits will be clearly marked in the field by construction personnel under the guidance of the biologist. Construction or clearing will not be conducted within the project disturbance limits adjacent to the 100 ft buffer until the biologist determines that the young have fledged or the nest is no longer active. **Avoidance Measure TE-4: Barrier Installation.** Prior to clearing or construction, highly visible barriers (such as orange construction fencing) will be installed around coastal sage scrub and coastal California gnatcatcher designated critical habitat (with constituent elements) adjacent to and outside the project footprint to designate ESAs. No grading or fill

[1] This impact is less than significant with mitigation under CEQA.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			activity of any type will be permitted within the ESAs and no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner so as to prevent accidental damage to nearby ESAs. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESAs. Silt fence barriers will be installed at the ESA boundaries adjacent to the project footprint to prevent accidental deposition of fill material in areas where vegetation is adjacent to planned grading activities. **Avoidance Measure TE-5: Construction Activities Monitoring.** A qualified biologist will monitor all construction activities for the duration of the project construction in areas adjacent to ESAs to flush out any wildlife species present from the construction areas prior to construction and to ensure that vegetation removal, best management practices, ESAs, and all avoidance and minimization measures are properly followed. **Avoidance and Minimization Measure TE-6: Shielded Lighting.** Shielded lighting will be used for any nighttime construction adjacent to coastal sage scrub within coastal California gnatcatcher designated critical habitat to avoid and minimize artificial night lighting effects on the gnatcatcher. **Mitigation Measure TE-7: Section 7 Consultation and Biological Opinion.** Section 7 consultation was conducted with the United States Fish and Wildlife Service (USFWS) to address effects to coastal California gnatcatcher and coastal California gnatcatcher-occupied and/or critical habitat outside the Natural Communities Conservation Plan (NCCP)

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Area. Requirements from the 2019 Biological Opinion are listed below. Temporary impacts to coastal sage scrub and native plant restoration will be offset through restoration of 6.84 acres with coastal sage scrub (not as mitigation slopes; coastal sage scrub will be the baseline condition for future consultations). Temporary impacts to chaparral, oak woodland, nonnative grassland, and ruderal in designated critical habitat will be offset through restoration of 7.31 acres with native fuel modification zone species[1] (not mitigation slopes). Permanent impacts to coastal sage scrub and native plant restoration will be offset through: on-site restoration of 8.73 acres (6.98 acres with coastal sage scrub and 1.75 acres with native fuel modification zone species [not mitigation slopes]); off-site mitigation of 19.63 acres including advance restoration of 13.3 acres at Strawberry Farms (9.75 acres of coastal sage scrub restoration, 1.86 acres of coastal sage scrub and prickly pear cactus restoration, 0.39 acre of native perennial grassland restoration, and 1.3 acre of coastal sage scrub enhancement); and off-site mitigation of 6.33 acres at Saddle Club (2.63 acres of coastal sage scrub and 3.7 acres of coastal sage scrub/chaparral mix). Permanent impacts to chaparral, oak woodland, nonnative grassland, and ruderal in designated critical habitat will be offset through: on-site restoration of

[1] A fuel modification zone is an area where combustible vegetation in the landscaping is modified or replaced with drought-tolerant or fire-resistant vegetation to provide protection against wildfires. These drought-tolerant and fire-resistant species are considered fuel modification zone species.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			7.31 acres with native fuel modification zone species (not mitigation slopes); on-site restoration of 0.28 acre with native fuel modification zone species, with maintenance activities within 14 ft from edge of pavement (not mitigation slopes); and off-site mitigation of 4.24 acres at Saddle Club with coast live oak woodland. The conservation measures (CMs) included in the 2019 Biological Opinion that will be implemented as part of the Proposed Project to avoid and minimize impacts to gnatcatchers are as follows: ***Avoidance and Minimization through Project Design*** ***CM 1.*** *If feasible, the Soil Nail Wall Design Option will be selected to minimize permanent impacts to approximately 5 acres of land located within the Gypsum Canyon Nature Preserve. The final engineering design for this area will be reported to the CFWO at least 15 working days prior to initiating project impacts.* ***CM 2.*** *Permanent project lighting will be of the lowest illumination necessary for safety and will be directed toward the roadway and away from sensitive habitats and wildlife crossing areas. Light glare shields will be used to reduce the extent of illumination into sensitive habitats. The Caltrans Project Biologist[1] will review the permanent lighting plans and then submit them to the CFWO for review and approval at least 15 working days prior to initiating project impacts.*

[1] The Caltrans Project Biologist will be a Caltrans biologist familiar with the federally listed species potentially affected by the project and with the habitats that support these species; he/she will be the primary contact for the CFWO during project implementation.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			CM 3. *A wildlife connectivity plan will be developed and implemented to ensure that ecosystem functions[1] are maintained by the project for the benefit of listed species. The plan will be provided to the CFWO for review and approval at least 60 days prior to initiating project impacts. The plan will include the following requirements:* *a. Animals may not be able to navigate steep vertical bends and they may not utilize culverts or crossing structures that have horizontal bends that limit visibility. The culvert at drainage feature 4 will be lengthened by the project but no vertical or horizontal bends will be constructed in the culvert extension;* *b. To the maximum extent feasible, rock slope protection will be avoided at culvert and wildlife crossing openings. If rock slope protection is required, modifications (e.g., small pebble, dirt, or grouted movement pathways) will be made such that animals of all sizes can access culverts and wildlife crossings;* *c. If stream bank reinforcements are required at wildlife crossing and culvert areas, project proponents will design them in the manner most conducive to wildlife movement. If stream bank reinforcements of ungrouted riprap gabions or other material are required, they will be constructed at the shallowest possible slope (2:1 or less), and will be covered with soil and revegetated with native riparian plant species in a manner that will allow for the movement of wildlife of all sizes.*

[1] For example, dispersal of top predators to control meso-predators that prey on avifauna, such as gnatcatchers (e.g., Crooks and Soule 1999)

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Project proponents will ensure that soil placement on top of stream bank reinforcements will occur in a manner that does not result in erosion holes in the soil surface over time; *d. Restoration of temporary impact areas at wildlife crossings will be planned in a manner that will encourage wildlife use and movement. Project proponents will ensure that plantings will not obscure culvert or wildlife crossing openings. Native vegetation may be used to funnel wildlife toward the crossings and create a visual barrier between the roadway and habitat in a manner that will encourage wildlife movement;* *e. Culvert openings will be flush with the road slope and ground to allow animals to easily find and access the culverts. Culvert openings that provide for wildlife movement under the roadway will not be blocked with grates, with the exception of openings from culverts to those portions of the roadway median that are not intended for wildlife access or movement;* *f. Where the project will result in new roadside fencing, project proponents will ensure that fencing ties into culvert and wildlife crossing openings such that animals following the fencing can easily find and access culverts and crossings. Any new roadside fencing will be 10 to 12-foot high chain link fence with an 18-inch "outrigger" (three strands of barbed wire) angled away from the road, located within the Caltrans right-of-way, subject to the Biological Monitor's[1] recommendations, and will be buried 24 inches into the ground to discourage wildlife from digging under the fence. In areas*

[1] See CM 14 for a description of the Biological Monitor.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			where new fencing is installed, old fencing that blocks access to culverts and crossings will be removed. Any new fencing constructed by the project at the SR-241/SR-91 interchange will incorporate recommendations on page 194 of USGS 2013; *g. Project proponents will coordinate with the Orange County Transportation Authority (OCTA) to ensure that the project will not negatively affect the camera study and native plantings planned by OCTA at the Coal Canyon Undercrossing;* *h. Equipment maintenance, lighting, and staging for the project will be in designated areas, away from the Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing. Construction in the Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be limited to daylight hours. These areas will be kept clear of all equipment or structures that could potentially serve as barriers to wildlife passage. Structures required for bridgework at the Windy Ridge Wildlife Undercrossing will be erected so as not to block the main underpass, and scaffolding and false work will be restricted to the side of the underpass to maintain the functionality of the crossing for wildlife movement. Construction access to the SR-91 median at Coal Canyon will be provided within the fenced access area at Coal Canyon Road, and no project work or access will take place beyond the fencing within the existing dirt wildlife crossing area at Coal Canyon;* *i. Freeway signage with lighting, including changeable message signs, will be located in areas away from the Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing;*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			j. Construction noise at the Coal Canyon Undercrossing will be limited to no more than 5 dBA hourly L_{eq} above ambient levels beyond 100 feet from the edge of the roadway to avoid noise disturbance to wildlife within the crossing; *k. A new turnaround has been constructed in the SR-91 median west of Coal Canyon that benefits both wildlife connectivity and human safety by providing a more accessible and rapid turnaround location that is outside of the wildlife undercrossing. This turnaround is not large enough to accommodate construction vehicles and will continue to be accessible to emergency vehicles during project work, maintaining the recent benefits to wildlife movement that the turnaround provides; and* *l. Subject to approval by California Highway Patrol (CHP) and Orange County Fire Authority (OCFA), install a permanent access control gate near the top of the eastbound off-ramp at Coal Canyon, leaving enough room in front of the gate for personnel in authorized vehicles to exit SR-91 and open the gate, but encouraging unauthorized vehicles to use the new median turnaround. Signage will be posted and maintained at the gate to inform the public about adjacent sensitive habitats and species as well as access restrictions (e.g., wildlife crossing, no unauthorized access, no night access). The gate and signage will be installed prior to completion of project construction. If installation of the gate is not approved, Caltrans and TCA will coordinate with the CFWO to identify an alternative measure to enhance connectivity or improve safety for dispersing wildlife to offset temporal impacts resulting from the substantially degraded functioning of Coal Canyon as a wildlife undercrossing during the 2-year construction*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			period. If enhancing connectivity at Coal Canyon itself is not practicable, then improvements may occur at a different location identified in coordination with the CFWO. ***Avoidance and Minimization during Vegetation Clearing/Project Construction*** ***CM 4.*** *The clearing and grubbing of native upland habitats for the project will occur between September 1 and February 14, to avoid the gnatcatcher breeding season (or sooner than September 1, if a biologist knowledgeable of gnatcatcher biology and ecology approved by the CFWO demonstrates to the satisfaction of the CFWO that all gnatcatcher nesting is complete). The project proponents will submit the biologist's name, address, telephone number, and work schedule on the project to the CFWO at least 15 working days prior to initiating project impacts.* ***CM 5.*** *All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities will be restricted to designated staging areas that are a minimum of 100 feet from sensitive habitats and drainages.* ***CM 6.*** *All lighting used at night for project construction will be selectively placed and directed at the immediate work area and away from adjacent sensitive habitats. Light glare shields will be used to reduce the extent of illumination into sensitive habitats.* ***CM 7.*** *Erosion and sediment control devices used for the project, including fiber rolls and bonded fiber matrix, will be made from biodegradable materials*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			such as jute, with no plastic mesh, to avoid creating a wildlife entanglement hazard. ***CM 8.*** *The project site will be kept as clear of debris as possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the site. All spoils and material disposal will be disposed of properly.* ***CM 9.*** *If fill must be borrowed from or disposed of offsite, the construction contractor will identify any necessary borrow and disposal sites and provide this information to Caltrans for review. Caltrans will review borrow and disposal site information and if borrow or disposal activities may affect a listed species or critical habitat, Caltrans will reinitiate Section 7 consultation.* ***CM 10.*** *Impacts from fugitive dust will be avoided and minimized through watering and other appropriate measures.* ***CM 11.*** *Project personnel will be prohibited from bringing domestic pets to construction sites to avoid disturbance and depredation of wildlife by domestic pets in adjacent habitats.* ***CM 12.*** *During project construction, all invasive species included on the National Invasive Species Management Plan, the State of California Noxious Weed List, and the California Invasive Plant Council's Invasive Plant Inventory list (Cal-IPC 2006) found growing within the project impact area will be removed. Special care will be taken during transport, use, and disposal of soils containing invasive weed seeds and all weedy vegetation removed during construction will be properly disposed of to prevent*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			spread into areas outside of the construction area. ***CM 13.*** *All native or sensitive habitats outside and adjacent to the construction limits will be designated as Environmentally Sensitive Areas (ESAs) on project maps. ESAs will be temporarily fenced during construction with orange plastic snow fence, orange silt fencing, or in areas of flowing water, with stakes and flagging. No personnel, equipment, or debris will be allowed within the ESAs. Temporary ESA fencing and flagging will be installed in a manner that does not impact habitats to be avoided and such that it is clearly visible to personnel on foot and operating heavy equipment. The project proponents will submit to the CFWO, at least 5 days prior to initiating project impacts (except for impacts resulting from clearing to install temporary fencing), the final plans for initial clearing and grubbing of habitat and project construction. These final plans will include photographs that show the fenced and flagged limits of impact and all areas to be impacted or avoided. Field maps indicating the location of temporary ESA fencing and/or staking will also be provided. If work occurs within gnatcatcher habitat beyond the fenced or demarcated limits of impact, all work will cease until the problem has been remedied to the satisfaction of the CFWO. Temporary ESA fencing and markers will be maintained in good repair until the completion of project work adjacent to each ESA and removed upon completion of project work adjacent to each ESA.* ***CM 14.*** *A CFWO-approved biologist (Biological Monitor)[1] will be on site during all initial vegetation clearing/grubbing and weekly during project*

[1] The Biological Monitor will be familiar with the federally listed species potentially affected by the project (i.e., gnatcatcher) and with the habitats that support this species.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			construction within 500 feet of gnatcatcher habitat to monitor compliance with all conservation measures. The project proponents will submit the biologist's name, address, telephone number, and work schedule on the project to the CFWO at least 15 working days prior to initiating project impacts. The contract of the Biological Monitor will allow direct communication with the CFWO at any time regarding the proposed project. The Biological Monitor will be provided with a copy of this consultation. The Biological Monitor will be available during pre-construction and construction phases to address protection of sensitive biological resources, monitor ongoing work, and maintain communications with construction personnel to facilitate the appropriate and lawful management of issues relating to biological resources. The Biological Monitor will perform the following duties: *a. Perform a minimum of three focused preconstruction surveys, on separate days, to determine the presence of gnatcatchers in the upland project impact footprint. Surveys will begin a maximum of 30 days prior to performing vegetation clearing/grubbing, and one survey will be conducted the day immediately prior to the initiation of vegetation clearing. If any gnatcatchers are found in the upland project impact footprint, the Biological Monitor will direct construction personnel to begin vegetation clearing/grubbing in an area away from the gnatcatchers. It will be the responsibility of the Biological Monitor to implement measures (e.g., direct vegetation clearing away from gnatcatchers, flush gnatcatchers out of the active work area) to avoid death and injury of gnatcatchers by vegetation clearing/grubbing. The Biological Monitor will also record the number and*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			location of gnatcatchers disturbed by vegetation clearing/grubbing. Caltrans will notify the CFWO at least 7 days prior to vegetation clearing/grubbing to allow the CFWO to coordinate with the Caltrans Project Biologist on potential bird flushing activities; *b. Perform a minimum of three focused surveys, on separate days, to determine the presence of gnatcatcher nest building activities, egg incubation activities, or brood rearing activities within 500 feet of project construction that is initiated during the February 15 to August 31 breeding season for the gnatcatcher. Surveys will begin a maximum of 7 days prior to performing construction within 500 feet of gnatcatcher habitat during the breeding season, and one survey will be conducted the day immediately prior to the initiation of construction within 500 feet of gnatcatcher habitat during the breeding season. Additional surveys will be done once a week during project construction within 500 feet of gnatcatcher habitat during the breeding season. These additional surveys may be suspended as approved by the CFWO;* *c. If active gnatcatcher nests are identified within 500 feet of noise generating construction activities and noise is in excess of 60 dBA hourly L_{eq} or if noise is in excess of ambient noise levels if ambient noise levels exceed 60 dBA hourly L_{eq}, noise attenuation structures will be installed at the noise source to reduce noise levels to 60 dBA hourly L_{eq} or to ambient noise levels if ambient noise levels exceed 60 dBA hourly L_{eq} at the nest location. Noise monitoring will occur during the breeding season and be reported monthly to the CFWO. If the Biological Monitor suspects that avoidance and minimization measures are ineffective, and project activities may be adversely affecting the*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			gnatcatcher, culpable activities will be suspended within 500 feet of active nests until nesting activity is completed and fledglings are no longer in the area or until effective avoidance and minimization measures can be identified, implemented, and demonstrated to be effective. If the specified noise targets cannot be met or the Biological Monitor observes potential adverse effects to gnatcatchers from project-related noise, activities that are resulting in potential adverse effects will be halted, and the CFWO will be contacted to determine if reinitiation of consultation is necessary; *d. Oversee installation of and inspect erosion control measures a minimum of once per week to document and bring to the attention of the contractor any breaks in erosion control measures such that they are repaired immediately;* *e. Oversee installation of and inspect ESA fencing a minimum of once per week to document and bring to the attention of the contractor any breaks in the fence such that they are repaired immediately;* *f. Train contractors and construction personnel expected to be in the project impact area on the biological resources associated with the project and document that training is implemented by construction personnel. At a minimum, training will include:* *i. The purpose for resource protection;* *ii. A description of the gnatcatcher and its habitats;* *iii. The CMs that should be implemented during project construction to conserve the gnatcatcher, including strictly limiting activities, vehicles, equipment, and construction materials to the*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			project footprint to avoid adjacent sensitive resource areas; *iv. Environmentally responsible construction practices;* *v. The protocol to resolve conflicts that may arise at any time during the construction process; and* *vi. The general provisions of the Act, the need to adhere to the provisions of the Act, and the penalties associated with violating the Act;* *g. Monitor the project site immediately prior to and during construction to identify the presence of invasive weeds and recommend measures to avoid their inadvertent spread in association with the project. Such measures may include inspection and cleaning of construction equipment and use of eradication strategies;* *h. Periodically monitor the work area to document that work activities do not generate excessive amounts of dust;* *i. Submit monthly email reports (including photographs of impact areas) to the CFWO during clearing of, and construction within, 500 feet of gnatcatcher habitat. The monthly reports will document that authorized impacts were not exceeded and in general compliance with all conditions. The reports will also outline the location of construction activities, the type of construction that occurred, and equipment used. These reports will specify numbers and locations of gnatcatchers (if observed), their observed behavior (especially in relation to construction activities), and remedial measures employed to avoid and minimize impacts to these species. Raw field notes should be*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			available upon request by the CFWO; and *j. Submit a final report to the CFWO within 120 days of the completion of construction for the project that includes: photographs of habitat areas that were to be avoided and other relevant summary information documenting that authorized impacts were not exceeded and that general compliance with all conservation measures was achieved.* ***Measures to Offset Impacts to Gnatcatcher and its Habitat*** ***CM 15.*** *Areas of temporary impact, as quantified in Tables 1 and 3, will be revegetated and restored with native species as specified in Tables 4 and 5. These areas will be returned to original grade, as feasible. Prior to initiating project impacts, a restoration plan will be developed for the temporary impact areas. The plan will be submitted to the CFWO for review and approval at least 15 working days prior to initiating project impacts. This plan will include a detailed description of restoration methods, slope stabilization, and erosion control, criteria for restoration to be considered successful, and monitoring protocol(s). Following the completion of construction activities within each area of impact, the restoration plan will be implemented for a minimum of 5 years, unless success criteria are met earlier and all artificial water has been off for at least 2 years. Temporary impact areas will be planted as soon as possible, with consideration of seasonal timing, following re-grading after completion of construction to prevent encroachment by nonnative plants.*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			CM 16. *Some permanent impact cut and fill slopes for the project will be revegetated with native species as specified in Table 4. Duff and rare plants may be salvaged from the project impact footprint to aid in revegetating slopes with native habitats. The revegetated areas will have temporary irrigation and will be planted with native container plants and seeds. At least 3 years of plant establishment/ maintenance on these slopes will be conducted to control nonnative plants. These areas will be planted as soon as possible, with consideration of seasonal timing, following the completion of construction to prevent encroachment by nonnative plants.* ***CM 17.*** *If maintenance of a coastal sage scrub restoration area is necessary between February 15 and August 31, a CFWO-approved biologist[1] will survey for gnatcatchers within the restoration area, access paths to it, and other areas susceptible to disturbances by site maintenance. Surveys will consist of three visits separated by 2 weeks starting March 1 of each maintenance/monitoring year. Work will be allowed to continue on the site during the survey period. However, if gnatcatchers are found during any of the visits, the applicant will notify and coordinate with the CFWO to identify measures to avoid and/or minimize effects to the gnatcatcher (e.g., nests and an appropriate buffer will be flagged by the biologist and avoided by the maintenance work).*

[1] The biologist for this measure will be a trained ornithologist with at least 40 hours of observing gnatcatchers in the field and documented experience locating and monitoring nests of the target species.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			CM 18. *Permanent and temporary impacts to the gnatcatcher and its habitat[1] (as summarized in Tables 1, 2, and 3) will be offset as specified in Tables 4 and 5.* ***CM 19.*** *Portions of the Saddle Club property used to offset project-related impacts will be conserved and managed in perpetuity. Each of the sub-measures below will be implemented prior to initiating project-related impacts:* *a. A CFWO-approved conservation easement will be recorded over conserved land in favor of a CFWO-approved entity (e.g., a non-profit environmental organization or government agency). The conservation easement will prohibit all activities that significantly disturb wildlife or detrimentally impact habitat for the gnatcatcher. Potential recreation uses that do not impact habitat or result in significant disturbance to gnatcatchers (e.g., hiking along existing trails) may be proposed in a CFWO-approved habitat management plan for the property provided that the management plan includes sufficient measures and funding to ensure that these activities are appropriately monitored and managed;* *b. A CFWO-approved habitat management plan will be prepared that addresses potential threats to the conserved habitat, such as unauthorized human access, monitoring and management of any authorized recreational activities, control of non-native invasive plant species, and habitat*

[1] Permanent and temporary impacts to 3.81 acres and 26.63 acres of habitat, respectively, have already been offset in accordance with the requirements of Biological Opinion 1-6-94-F-17.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			degradation from fire; *c. A CFWO-approved land manager will be identified to implement the habitat management plan; and* *d. A CFWO-approved non-wasting endowment or endowments will be established with sufficient funds to implement the habitat management plan and to monitor and enforce the conservation easement. The funding for the endowment(s) will be determined through a Property Analysis Record (PAR) or equivalent analysis.* *Caltrans will monitor and report on compliance with the established take exemptions for gnatcatchers associated with the proposed action. The terms and conditions of the 2019 Biological Opinion are as follows:* ***Coastal California Gnatcatcher*** ***1.1** Prior to initiating project work, three preconstruction surveys will be conducted within all suitable gnatcatcher habitat within the project footprint, within 30 days prior to initiation of vegetation removal activities, to verify that no more than 1 pair of gnatcatchers will be harmed as a result of the project.* ***1.2** Prior to initiating project work, Caltrans will provide to the CFWO a map showing the distribution of gnatcatchers relative to the project footprint and an estimate of the number of gnatcatcher territories that will be impacted by the project, or confirm in writing that maps, distribution information, and the number of territories that will be impacted by the project remain correct.*

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			1.3 *Prior to project construction, the project proponent will submit to the CFWO Geographic Information System (GIS) shapefiles in UTM, Zone 11N (meters), NAD 83 coordinate system that show the following: anticipated permanent impacts, temporary impacts, habitat restoration sites, and habitat conservation sites. Please note that these polygons may overlap. For example, one location could be temporarily impacted and subsequently restored and conserved. Include the following metadata for each shapefile: summary/description of the data, attribute definitions, coordinate system/ projection information or any other pertinent information. If there are any changes to the boundaries anticipated impacts, restoration, or conservation sites, such changes must be addressed consistent with the Reinitiation Notice below. In addition, updated GIS shapefiles will be submitted to the CFWO.* ***1.4*** *Caltrans will notify the CFWO within 30 days of completing removal of gnatcatcher occupied habitat. The purpose of this notification is to ensure that impacts to gnatcatcher-occupied habitat from the proposed project do not exceed the take thresholds.* **Avoidance and Minimization Measure TE-8: Foraging Special-Status Riparian Birds.** Prior to vegetation clearing or construction within the species foraging habitat areas during the nesting period, a qualified biologist will conduct a preconstruction survey to identify the locations of any special-status riparian birds. If foraging individuals are found within the vegetation clearing area during the breeding season, clearing will be delayed until the species are absent. Per the NCCP/HCP construction minimization measures, outside the breeding season, the monitoring biologist will flush NCCP/HCP identified

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			species from the area, prior to brush-clearing and earth-moving activities. **ETC Final EIR and Final EIS Measure B-27.** *Grading and construction activities shall be redirected temporarily around any nesting sites for a distance of 500 ft for candidate and listed species of birds and at a distance of 1,000 ft for raptors during nesting and breeding seasons. ~~In the event that a coyote, bobcat, or mountain lion den is located, grading and construction operations shall be redirected around the den for a distance of 1,000 ft.~~ The nesting sites ~~and dens~~ should be resurveyed toward the end of the breeding seasons of these species to verify completion of the breeding cycle. Nests ~~and dens~~ that will be removed ~~due to ETC~~ must be removed during the nonbreeding season only.*
Invasive Species	No impacts	• Potential to spread invasive species by the entering and exiting of construction equipment contaminated by invasive species, disturbances to soil surfaces, and improper removal and disposal of invasive species that result in the seed being spread along the highway.	**Minimization Measure IS-1: Weed Abatement Program/Non-Standard Special Provisions.** During Final Design, a qualified landscape architect will develop a Weed Abatement Program/Non-Standard Special Provisions (NSSP) for inclusion in the project specifications. The Weed Abatement Program/NSSP will be developed in compliance with Executive Order 13112 to minimize the potential for intrusion or export of invasive plant species to and from the Biological Study Area during project construction. At a minimum, the following will be included in the Weed Abatement Program/NSSP and implemented prior to and during construction to address potential effects associated with invasive species. The Weed Abatement Program/NSSP will define the specific details, frequency, and, if applicable, performance standards for the following individual activities and requirements: • Inspect and clean construction equipment at the beginning and end of each day and prior to

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			transporting equipment from one project location to another. • Limit soil and vegetation disturbance to those areas specifically required for the project construction. • Obtain soil, gravel, and rock from weed-free sources.
			• Use only certified weed-free straw, mulch, and/or fiber rolls for erosion control during construction. • Prior to the completion of construction, revegetate affected areas adjacent to native vegetation with plant species that are native to the vicinity and approved by California Department of Transportation (Caltrans) District 12 Biologists. • Not use any species listed in the California Invasive Plant Council Invasive Plant Inventory with a High or Moderate rating in revegetation. • After construction, ensure that erosion control and revegetation sites are monitored until achievement of the project-specific performance standards defined in the Weed Abatement Program/NSSP or a period of 1 year, whichever is greater, after installation, to detect nonnative species prior to the establishment of the native vegetation. • Implement eradication procedures (e.g., spraying and/or hand weeding) should an infestation occur during or after construction. The use of herbicides will be prohibited within and adjacent to native vegetation, except as specifically authorized and monitored by Caltrans District 12 Biologists during and after project construction. • During construction, reduce indirect impacts of exotic plant infestations and litter by roadside maintenance at least once daily during construction to remove litter and weeds from the right-of-way.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Cumulative Impacts	No impacts	The Build Alternative, when considered with other cumulative projects as stated in Table 3.1.3 would contribute incrementally to cumulatively considerable impacts related to: • Potential permanent impacts to paleontological resources when excavations extend into fossiliferous formations. • Permanent and/or temporary removal of coastal sage scrub and grassland, which has the potential to result in adverse impacts to special-status plant and animal species.	Project-specific measures described within this table would avoid or reduce and minimize potential cumulative impacts.
Climate Change	No impacts	• The increase in average vehicle speeds in the Project Area by 2–4 miles per hour would decrease the average delay per vehicle by up to 20 percent, which would help offset the 3,400–7,800 increase in daily trips. • No substantial change to greenhouse gas emissions.	See Measures AQ-2, AQ-4, AQ-5, and TR-1 above. • Landscaping reduces surface warming, and through photosynthesis, decreases CO_2. Landscaping would be provided where necessary within the corridor to provide aesthetic treatment, replacement planting, or mitigation planting for the Proposed Project. The landscape planting would help offset any potential CO_2 emissions increase. The project will plant native trees and shrubs within the project area and right of way; see visual measure V-7. • The Proposed Project would specify the use of energy-efficient lighting, such as LED traffic signals. LED bulbs consume 10 percent of the electricity of traditional lights, which will also help reduce the Proposed Project's operational CO_2 emissions. • According to Caltrans Standard Specifications, idling time for lane closure during construction is restricted to 10 minutes in each direction. In addition, the contractor must comply with Title 13,

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			CCR Section 2449(d)(3) that was adopted by the ARB on June 15, 2008. This regulation restricts idling of construction vehicles to no longer than 5 consecutive minutes. Compliance with this regulation reduces harmful emissions from diesel-powered construction vehicles. • TSM/TDM elements, described more fully in Section 2.2.1.2, are included in the scope of the Build Alternatives. • Legally enforceable measures intended to reduce GHG emissions from the 2016 SCAG RTP/SCS will be included in the Plans, Specifications, and Estimates package prepared for the Project. For example, the new toll lanes would be available for high occupancy vehicles such as buses and vehicles with three or more persons.

ARB = California Air Resources Board
BMPs = Best Management Practices
BSA = biological study area
Caltrans = California Department of Transportation
CCR = California Code of Regulations
CDFW = California Department of Fish and Wildlife
CO_2 = carbon dioxide
dBA = A-weighted decibels
ESA = Environmental Site Assessment
FTIP = Federal Transportation Improvement Program
GHG = greenhouse gas
HCP = Habitat Conservation Plan
HOV = High Occupancy Vehicle
LED = light emitting diode
LRTP = Long-Range Transportation Plan
MPAH = Master Plan of Arterial Highways
NCCP = Natural Communities Conservation Plan
RCTC = Riverside County Transportation Commission
RTP = Regional Transportation Plan
RWQCB = Regional Water Quality Control Board
SCAG = Southern California Association of Governments
SCS = Sustainable Communities Strategy
SR-241 = State Route 241
SR-55 = State Route 55
SR-91 = State Route 91
TDM = Transportation Demand Management
TSM = Transportation System Management
USACE = United States Army Corps of Engineers
VHT = vehicle hours traveled
VMT = vehicle miles traveled
MSHCP = Multiple Species Habitat Conservation Plan

S.7.1 Unresolved Issues or Areas of Controversy

The Proposed Project is a later phase of the ETC that would be constructed in the median of SR-241 and SR-91, and therefore, there are no known unresolved issues or areas of controversy.

S.7.2 Project Schedule

Table S.2 summarizes the general schedule for the Proposed Project, subject to funding availability and obtaining all required approvals and permits. Final Design is expected to be completed in spring 2021.

Table S.2 Project Schedule

Milestone	Estimated Date
Completion of Final Supplemental EIR/EIS and Record of Decision	Early 2020
Completion of anticipated permits, licenses, and approvals after Record of Decision	Mid 2021
Anticipated start of construction	Late 2021
Opening Year	2023

S.7.3 Permits and Approvals Needed

Table S.3 identifies the permits and/or approvals that are or may be required prior to or during construction and/or operation of the Build Alternative.

Table S.3 Permits and Approvals Needed

Agency	Permit/Approval	Status/When Required
Federal Highway Administration (FHWA)	Air Quality Conformity Analysis Determination	FHWA determined that the Proposed Project conforms to the State Implementation Plan (SIP) in accordance with 40 CFR Part 93 on May 3, 2017.
United States Fish and Wildlife Service (USFWS)	Section 7 consultation for threatened and endangered species	A new Biological Opinion was issued on April 17, 2019.
United States Army Corps of Engineers (USACE)	Section 404 Permit for filling or dredging of waters of the United States	A Nationwide Permit will be obtained during Final Design.
California Department of Fish and Wildlife (CDFW)	1602 Lake or Streambed Alteration Agreement for impacts to jurisdictional areas	An agreement will be obtained during Final Design.
California Department of Transportation (Caltrans)	Encroachment Permit	An Encroachment Permit will be obtained by the F/ETCA during Final Design.
California Transportation Commission (CTC)	CTC vote to approve funds and approve new public road connection	Following the approval of the Final Supplemental EIR/EIS, the CTC will be required to vote to approve funding for the project if federal funding is sought, as well as approve the new SR-91/SR-241 Express Lanes Connector.
State Water Resources Control Board (SWRCB)	Caltrans NPDES Permit	Permit issued to Caltrans on September 19, 2012, for discharges from State right-of-way. The SWRCB and the Santa Ana RWQCB will be notified of the Project during final design pursuant to the permit requirements.
	Section 402 NPDES Permit (Construction Activity) for waste discharge requirements during construction	Permit Registration Documents, including an NOI, will be submitted at least 7 days prior to the start of construction.
Santa Ana Regional Water Quality Control Board (RWQCB)	Section 401 Water Quality Certification for impacts to jurisdictional areas	Certification will be obtained during final design.
	Section 402 NPDES Permit (Groundwater Dewatering)	If groundwater dewatering is required, an NOI will be submitted at least 60 days prior to the start of construction.
Various Utilities	Encroachment Permits for protection-in-place and possible relocations	During Final Design
City of Anaheim	Potential Encroachment Permit	During Final Design
Orange County Parks (OC Parks)	Concurrence on Section 4(f) De Minimis Determination	OC Parks provided written concurrence with the Section 4(f) De Minimis Determination on July 25, 2017 (see Appendix B).
	Approval of land transfer (partial acquisition)	During right-of-way acquisition process.
Riverside County Transportation Commission (RCTC) and Orange County Transportation Authority (OCTA)	Concept of Operations Report preparation and coordination (tolling operations)	Toll operations are being coordinated among the F/ETCA, OCTA, and RCTC and are evaluated in a separate Concept of Operations report. That report will be completed during Final Design.

CFR = Code of Federal Regulations
EIR/EIS = Environmental Impact Report/Environmental Impact Statement
F/ETCA = Foothill/Eastern Transportation Corridor Agency
NOI = Notice of Intent
NPDES = National Pollutant Discharge Elimination System
SR-241 = State Route 241
SR-91 = State Route 91

This page intentionally left blank

SR-241 / SR-91 Express Lanes Connector Project

ORANGE COUNTY AND RIVERSIDE COUNTY, CALIFORNIA
City of Anaheim, City of Yorba Linda and City of Corona
12-ORA-241 PM 36.1/39.1
12-ORA-91 PM 14.7/18.9
08-RIV-91 PM 0.0/1.5

0K9700 / 1200020097

Traffic Analysis Report

Prepared for:
Foothill/Eastern Transportation Corridor Agency, Project Sponsor

and for:
State of California Department of Transportation, Lead Agency

July 24, 2015

The environmental review, consultation, and any other action required in accordance with applicable Federal laws for this project is being, or has been, carried-out by Caltrans under its assumption of responsibility pursuant to 23 USC 327.

Signature Page

12-ORA-241 PM 36.1/39.1
12-ORA-91 PM 14.7/18.9
08-RIV-91 PM 0.0/1.5

This Traffic Analysis Report has been prepared under the direction of the following Registered Traffic Engineer. The Registered Traffic Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

James Roldan
REGISTERED TRAFFIC ENGINEER

7.24.15
DATE

Table of Contents

EXECUTIVE SUMMARY 1

1 INTRODUCTION 5

2 STUDY OVERVIEW AND METHODOLOGY 9

2.1 Study Area 9
2.2 Microsimulation Analysis Approach 10
2.3 Technical Assumptions and Details 11

3 INPUT DATA 12

3.1 Existing Traffic Data 12
3.2 Performance Data 13
3.3 Roadway Geometry 13
3.4 Bluetooth Study 15

4 BASELINE VISSIM CODING 22

4.1 Geometry 22
4.2 Control Elements 22
4.3 Traffic Demands 23

5 EXISTING CONDITIONS CALIBRATION 24

5.1 Testing and Verification 24
5.2 Calibration Approach 24
5.2.1 FHWA and Caltrans Guidelines 24
5.2.2 VISSIM Calibration Adjustments 25
5.2.3 Visual Audit Criteria 30
5.3 Calibration Results 31
5.3.1 Volume Calibration Results 31
5.3.2 Travel Time Calibration Results 32
5.3.3 Visual Calibration Results 33
5.3.4 Calibration Summary 37

6 TRAFFIC FORECASTING METHODOLOGY 38

6.1 Overview of Future Year Demand Development 38
6.1.1 Existing Traffic Data 39
6.1.2 Existing OCTAM Data 39
6.1.3 Short-Term Future Data 39
6.1.4 Long-Term Future Data 39
6.2 Estimate Future Mainline/Ramp Demands 39
6.3 Forecast Results in the Mixing Bowl 41
6.3.1 2017 Forecasts 41
6.3.2 2040 Forecasts 44
6.3.3 Regional Shift to SR-241 with Project 46

7 TRAFFIC ANALYSIS METHODOLOGY 48

7.1 Traffic Analysis Purpose 48
7.2 Overall Approach 48
7.3 Description of Scenarios 49

8 TRAFFIC ANALYSIS RESULTS 52

8.1 2017 Conditions (No-Build vs. Build) 52
8.1.1 Volume Served 52

8.1.2 Speed 58
8.1.3 Density and LOS 64
8.1.4 Travel Time 67
8.1.5 Network Performance 71
8.1.6 Express Lane Operations 73
8.2 2040 Conditions (No-Build vs. Build) 74
8.2.1 Volume Served 74
8.2.2 Speed 80
8.2.3 Density and LOS 86
8.2.4 Travel Time 89
8.2.5 Network Performance 92
8.2.6 Express Lane Operations 94
8.3 Additional Design Variations 95
8.3.1 Eastbound Design Variations 95
8.3.2 Eastbound Design Variation Results Comparison 98
8.3.3 Westbound Design Variations 102
8.3.4 Design Variations Considered during Earlier Stages of Project Development 103

9 SUMMARY OF FINDINGS 105

9.1 Overall Traffic Operations Findings 105
9.2 Overall Advantages 107
9.3 Overall Challenges 108

10 PROJECT REVIEWERS 109

Appendices

A Bluetooth Study Summary Statistics

B VISSIM Summary of Results – Existing Conditions

C VISSIM Summary of Results – 2017 No Build Conditions

D VISSIM Summary of Results – 2040 No Build Conditions

E VISSIM Summary of Results – 2017 Build Conditions

F VISSIM Summary of Results – 2040 Build Conditions

G Project Layout Plan

Executive Summary

The purpose of this report is to document the traffic analysis for the State Route 241/State Route 91 (SR-241/SR-91) Express Lane Connector Project Approval/Environmental Documentation (PA/ED). The Foothill/Eastern Transportation Corridor Agency (F/ETCA) is developing the PA/ED for the proposed improvements to the SR-241/SR-91 interchange in Orange County. The proposed improvements evaluated in the PA/ED focus on a single build alternative: a new direct connection between SR-241 and the SR-91 Express Lanes ("proposed project"). That alternative would construct direct connectors from northbound SR-241 to the eastbound SR-91 Express Lanes, and from the westbound SR-91 Express Lanes to southbound SR-241 (one lane in each direction). The goal of the traffic analysis in this report is to conduct operational analysis to refine and study the PA/ED alternative. The analysis is focused on the interaction of the Express Lane weaving section with the congested general purpose (GP) lanes.

SR-241 is a toll-only facility, from the Oso Parkway interchange in south Orange County to its terminus at SR-91. There are two mainline toll stations, including one at Windy Ridge south of the SR-91 interchange. Approximately half of the ramps are tolled as well, depending on the direction of travel and proximity to the mainline stations. Toll stations have both FasTrak and license plate readers and no cash is accepted. The toll pricing structure on SR-241 is the same for all vehicle types, regardless of occupancy. The existing SR-241 is owned and maintained by Caltrans, with the F/ETCA operating the toll facilities.

The 91 Express Lanes is a two-lane toll facility on SR-91 in each direction from SR-55 to the Orange/Riverside County line (east of the SR-241 interchange). To the west and east of the 91 Express Lanes termini, there are HOV lanes on SR-91 that extend from the Interstate 110 (I-110) freeway in Gardena to the west and to the Madison Street interchange in Riverside to the east. The Orange County Transportation Authority (OCTA) operates the 91 Express Lanes. The Riverside County Transportation Commission (RCTC) is currently constructing the SR-91 Corridor Improvement Project (CIP). The SR-91 CIP will extend the tolled express lanes on SR-91 between the Orange County/Riverside County line and I-15, add one GP lane between SR-71 and I-15, add one GP lane from the I-15/SR-91 interchange to Pierce Street, and improve five local interchanges and the I-15/SR-91 interchange.

A detailed traffic operations analysis was conducted to evaluate potential design variations of the PA/ED alternative. This report focuses on that analysis. Simulation modeling was the primary tool for analysis, using VISSIM, a microscopic, behavior-based multi-purpose traffic simulation program. VISSIM was used to simulate operations on the SR-91 and SR-241 corridors, including mainline segments, ramps, interchanges, and freeway connections. One of the key benefits of VISSIM is the ability to visually simulate traffic operations to reveal the operational effects of various design solutions. The VISSIM modeling done as part of this analysis does not include dynamic behavior based on toll rate policy. Instead, the modeling is intended to optimize operations within the study area and assumes that tolling policies will be set to match the travel-demand assumptions used on the toll facilities in the VISSIM model. The volume of northbound SR-241 to eastbound SR-91 traffic using the

direct connector was developed by determining the volume of traffic that would optimize (maintain speeds in excess of 60 mph) the express lane operations in the mixing bowl. The volume using the new connector will ultimately be influenced by pricing. The amount of traffic exiting the eastbound SR-91 express lanes (from OCTA) and entering the eastbound express lanes (to RCTC) is generally fixed based on the data gathered from the Bluetooth study. The third contributing stream of traffic is the volume coming from the new direct connecter. The volume used in the analysis is the volume that will optimize express lane operations and still be acceptable to all three tolling agencies (OCTA, RCTC, and F/ETCA). A separate Tolling and Revenue Study and Concept of Operations Study will be developed to determine toll rates. The Tolling and Revenue Study and Concept of Operations Study will investigate the tolling policy that will provide the optimized direct connector demand determined in this study.

Table E-1 summarizes the overall traffic operational benefits of the proposed project.

FIGURE E-1
Overall Project Benefit Summary[1]

Measure	Year	Results
Increase in Throughput in the Mixing Bowl	2017	2,586 vehicles in the peak direction (+7%)
	2040	1,239 vehicles in the peak direction (+3%)
Increase in Corridor Vehicle Miles Traveled (VMT)	2017	34,301 VMT (+4%)
	2040	17,403 VMT (+2%)
Change in Speed	2017	+1.9 mph (+6%)
	2040	+2.7 mph (+7%)
Change in Delay	2017	-0.6 minutes/vehicle (-12%)
	2040	-0.8 minutes/vehicle (-17%)

[1] Based on seven hours of results for the combined AM peak (three hours) and PM peak (four hours).

In the build scenario, the overall findings of the traffic analysis are as follows:

- The overall throughput on SR-91 increases.
- On the eastbound SR-91 GP lanes, more vehicles must exit the OCTA Express Lanes and enter the GP lanes and fewer cars can leave the GP lanes and enter the RCTC Express Lanes. More vehicles are in the Express Lanes in the mixing bowl area because the northbound SR-241 to eastbound SR-91 Express Lane Connector adds more traffic to the mixing bowl. More vehicles will exit, increasing friction, because the downstream constraint remains the same (3,200 vehicles/hour in the RCTC Express Lanes).
- However, there is also a reduction in friction due to fewer vehicles weaving from the northbound SR-241 to eastbound SR-91 GP ramp to the RCTC Express lanes with the project (i.e., most of these vehicles will now use the SR-241 to SR-91 Express Lane Connector.).

- The result is an overall net zero effect on the eastbound SR-91 GP lanes in the PM peak period. The overall average difference in vehicle throughput (Build minus No-Build) in the 2017 PM peak period is -0.3% and 0.6% in the 2040 PM peak period.

A more detailed summary of the overall findings of the traffic analysis for the SR-241/SR-91 Express Lane Connector Project is provided below:

- Traffic is projected to shift from other regional routes (SR-91, SR-55, surface streets) to SR-241. This regional shift is a result of the additional capacity of the new connector.
- In the AM peak period, more traffic is forecasted to travel from westbound SR-91 to southbound SR-241 in the build scenario. The resulting shift leads to fewer vehicles in the westbound SR-91 GP lanes (850 vehicles/hour in 2017 and 1,320 vehicles/hour in 2040), west of the SR-91/SR-241 interchange.
- In the 2017 PM peak period, more traffic is forecasted to travel from northbound SR-241 to eastbound SR-91 in the build scenario. The resulting shift leads to fewer vehicles in the eastbound SR-91 GP lanes (190 vehicles/hour in 2017), west of the SR-91/SR-241 interchange. Once these vehicles shift to SR-241, they are projected to use the northbound SR-241 to eastbound SR-91 Express Lane Connector and continue on to the RCTC Express Lanes. By the 2040 Design Year, background growth and the additional eastbound capacity provided by the SR-91 Ultimate CIP project is anticipated to balance traffic demand within the corridor between the No Build and Build scenario. Therefore, for the 2040 PM peak, there is no eastbound SR-91 regional shift to SR-241 projected.
- The project increases the toll road system throughput and revenue in both 2017 and 2040.
- The project will reduce the length of the northbound SR-241 to eastbound SR-91 queue on the general purpose ramp in the PM peak period.
- The project provides measureable system benefits in the AM peak period in the form of increased vehicle throughput on SR-91 in the mixing bowl (7% in 2017 and 3% in 2040), increased corridor-wide VMT (4% in 2017 and 2% in 2040), increased average speed (+1.9 mph in 2017 and +2.7 mph in 2040), and reduced average delay (-0.6 minutes/vehicle in 2017 and -0.8 minutes/vehicle in 2040).
- During the PM peak period, system benefits are mixed in 2017 but show an overall improvement by 2040. SR-91 vehicle throughput and VMT both increase in 2017, but the average speed drops (1 mph) and delay increases (0.4 minutes/vehicle) due to the regional shift that increases demand in the GP lanes. However, all system measures show positive impact by 2040 (average speed increases by 2 mph and delay decreases by 0.4 minutes/vehicle).
- At the SR-91 westbound mainline bottleneck between the Green River Road interchange and the Express Lane Ingress (AM peak period), the project provides benefit in the form of shorter queues, higher vehicle throughput, higher speed and lower density, and shorter travel times in both 2017 and 2040.
- At the SR-91 eastbound mainline bottleneck between the Express Lane Ingress and the Green River Road interchange (PM peak period), the project increases vehicle throughput in both 2017 and 2040. By the 2040 Design Year, the project will improve conditions at the bottleneck by increasing average speed (5 mph) and vehicle

throughput (between 0.5 and 1.5%) while reducing density and lowering travel time (from 1 to 4.5 minutes depending on path).

- With the project, high-speed operations of the SR-91 Express Lanes can be maintained with a maximum eastbound exiting Express Lane volume of 1800 vehicles/hour in 2017 (1600 vehicles/hour in 2040). The mix of OCTA/F/ETCA/RCTC toll traffic is critical to the successful operations of the mixing bowl.
- Analysis of three design variations for the SR-91 Eastbound Express Lane weaving section shows that there is very little difference between the variations from a traffic operations perspective, and the optimal configuration should be chosen based on other design considerations.
- The VISSIM modeling done as part of this analysis does not include dynamic behavior based on toll rate policy. Instead, the modeling is intended to optimize operations within the study area and assumes that tolling policies will be set to match the travel-demand assumptions used on the toll facilities in the VISSIM model. A separate tolling and revenue study will determine toll rates.

Overall Advantages

The proposed SR-241/SR-91 Express Lane Connector Project has several advantages:

- The direct connection closes the gap between two major toll systems (SR-91 Express Lanes and SR-241 Toll Roads)
- The project improves vehicle throughput in SR 91 corridor since more vehicles can be pushed through the SR-91 Express Lanes (i.e., the project brings more cars into the express lanes in the mixing bowl and therefore the combined GP and Express Lane throughput increases in the mixing bowl). The Express Lanes throughput upstream and downstream of the mixing bowl (i.e., in the OCTA and RCTC Express Lanes) remains the same with or without the project (approximately 3,200 vehicles/hour), consistent with the OCTA and RCTC tolling policy assumptions.
- The project improves vehicle miles traveled throughout study area.
- The project will pull 1,700 vehicles during the peak hours (AM/PM) from I-5, SR-55 and surrounding local arterials to SR-241 in the 2017 Opening Year.
- Travel time will be reduced by 24% for northbound SR-241 to eastbound SR-91 toll users in the 2017 Opening Year.

Overall Challenges

The proposed project also has challenges that will need to be addressed in future design/operations efforts:

- The operations through the SR-91/SR-241 interchange ingress/egress area require that flows to/from each system are controlled to ensure that the Express Lanes do not break down. This will require coordinating the pricing schemes for three different systems and for different entry points.
- The direct connection proposed by the project will integrate three tolling facilities (SR-91 Express Lanes, SR-241 Toll Roads, RCTC Express Lanes) operated by three different agencies (OCTA, F/ETCA, and RCTC). The operation and setting of toll rates for all three systems will require careful planning and coordination.

Both of the above items will be addressed in the Concept of Operations Report.

1 Introduction

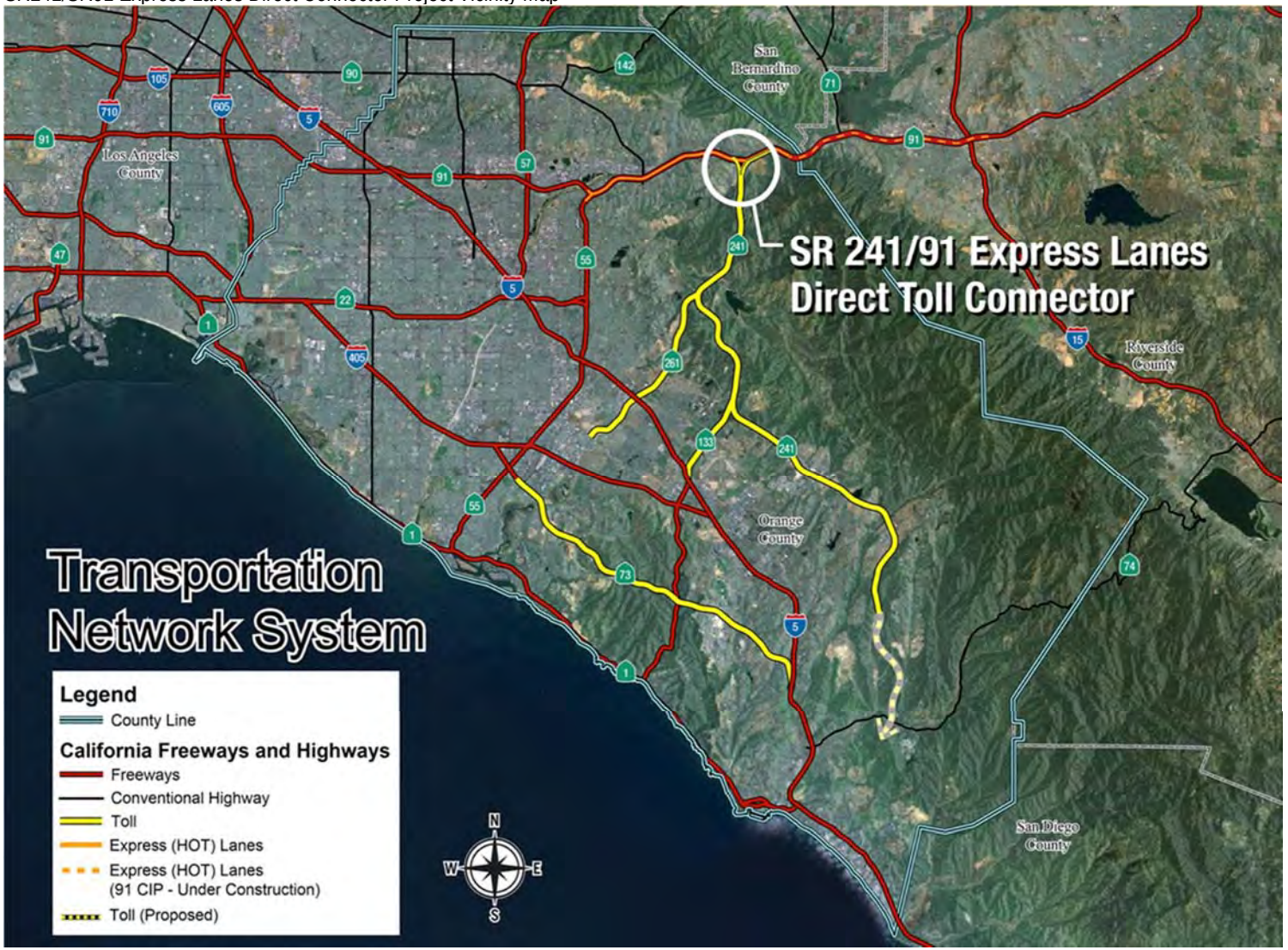
The purpose of this report is to document the traffic analysis for the State Route 241/State Route 91 (SR-241/SR-91) Express Lane Connector Project Approval/Environmental Documentation (PA/ED). The Foothill/Eastern Transportation Corridor Agency (F/ETCA) is developing the PA/ED for the proposed improvements to the SR-241/SR-91 interchange in Orange County. The proposed improvements evaluated in the PA/ED focus on a single build alternative: a new direct connection between SR-241 and the SR-91 Express Lanes ("proposed project"). That alternative would construct direct connectors from northbound SR-241 to the eastbound SR-91 Express Lanes, and the westbound SR-91 Express Lanes to southbound SR-241 (one lane in each direction). The goal of the traffic analysis in this report is to conduct operational analysis to refine and study the PA/ED alternative. The analysis is focused on the interaction of the Express Lane weaving section with the congested general purpose (GP) lanes.

The Proposed Project, located at the junction of SR-241 and SR-91 within the cities of Anaheim, Yorba Linda, and Corona and counties of Orange and Riverside, would provide improved access between SR-241 and SR-91 and is proposed to be a tolled facility. The proposed median-to-median connector project encompasses 12-ORA-241 (PM 36.1/39.1), 12-ORA-91 (PM 14.7/18.9), and 08 RIV-91 (PM 0.0/1.5) for a length of approximately 8.7 mi. A vicinity map of the project in relation to the toll road system in Orange County is provided in **Figure 1-1.**

Improvements for the connector are limited to 5.9 mi in the cities of Anaheim and Yorba Linda from south of the Windy Ridge Wildlife Undercrossing on SR-241 to Coal Canyon Undercrossing on SR-91. The remaining 2.8 mi of the Proposed Project is limited to FasTrak signage improvements (advance signage) in the cities of Anaheim (1.2 mi total), Yorba Linda (0.1 mi) and Corona (1.5 mi), with exact placement pending the Final Design process. The Proposed Project is mostly within existing Caltrans right-of-way, with one partial acquisition adjacent to eastbound SR-91. Construction access and staging areas would occur within existing Caltrans right-of-way. The project layout plan is provided in Appendix G.

SR-241 is a toll-only facility, from the Oso Parkway interchange in south Orange County to its terminus at SR-91. There are two mainline toll stations, including one at Windy Ridge south of the SR-91 interchange. Approximately half of the ramps are tolled as well, depending on the direction of travel and proximity to the mainline stations. Toll stations have both FasTrak and license plate readers and no cash is accepted. The toll pricing structure on SR-241 is the same for all vehicle types, regardless of occupancy. The existing SR-241 is owned and maintained by Caltrans, with the F/ETCA operating the toll facilities.

FIGURE 1-1
SR241/SR91 Express Lanes Direct Connector Project Vicinity Map



The 91 Express Lanes is a two-lane toll facility on SR-91 in each direction from SR-55 to the Orange/Riverside County line (east of the SR-241 interchange). To the west and east of the 91 Express Lanes termini, there are HOV lanes on SR-91 that extend from the Interstate 110 (I-110) freeway in Gardena to the west and to the Madison Street interchange in Riverside to the east. The Orange County Transportation Authority (OCTA) operates the 91 Express Lanes. The Riverside County Transportation Commission (RCTC) is currently constructing the SR-91 Corridor Improvement Project (CIP). The SR-91 CIP will extend the tolled express lanes on SR-91 between the Orange County/Riverside County line and I-15, add one GP lane between SR-71 and I-15, add one GP lane from the I-15/SR-91 interchange to Pierce Street, and improve five local interchanges and the I-15/SR-91 interchange.

The 91 Express Lanes require all drivers to have a FasTrak transponder to pay for the toll. There is no ingress/egress except at the endpoints, so there is only a single toll station in the middle of the tolled segment. Toll rates vary by day-of-week and time-of-day, and these are set in advance by OCTA, using historical traffic patterns. These rates remain the same for several months until they are updated again. OCTA maintains a toll policy that describes the criteria for changing the tolls (*http://www.91expresslanes.com/policies.asp*).

Vehicles on the SR-91 Express Lanes with three or more persons can use the 3+ lane toll-free (although they still are required to have a transponder), except when traveling eastbound (EB) on Monday through Friday between the hours of 4 and 6 PM. During that peak time, when traveling through the 3+ lane, drivers receive a 50% discount on the posted toll. The discount policy also applies to zero emission vehicles (ZEVs), motorcycles, disabled plates and disabled veterans.

A detailed traffic operations analysis was conducted to evaluate potential design variations of the PA/ED alternative. This report focuses on that analysis. Simulation modeling was the primary tool for analysis, using VISSIM, a microscopic, behavior-based multi-purpose traffic simulation program. VISSIM was used to simulate operations on the SR-91 and SR-241 corridors, including mainline segments, ramps, interchanges, and freeway connections. One of the key benefits of VISSIM is the ability to visually simulate traffic operations to reveal the operational effects of various design solutions. The VISSIM modeling done as part of this analysis does not include dynamic behavior based on toll rate policy. Instead, the modeling is intended to optimize operations within the study area and assumes that tolling policies will be set to match the travel-demand assumptions used on the toll facilities in the VISSIM model. A separate tolling and revenue study will determine toll rates.

In this report, following the introduction (Section 1), the report is organized as follows:

- Section 2 is a description of the study overview and methodology used to complete the analysis.
- Section 3 includes a detailed description of input data.
- Section 4 contains the coding of the baseline VISSIM model.
- Section 5 explains the calibration of the base model.
- Section 6 describes the development of future year travel demands.
- Section 7 discusses the traffic analysis methodology.
- Section 8 summarizes the results.
- Section 9 is the overview of findings and recommendations from the analysis.

2 Study Overview and Methodology

This section includes the details of the microsimulation analysis approach and assumptions and limitations of this study.

2.1 Study Area

The study area was chosen to be wide enough to capture the changes in traffic operations caused by the proposed project. The traffic analysis study area is illustrated in **Figure 2-1**. The freeway network includes SR-91 from west of the Weir Canyon Road interchange in Anaheim Hills to east of the Serfas Club Drive/Auto Center Drive interchange in Corona. The network also includes SR-241 from north of the Santiago Canyon Road interchange and SR-71 south of the Butterfield Ranch Road interchange.

FIGURE 2-1
Study Area

All on- and off-ramps within the freeway study area are included in the traffic analysis. The study area includes the SR-91 GP lanes, SR-91 Express Lanes, the SR-241 and SR-71 interchange connector ramps, and the service interchange ramps (i.e., local street interchange ramps). No ramp terminal intersections or other local streets are included in the study area. Off-ramps were modeled to a point just upstream of the stop bar at the intersection. On-ramps were modeled from the curb return on the local street, and include ramp meters if present.

During the development of the study area, consideration was given to the effect of the I-15 interchange (east of the project). Including SR-91 out to I-15 in the model would have substantially increased the complexity and data requirements for the analysis, without providing any more information about the SR-241/SR-91 connector benefits and impacts.

Therefore, the approach agreed upon by the technical stakeholders (Caltrans, OCTA, F/ETCA, and RCTC) was to replicate the effects of any bottlenecks caused by I-15 on eastbound traffic during the calibration process. For the calibration of existing conditions (see Section 5), the effects of downstream bottlenecks were modeled with reduced speed areas. These agreements were made at the traffic modeling methods and assumptions workshop held on April 25, 2013 at the F/ETCA offices.

2.2 Microsimulation Analysis Approach

This study followed the guidelines set forth in the Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, Federal Highway Administration (FHWA), July 2004. A base year (2013) model for the study area was built in VISSIM (version 5.40-09) to reflect current conditions. The focus areas for the model were mainline segments, ramps, and freeway connections. The intersections at the freeway ramp termini were not included in the network since the focus of the analysis was the freeway operations (mainline and express lanes).

The VISSIM model developed for this study was based on the SR-91 CIP Final Traffic Study Paramics model (prepared by Parsons Brinckerhoff for RCTC in 2009) and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study VISSIM model (prepared by Stantec for OCTA and F/ETCA in 2011). Validation of the simulation model will be accomplished by comparing the inputs/outputs to these previously-developed models.

The AM and PM peak periods were modeled, using the hours of 6 to 9 AM and 3 to 7 PM as the analysis windows. Three basic vehicle types were included in the model: non-toll paying vehicles (includes single-occupant and high occupancy vehicles); toll paying vehicles (includes single-occupant and high occupancy vehicles); and heavy trucks. The vehicle operational characteristics for non-toll paying vehicles and toll paying vehicles were considered identical.

After the existing conditions VISSIM microsimulation model was coded, an error checking process was conducted by reviewing the network coding for accurate lane geometry, lane channelization, lane alignment, and traffic controls. Once this error checking process was completed, low (e.g., 10%) traffic demands were coded into the model to ensure reasonable driver behavior at low volumes. Static routing in VISSIM was used for the origin/destination (O-D) assignment. Base year (2013) and future year (2017 and 2040) models, which were calibrated to match existing conditions, were used to analyze alternative scenarios. The planned opening year is 2018. The year 2017 was chosen to represent the opening year of the project. 2017 is considered by F/ETCA a reasonable estimate for opening year (plus or minus two years, 2017 to 2019). The year 2040 was chosen to represent the long-term horizon year.

The following outputs and measures of effectiveness (MOEs) were reported from the VISSIM analysis for both the GP and Express Lanes in the study area:

- Volume served (GP and Express Lanes)
- Density (GP and Express Lanes)
- Speed (GP and Express Lanes)

- Level of Service (GP and Express Lanes)
- Travel time by direction/O-D (GP and Express Lanes)
- Vehicle hours travelled (VHT)
- Vehicle miles travelled (VMT)

2.3 Technical Assumptions and Details

Table 2-1 summarizes assumptions for the VISSIM operational parameters.

TABLE 2-1
VISSIM Freeway Operational Parameters

Parameter	Approach
Vehicle Types and Classes	Non-toll, Toll, Trucks
Driving Behavior: Freeway Mainline and Ramps	Wiedemann 99[1] Freeway default parameters for car following and lane changing behavior; Adjustments may be made at bottleneck locations to match observed congestion as part of calibration process
Vehicle Acceleration	VISSIM default parameters
Vehicle Deceleration	VISSIM default parameters
Free-Flow Speed	Estimated from field surveys[2]
Reduced-Speed Areas on Ramps	From speed advisory signs and field surveys[2]
Off-Ramp Lane Change Distance	Initially based on location of exit-signs and upstream ramps, but could change as part of network calibration
Simulation Speed	5 time steps[3] per second

[1] The Wiedemann 99 model consists of ten calibration parameters, all labeled with a 'CC" prefix. Each of the parameters controls a unique aspect of the car following model. Additional discussion of these CC parameters and how they were adjusted during calibration is discussed in Section 5.2.2.
[2] Field survey data is based on PeMS data collected in the first and fourth quarter of 2013.
[3] The number of simulation seconds to a real time second. The change of the Simulation Speed does not affect the results of the simulation.

Other technical details are as follows:

- Trucks were restricted from using the left-most lane in the VISSIM model on SR-91 GP lanes. In addition, trucks were restricted from using Express/HOV lanes.
- Transit vehicles were not modeled in VISSIM.
- Pedestrians were not be modeled in VISSIM since the operations are focused on freeway operations.

3 Input Data

Detailed data were needed for both model input and calibration. Model input data included geometric data (supply), traffic data (demand), and control data. Calibration data were focused on performance data, including speed and queues. Both model input and calibration data were obtained from Bluetooth data collected in November/December 2013, field visits, aerial photographs (Google Earth), previous studies (SR-91 CIP Final Traffic Study Report prepared by Parsons Brinckerhoff for RCTC in 2009, SR-91 Corridor System Management Plans (CSMP) prepared by System Metrics Group in 2010), and historical archived data from the Caltrans Freeway Performance Measurement (PeMS) System (http://pems.eecs.berkeley.edu/State/, data taken from the first and fourth quarter of 2013).

3.1 Existing Traffic Data

Most of the detailed, historical data for mainline and ramp locations were extracted from PeMS. **Tables 3-1** and **3-2** summarize the availability of PeMS data for the ramps. Where PeMS data were not available (i.e., PeMS detectors not present at some locations), Caltrans published data and/or data from other studies (SR-91 CSMP Studies, SR-91 CIP Final Traffic Study Report) in the area were used to supplement the database.

TABLE 3-1
SR-91 Corridor – Eastbound Ramp Data Summary

#	Study Ramp	PeMS Data?	#	Study Ramp	PeMS Data?
1	Off-Ramp to Weir Canyon Road	Yes	9	Off-Ramp to Green River Road	Yes
2	On-Ramp from SB Weir Canyon Road	Yes	10	On-Ramp from Green River Road	Yes
3	On-Ramp from NB Weir Canyon Road	Yes	11	Off-Ramp to NB SR 71	No
4	Off-Ramp to SB SR 241 GP	Yes	12	On-Ramp from SB SR 71	Yes
5	Off-Ramp to Gypsum Canyon Road	Yes	13	Off-Ramp to Serfas Club Drive/Auto Center Drive	Yes
6	On-Ramp from SB Gypsum Canyon Road	Yes	14	On-Ramp from Serfas Club Drive/Auto Center Drive	Yes
7	On-Ramp from NB Gypsum Canyon Road	Yes	15	Off-Ramp to South Maple Street	Yes
8	On-Ramp from NB SR 241 GP	Yes			

Note: Where PeMS ramp data was not available, data from the SR-91 CIP Final Traffic Study Report (Parsons Brinckerhoff, 2010) was used.

TABLE 3-2
SR-91 Corridor – Westbound Ramp Data Summary

#	Study Ramp	PeMS Data?	#	Study Ramp	PeMS Data?
1	Off-Ramp to Serfas Club Drive/Auto Center Drive	No	8	Off-Ramp to Gypsum Canyon Road	No
2	On-Ramp from Serfas Club Drive/Auto Center Drive	Yes	9	On-Ramp from NB Gypsum Canyon Road	No
3	Off-Ramp to NB SR 71	No	10	On-Ramp from SB Gypsum Canyon Road	No
4	On-Ramp from SB SR 71	No	11	On-Ramp from NB SR 241	Yes
5	Off-Ramp to Green River Road	No	12	Off-Ramp to Weir Canyon Road	Yes
6	On-Ramp from Green River Road	No	13	On-Ramp from NB Weir Canyon Road	Yes
7	Off-Ramp to SB SR 241 GP	Yes	14	On-Ramp from SB Weir Canyon Road	Yes

Note: Where PeMS ramp data was not available, data from the SR-91 CIP Final Traffic Study Report (Parsons Brinckerhoff, 2010) was used.

3.2 Performance Data

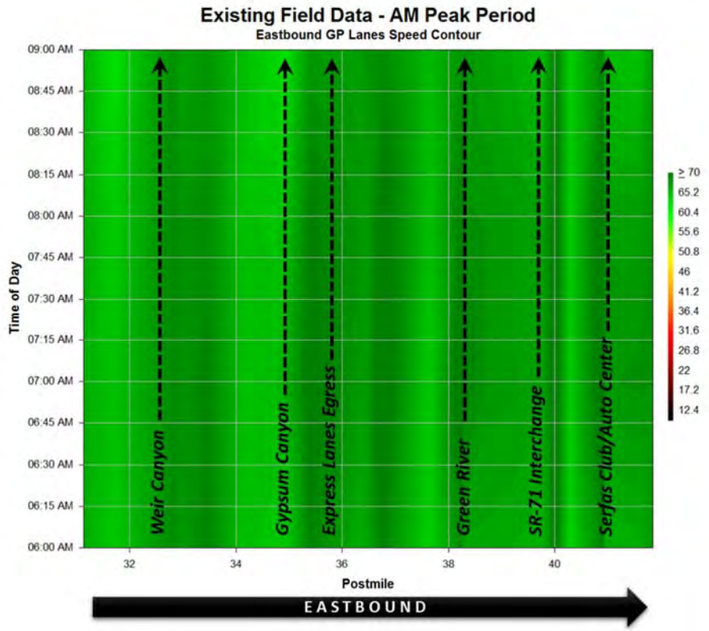
Travel speeds and bottleneck locations along the study corridor were required for the calibration of the VISSIM model. For the SR-91 corridor, 2013 PeMS data were available throughout a majority of the study area. **Figures 3-1** and **3-2** illustrate the existing conditions temporal speed diagrams for the GP lanes in the AM and PM peak hours, respectively, based on 2013 PeMS data. The diagrams are based on speed measurements taken from PeMS at stations within the study area and reported every 15 minutes.

The horizontal scale is the location (with a postmile reference); traffic moves from left to right in the eastbound direction and right to left in the westbound direction. For reference, Table 3-3 provides a geographic listing of postmile locations. The vertical scale is the time within the peak period (6 to 9 AM and 3 to 7 PM), with time progressing from bottom to top. Green colors indicate higher speeds (roughly 55 mph and higher) with red colors indicating speeds under 30 mph. In general, bottleneck locations are the vertical lines transitioning between red and green areas. The queues are the red colors upstream of the bottlenecks.

3.3 Roadway Geometry

Field visits and aerial photographs (Google Earth) were used to obtain roadway geometry.

FIGURE 3-1
SR-91 Existing Condition Temporal Speed Diagram – AM Peak Period (6-9 AM)



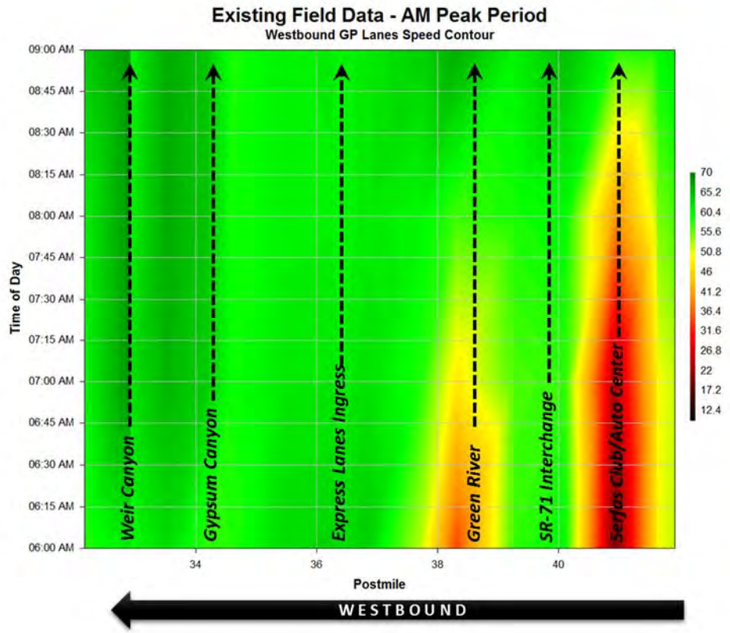
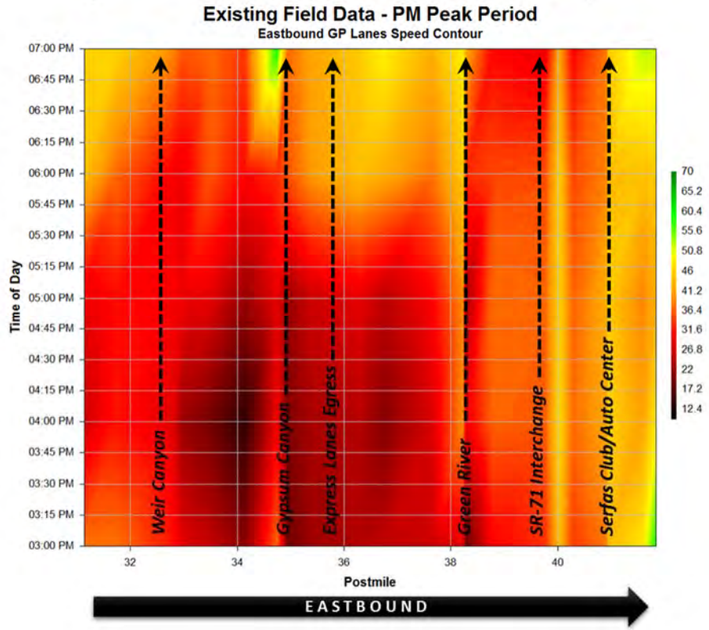


FIGURE 3-2
SR-91 Existing Condition Temporal Speed Diagram – PM Peak Period (3-7 PM)



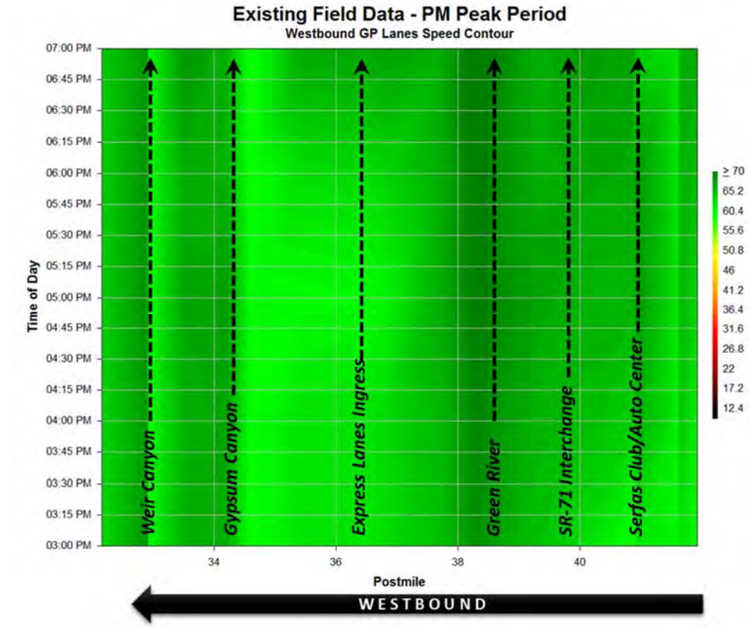


TABLE 3-3
SR-91 Geographic Post Mile Reference

SR-91 Eastbound	
Absolute Postmile	Description
32.21	EB ON TRUCK WEIGH STATION
32.57	EB OFF WEIR CANYON ROAD
34.51	EB OFF GYPSUM CANYON ROAD
36.12	EB OFF COAL CANYON ROAD
36.48	EB ON COAL CANYON ROAD
Riverside County Line (Abs PM = 37.23)	
38.12	EB OFF TO GREEN RIVER DRIVE
38.40	EB ON FROM GREEN RIVER DRIVE
40.81	EB OFF TO SERFAS CLUB DRIVE
41.06	EB ON FROM SERFAS CLUB DRIVE
41.32	EB OFF TO MAPLE STREET
SR-91 Westbound	
Absolute Postmile	Description
32.00	WB ON TRUCK WEIGH STATION
32.22	WB OFF TRUCK WEIGH STATION
33.10	WB OFF WEIR CANYON ROAD
35.08	WB OFF GYPSUM CANYON ROAD
36.21	WB ON COAL CANYON ROAD
36.61	WB OFF COAL CANYON ROAD
37.17	WB ON FROM GREEN RIVER ROAD
Riverside County Line (Abs PM = 37.32)	
38.22	WB ON FROM GREEN RIVER DRIVE
38.46	WB OFF TO GREEN RIVER DRIVE
40.87	WB ON FROM SERFAS CLUB DRIVE
41.25	WB OFF TO SERFAS CLUB DRIVE
41.62	WB ON FROM MAPLE STREET

3.4 Bluetooth Study

Data collection was needed to support the existing conditions simulation model. O-D data were needed as input to the model, and travel time data were needed for calibration. Because traffic patterns and congestion in the corridor are variable from day to day, a comprehensive data collection effort using Bluetooth detectors was recommended by the technical stakeholders during the development of the traffic study approach.

The Bluetooth data collection effort occurred over three separate weeks:

- Monday, November 4, 2013 through Sunday, November 17, 2013 (two weeks)
- Monday, December 9, 2013 through Sunday, December 15, 2013 (one week)

Bluetooth readers were installed at 10 locations along SR-91, SR-241, SR-71, and I-15 as illustrated on **Figure 3-3**. The Bluetooth readers collected data 24 hours per day over the entire three-week study period. The data were recorded and processed to provide information (from thousands of matched records) on O-D and travel time.

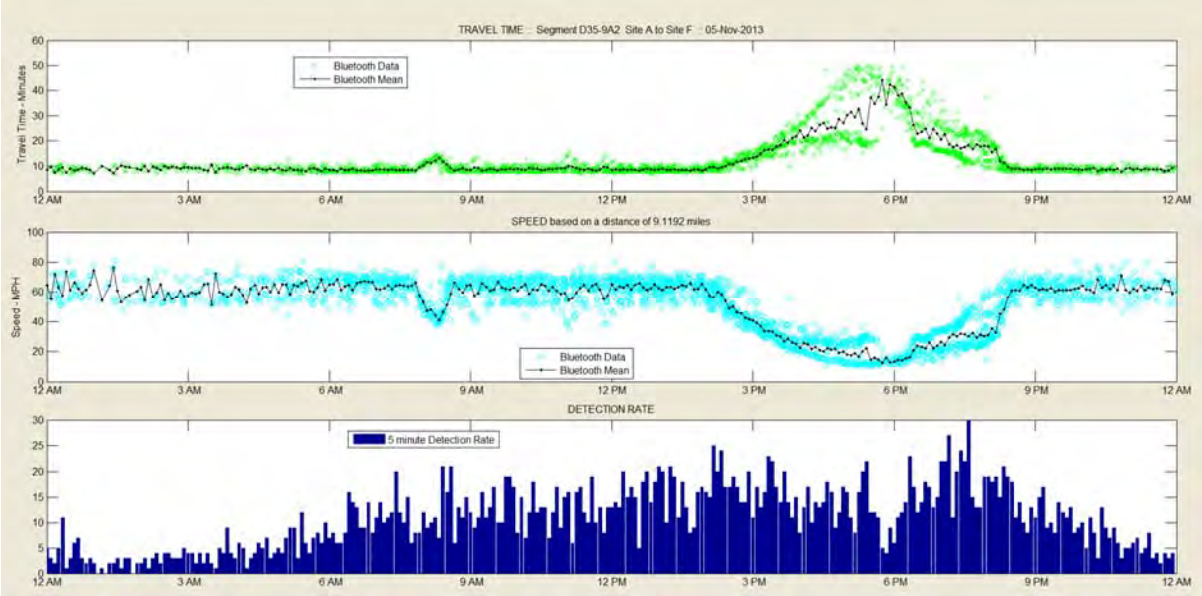
The Bluetooth study observed 2,287,722 unique Bluetooth users over the three-week study period. Below is a summary of the amount of daily users captured at each study location:

- Site A (SR-91, west of Weir Canyon Road): 13,665 vehicles/day
- Site B (SR-241, Windy Ridge): 3,501 vehicles/day
- Site C (SR-91, northbound SR-241 merge): 8,857 vehicles/day
- Site D (SR-91, County Line): 16,008 vehicles/day
- Site E (SR-71, north of SR-91): 1,716 vehicles/day
- Site F (SR-91, east of Serfas Club Drive/Auto Center Drive): 16,077 vehicles/day
- Site G (I-15, north of SR-91): 9,732 vehicles/day
- Site H (SR-91, east of I-15): 12,957 vehicles/day
- Site I (I-15, south of SR-91): 11,624 vehicles/day
- Site Z (SR-91, east of SR-55): 17,655 vehicles/day

The Bluetooth study yielded a large amount of valuable data within the study area. Statistics such as travel time, speed, and detection rate can be reported for all possible O-D pairs within the study area. Figure 3-4 illustrates sample statistics taken from the Bluetooth study that graphically illustrate the average travel time, speed, and detection rate along the eastbound SR-91 from the Weir Canyon Road interchange to the Serfas Club Drive/Auto Center Drive interchange over the course of the day. A sample set of summary statistics from the Bluetooth study are provided in Appendix A.

FIGURE 3-3
Bluetooth Study Area

FIGURE 3-4
Bluetooth Study Sample Statistics, Eastbound SR-91



O-D data were needed to understand the traffic patterns used in the study area. While there are a wide variety of issues that could be evaluated with O-D data, the study focused on three main questions:

- How much of the eastbound SR-91 Express Lane traffic ends up in Corona versus points east of I-15?
- How much of the eastbound SR-91 general purpose lane traffic ends up in Corona versus points east of I-15?
- What are the destinations of the northbound SR-241 traffic – are they potential users of the connector?

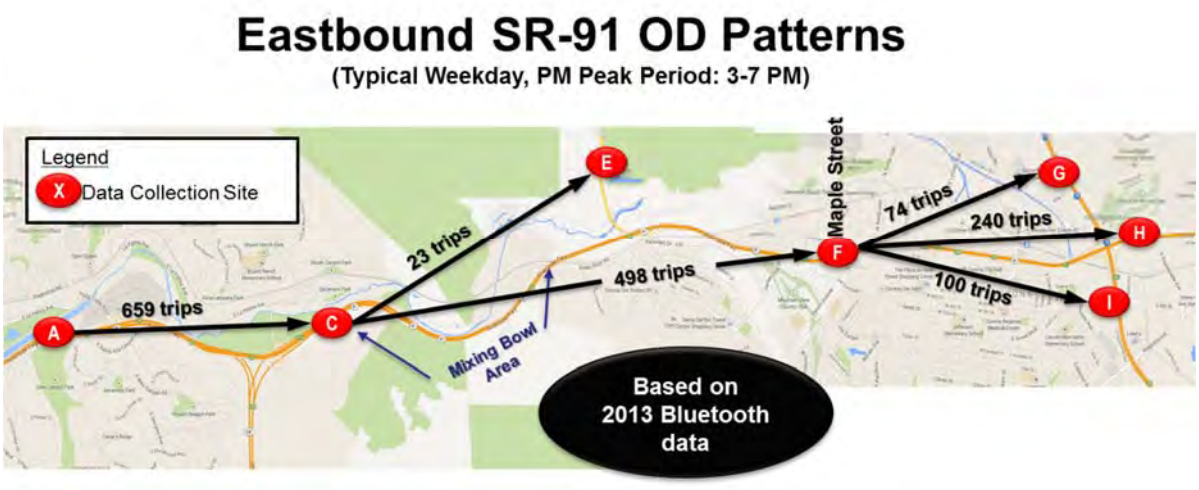
The O-D pairs referenced in the three questions above result in multiple weaving movements on SR-91 between the SR-91/SR-241 interchange and the SR-91/I-15 interchange. Understanding these O-D data helped develop future modeling assumptions that were paired with the geometric improvements associated with the SR-91 CIP Project and the proposed SR-241/SR-91 Express Lane Connector Project. The answers to the questions listed above helped to determine the following assumptions used in the project analysis:

- The number of eastbound SR-91 Express Lane users that will travel from the existing OCTA Express Lanes and continue to Riverside on the RCTC Express Lanes.
- The number of eastbound SR-91 Express Lane users that will travel from the existing OCTA Express Lanes and exit to the GP lanes in the "mixing bowl" to destinations in Corona or along SR-71. The mixing bowl is defined as the eastbound SR-91 ingress/egress area for Express Lane traffic. The limits of the mixing bowl are approximately from the northbound SR-241 to eastbound SR-91 GP lane ramp gore area to the eastbound Green River Road off-ramp.

- The number of eastbound SR-91 general purpose lane users who may enter the RCTC Express Lanes and continue east.
- The number of eastbound SR-91 users who will not use the SR-91 Express Lanes (OCTA or RCTC).
- The amount of northbound SR-241 users who are potential users of the eastbound RCTC Express Lanes.

Figure 3-5 summarizes the O-D patterns observed on the eastbound SR-91 in the PM peak period. Of the traffic travelling eastbound on the SR-91 OCTA express lanes, approximately 25% exits between the proposed mixing bowl and Maple Street in Corona (161 trips/25%). An additional 24% will have to exit the express lanes due to the proposed SR-91 CIP project because they wish to exit on ramps between Maple Street and I-15 (84 trips/13%) or they want to travel to northbound I-15 (74 trips/11%). Therefore, a total of 49% of the eastbound SR-91 OCTA express lane traffic must exit in the proposed mixing bowl because of their final destination. That observation was a critical input into the future modeling assumptions of the mixing bowl area in the eastbound direction.

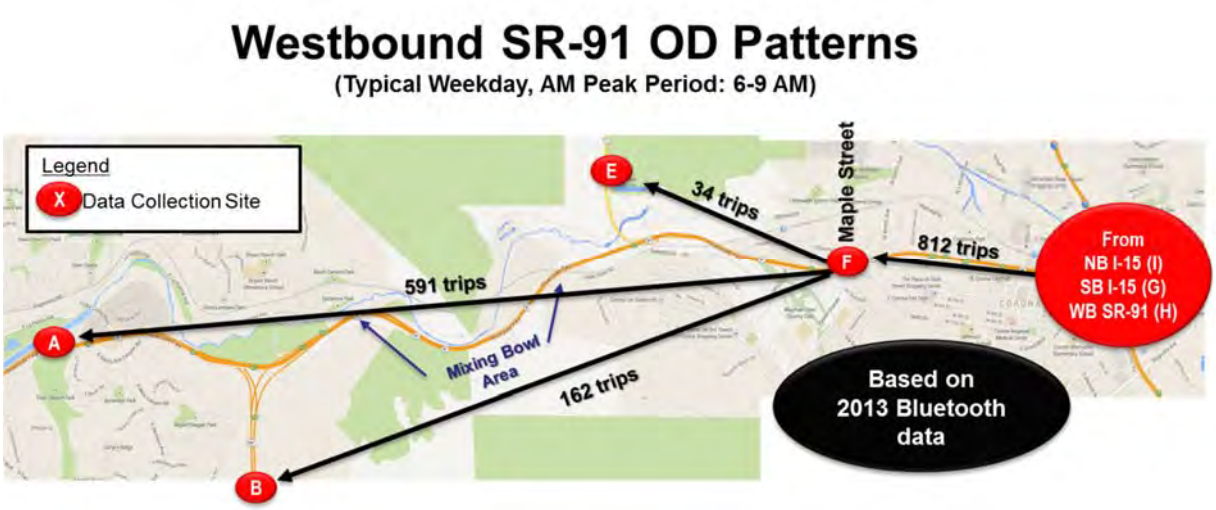
FIGURE 3-5
Bluetooth Study, Eastbound SR-91 O-D Patterns in the PM Peak Period



Note: Volumes reported represent the average four-hour Bluetooth volume captured between the hours of 3-7 PM during the study period.

Figure 3-6 summarizes the O-D patterns observed on westbound SR-91 in the AM peak period. Of the traffic travelling westbound on SR-91, approximately 73% (591 of the 812 trips) continues into Orange County west of the SR-241 interchange. Approximately 20% (162 of the 812 trips) travels to southbound SR-241. The remaining 7% of the westbound SR-91 traffic exits at SR-71 or destinations in Corona. These observations were also a critical input into the future modeling assumptions of the mixing bowl area in the westbound direction.

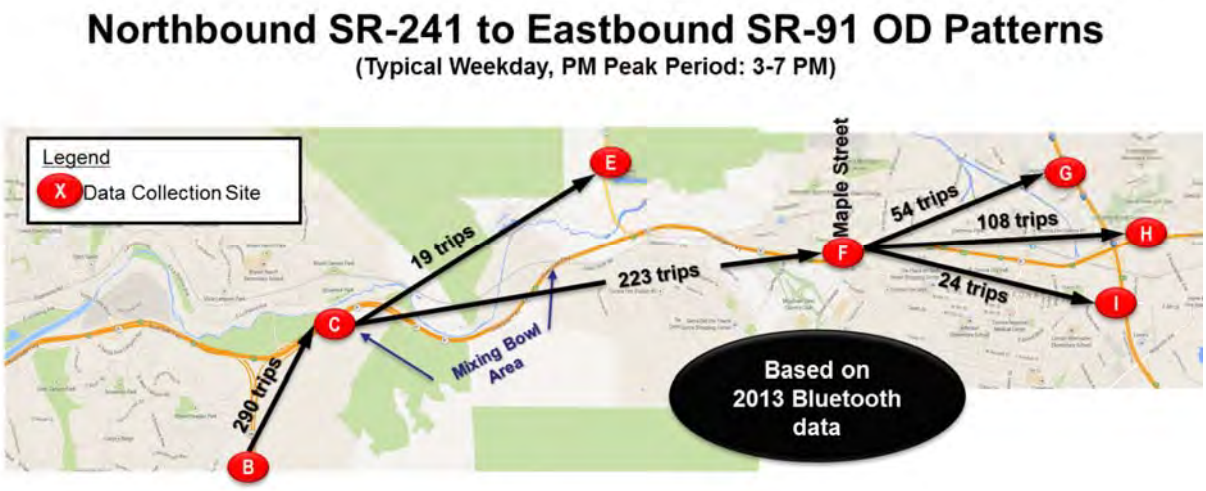
FIGURE 3-6
Bluetooth Study, Westbound SR-91 O-D Patterns in the AM Peak Period



Note: Volumes reported represent the average three-hour Bluetooth volume captured between the hours of 6-9 AM during the study period.

Figure 3-7 summarizes the O-D patterns observed for the northbound SR-241 to eastbound SR-91 movement in the PM peak period. Of the traffic travelling northbound on SR-241 to eastbound on SR-91, approximately 23% exits between proposed mixing bowl and Maple Street in Corona (67 trips/23%). An additional 31% will have to use the GP connector because they wish to exit on ramps between Maple Street and I-15 (37 trips/13%) or they want to travel to northbound I-15 (54 trips/18%). Therefore, a total of 54% of the northbound SR-241 to eastbound SR-91 movement must use the GP connector because of their final destination. That observation was a critical input into the future modeling assumptions of the mixing bowl area in the eastbound direction.

FIGURE 3-7
Bluetooth Study, Northbound SR-241 to Eastbound SR-91 O-D Patterns in the PM Peak Period



Note: Volumes reported represent the average four-hour Bluetooth volume captured between the hours of 3-7 PM during the study period.

4 Baseline VISSIM Coding

Simulation software, like VISSIM, requires three core building blocks: the network geometry, control elements, and traffic demand. Each is described in this section.

4.1 Geometry

The VISSIM network was developed from the VISSIM model applied for the "SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study" VISSIM model (prepared by Stantec in 2011). The baseline geometric configuration was coded to reflect the roadway design developed for this PA/ED. The layout plan for this project is included in Appendix G. Improvements for the connector are limited to 5.9 mi in the cities of Anaheim and Yorba Linda from south of the Windy Ridge Wildlife Undercrossing on SR-241 to Coal Canyon Undercrossing on SR-91. The remaining 2.8 mi of the Proposed Project is limited to FasTrak signage improvements (advance signage) in the cities of Anaheim (1.2 mi total), Yorba Linda (0.1 mi) and Corona (1.5 mi), with exact placement pending the Final Design process. The Proposed Project is mostly within existing Caltrans right-of-way, with one partial acquisition adjacent to eastbound SR-91. Construction access and staging areas would occur within existing Caltrans right-of-way.

All freeway mainline segments (GP and Express Lanes), ramps, and interchanges in the study area were verified and coded as needed to reflect the most recent conditions in the field and the planned improvements for this project and other projects in the area (including the SR-91 CIP project). Aerial photography (Google Earth) and design plans were used to establish gore points, horizontal curvature, and locations of interchanges. Specific geometric elements added to the VISSIM networks included:

- Freeway mainline and ramps
- Freeway auxiliary lanes
- Freeway merge and diverge lanes (tapers)
- Express/HOV lane ingress and egress locations
- Freeway interchange spacing and configuration

4.2 Control Elements

Control elements such as signals, stop signs, or roundabouts are typically needed at ramp terminal intersections to control conflicting traffic movements. However, the VISSIM network for the SR-91/SR-241 Connector project did not include ramp terminal intersections, as the primary area of focus was the freeway GP and Express Lanes and ramps. Ramp meters were included at all on-ramp locations in the VISSIM model where all existing ramp meters are known to be operated during the AM and PM peak periods. Meter rates varied at each location depending on the on-ramp demand volumes, with a range between 200 and 900 vehicles per hour per lane (vphpl). Each ramp meter was set at a rate to allow 100% of the ramp demand volumes to be accommodated without causing spillback

to the ramp terminal intersections. If on-ramp demand volumes were anticipated to exceed the 900 vphpl rate, then the meter was turned off, consistent with Caltrans policy.

4.3 Traffic Demands

Freeway traffic demands are a critical input for VISSIM modeling. It was not possible to report mainline freeway data collected in the field as freeway demand without adjusting the data. The reason is that freeway traffic volumes are different than freeway traffic demands on SR-91. With congestion, not all traffic can be served, so traffic demands are invariably higher than traffic volumes. This issue affects freeway traffic in the peak direction (westbound in the AM peak, eastbound in the PM peak) on SR-91, during both peak periods.

Discussion of the traffic forecasting is provided in Section 6.

5 Existing Conditions Calibration

The purpose of a simulation model is to investigate the effects of improvement alternatives. Simulation models are an efficient tool for evaluating improvements, but are only reliable when the base model matches real-world conditions. VISSIM, like all simulation models, was designed to be flexible enough that an analyst can correctly calibrate the network to match the local conditions at a reasonably accurate level. However, the default values will (almost) never give accurate results for a specific area. Therefore, calibration is required to adjust the VISSIM model parameters to replicate the traffic characteristics. This section summarizes the calibration approach and calibration parameters.

5.1 Testing and Verification

Verification is a form of error checking where the modeler verifies that the simulation model is built correctly. It basically ensures the model is performing reasonably. Verification occurs prior to calibration. Verification occurred in two basic steps.

The first step in the verification was a model review by the modeling team. Coding of the network and control components was completed at this point. Test volumes (10% of the actual demand) were added in order to observe the operations related to the network and controls. Any coding errors or needed enhancements were addressed at this time.

5.2 Calibration Approach

Calibrating the SR-91/SR-241 models occurred in three steps, following guidance from *Guidelines for Applying Traffic Microsimulation Modeling Software* (separate documents from both FHWA (June 2004) and Caltrans (September 2002)):

1. Calibrate the model to mainline and ramp volume data in the field
2. Calibrate the model to mainline speed and travel time data in the field
3. Review bottlenecks and queues between the model and the field

5.2.1 FHWA and Caltrans Guidelines

Volumes and speeds were calibrated to the criteria listed in **Table 5-1**. The criteria are based on tables in the Caltrans and FHWA guidelines. In both guides, a calibration target table is presented that was originally developed by the Wisconsin Department of Transportation (WisDOT) based upon guidelines developed in the United Kingdom.

TABLE 5-1
Calibration Criteria

Criteria and Measures	Calibration Acceptance Targets
Hourly Flows, Model Versus Observed	
--Individual Link Flows	
Within 400 vph, for Flow > 2700 vph	>85% of cases
Within 15%, for 700 vph < Flow < 2700 vph	>85% of cases
Within 100 vph, for Flow < 700 vph	>85% of cases
--Sum of All Link Flows	Within 5% of sum of all link counts
*GEH Statistic < 5 for Individual Link Flows	> 85% of cases
Travel Times, Model Versus Observed	
--Journey Times, Network Within 15% (or one min, if higher)	>85% of cases

*The GEH Statistic is computed as $GEH = \sqrt{\frac{(E-V)^2}{(E+V)/2}}$

Where:

E= model estimated volume

V=Field Count

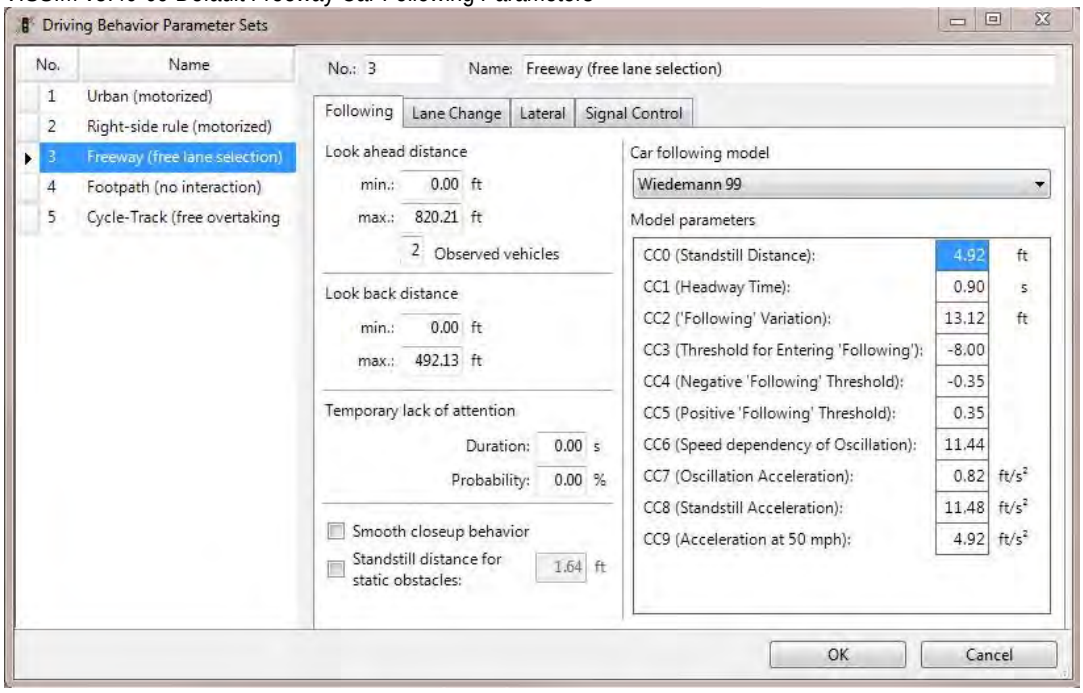
5.2.2 VISSIM Calibration Adjustments

Calibrating the peak period VISSIM models involved adjusting the default parameters to achieve the target volume and travel time thresholds. The primary parameters that were adjusted included:

- Car following parameters
- Lane change behaviors
- Lane change look back distances
- Speed distributions

VISSIM incorporates two car following models – one for freeways and one for arterials. In combination with other operational parameters, users have the ability to adjust these parameters as needed to achieve desired flow conditions. The default parameter network-wide settings for the freeway car following model (Wiedemann 99) are shown in **Figure 5-1**.

FIGURE 5-1
VISSIM v5.40-09 Default Freeway Car Following Parameters

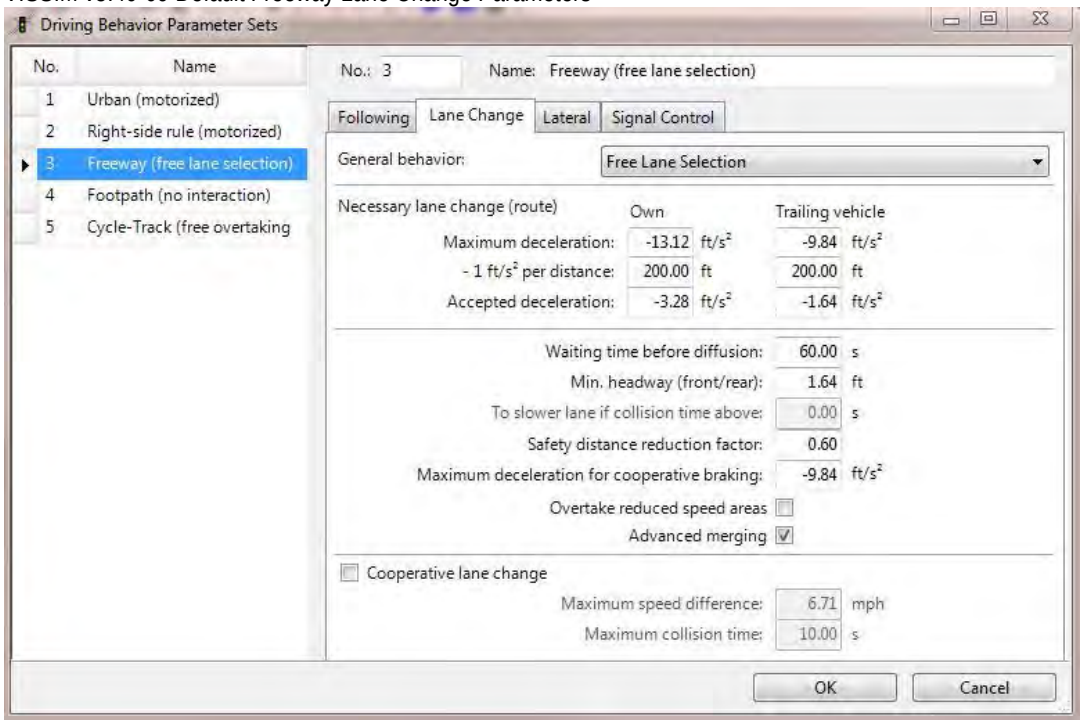


The car following parameters adjusted during the calibration process are listed below with a brief definition (from the VISSIM 5.40 User Manual). These parameters were adjusted, to achieve the calibration targets and reflect the operational conditions in the study area. Although there are nine different adjustable parameters in the Wiedemann 99 car following model, only the three listed below are typically adjusted during calibration.

- *CC0 – Standstill Distance* defines the desired distance between stopped cars. This parameter can have an effect on the length of queues observed during congested conditions.
- *CC1 – Headway Time* is not a direct measure of headway time, but rather a factor that affects the following (minimum desired safety) distance. Lower values allow the vehicles to travel closer together and increases capacity. In the case of high volumes (like those on SR-91), it is the following distance that has the strongest influence on capacity.
- *CC2 – Following Variation* restricts the longitudinal oscillation of vehicles in the car following state. It controls how much more distance than the desired safety distance a driver allows before he intentionally moves closer to the car in front. The reduction in the CC2 value means the driver allows less distance beyond the desired safety distance before he moves closer to the car in front.

Another important parametric change focused on the lane changing parameters. VISSIM includes parameters for necessary and discretionary lane changes. The default parameter network-wide settings for freeway lane changes are shown in **Figure 5-2**.

FIGURE 5-2
VISSIM v5.40-09 Default Freeway Lane Change Parameters



Tables 5-2 and **5-3** are a summary of the driver behavior parameter changes made during the calibration process for the SR-91/SR-241 networks. **Table 5-2** is for the eastbound direction (AM and PM peak) and **Table 5-3** is for the westbound direction (AM and PM peak). Note that many of these changes are link-specific to account for the variations in geometric and accompanying driver behavior in the corridor.

The seeding period is the period of time between the start of the simulation and when results start to be recorded. During the seeding period, vehicles are entering the network and the model requires adequate time for the network-wide volumes to become stable. Considering the size of the network and level of congestion that was observed at the start of the recording periods, a seeding period of one hour was used in the study. Visual observation of the simulation shows that after the one hour seeding period, vehicles are able to reach their destinations and congestion throughout the corridor matches field conditions at the start of the peak period.

TABLE 5-2
SR-91 Eastbound AM/PM Peak Calibration Parameters

	Car Following Parameters					Lane Changing				
Location	**CC0 Standstill Distance (ft)**	**CC1 Headway (sec)**	**CC2 Following Variation (ft)**	**Max Decel. Rate (ft/s^2)**	**Accepted Decel. Rate (ft/s^2)**	**Min. Headway (front/rear) (ft)**	**Safety Distance Reduction Factor**	**Max decel. for cooperative braking (ft/s^2)**	**Advanced Merging**	**Cooperative Lane Change**
Mainline West of Weir Canyon	4.9	**1.10**	13.1	**-26.0/ -184.0**	**-14.0/ -9.0**	**1.8**	**0.40**	**-14.9**	**No**	No
HOV weave between SR-241 and Green River	4.9	**1.10**	13.1	**-26.0/ -184.0**	**-14.0/ -9.0**	**1.8**	**0.10**	**-27.9**	Yes	**Yes**
All Merge Segments	4.9	**1.10**	13.1	-13.1**/ -18.0**	-3.3/ **-3.3**	1.6	**0.10**	**-29.5**	Yes	**Yes**
Mainline between Green River and Serfas Club	4.9	**1.10**	13.1	**-26.0/ -184.0**	**-14.0/ -9.0**	**1.8**	**0.40**	**-14.9**	**No**	No
VISSIM Default	4.9	0.90	13.1	-13.1/ -9.8	-3.3/ -1.6	1.6	0.60	-9.8	Yes	No

Note: Bold values indicate changes from default values

TABLE 5-3
SR-91 Westbound AM/PM Peak Calibration Parameters

	Car Following Parameters					Lane Changing				
Location	**CC0 Standstill Distance (ft)**	**CC1 Headway (sec)**	**CC2 Following Variation (ft)**	**Max Decel. Rate (ft/s^2)**	**Accepted Decel. Rate (ft/s^2)**	**Min. Headway (front/rear) (ft)**	**Safety Distance Reduction Factor**	**Max decel. for cooperative braking (ft/s^2)**	**Advanced Merging**	**Cooperative Lane Change**
Mainline between Serfas Club ramps	4.9	**1.10**	13.1	**-26.0/ -184.0**	**-14.0/ -9.0**	**1.8**	**0.10**	**-27.9**	**No**	No
HOV weave segments	4.9	**1.10**	13.1	**-26.0/ -184.0**	**-14.0/ -9.0**	**1.8**	**0.10**	**-27.9**	Yes	**Yes**
All Merge Segments	4.9	**1.10**	13.1	-13.1**/ -18.0**	-3.3/ **-3.3**	1.6	**0.10**	**-29.5**	Yes	**Yes**
Mainline between SR-71 and Green River	4.9	**1.10**	13.1	**-26.0/ -184.0**	**-14.0/ -9.0**	**1.8**	**0.40**	**-14.9**	**No**	No
Diverge to SR-241 and Diverge to Weir Canyon Rd	4.9	**1.10**	13.1	**-26.0/ -184.0**	**-14.0/ -9.0**	**1.8**	**0.10**	**-27.9**	Yes	**Yes**
VISSIM Default	4.9	0.90	13.1	-13.1/ -9.8	-3.3/ -1.6	1.6	0.60	-9.8	Yes	No

Note: Bold values indicate changes from default values

5.2.3 Visual Audit Criteria

A final step in the calibration process was a visual inspection by the modeling team. The visual audit is needed to ensure that the operations observed in the simulation model approximate expectations for the freeway and network performance. Key focus areas included the location of bottlenecks, duration and extent of queues, and traffic patterns in the network. Bottlenecks and queuing are the key elements of the visual audits. While bottlenecks and queuing affect volume and travel time, they also require a separate focus during calibration.

The first and most important characteristic of a bottleneck is its occurrence at a particular location. Bottlenecks may be formed at particular locations due to factors such as ramp merges or diverges, lane drops, and increases in traffic demand or even due to traffic accidents which cause a reduction in capacity. The bottlenecks formed due to temporary traffic conditions such as accidents are isolated incidents whereas the ones formed due to roadway geometric/design changes and increases in demand occur regularly. However, these recurring bottlenecks do not necessarily occur every day, and they may start and stop over time.

The second defining characteristic of a bottleneck is the distance of the queuing and is defined as the length/extent of the bottleneck.

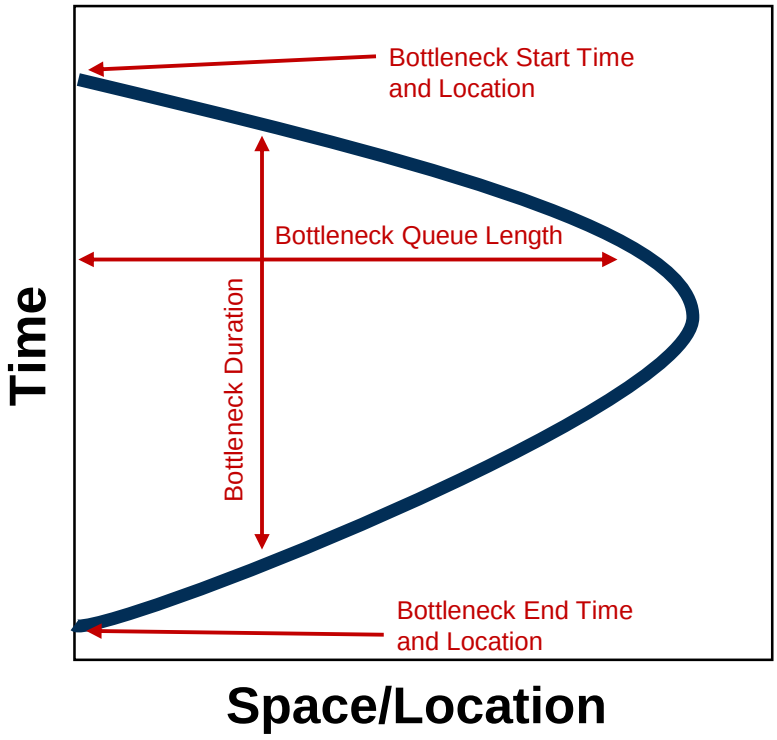
The last defining characteristics are the duration and start time of the bottleneck, which are the temporal components of the bottleneck at particular locations. In the effort to understand the cause of a bottleneck and find potential solutions, it is important to know where the bottleneck actually terminates and free-flow conditions are restored. This is typically found where speeds change from slow congested speeds to 30 to 50 miles per hour, often in a very short distance.

The length/extent and duration/time of a bottleneck often vary greatly from day to day. Both of these factors are very sensitive to the capacity and demand at the bottleneck. Because capacity and demand vary from day to day, the length/extent and duration/time also vary greatly from day to day.

To describe bottlenecks, four quantitative measures can be used (see **Figure 5-3**):

- Location
- Queue length upstream of each bottleneck (this varies over time),
- Time duration
- Starting time

FIGURE 5-3
Graphical Representation of a Typical Bottleneck



Bottlenecks can be assessed by analyzing the speed profile data obtained from PeMS or other data archival systems, combined with external sources such as travel time runs. These locations can then be confirmed using field observations. However, review of the field data suggests that there is a wide variation in bottlenecks and queues over time.

Section 5.3 compares the bottlenecks in the field with the modeling output of the existing conditions VISSIM model and explains the calibration results based on these comparisons. The comparison of the VISSIM output to the field target for queues and bottlenecks was subjective, but based on the general characteristics described in **Figure 5-3**.

5.3 Calibration Results

Calibration results for the VISSIM modeling consist of three MOEs:

- volume calibration
- travel time calibration
- visual calibration

The calibration results for all three elements are discussed in detail below.

5.3.1 Volume Calibration Results

Traffic volume from field counts was compared to VISSIM model throughput volume at all mainline and ramp links using the FHWA link flow criteria explained in Section 5.2.1. Volume calibration results are presented in **Table 5-4** and **5-5** for the AM and PM periods.

During the AM period, the VISSIM model individual link flow results for all hours and directions of travel are within the acceptable range (greater than 85% of cases for individual link flows and within 5% for sum of all link flows), with exception of the hour from 6 to 7 AM in the westbound direction (refer to Section 5.3.4 for additional explanation on calibration exceptions). In addition, the sum of all link flows is within the acceptable range for all hours and directions.

During the PM period, the VISSIM model individual link flows are close to the acceptable range (greater than 85% of cases for individual link flows and within 5% for sum of all link flows) in the peak eastbound direction (within two percentage points for the 4-5 PM peak hour), while the sum of all link flows is within the acceptable range. Refer to Section 5.3.4 for additional explanation on calibration exceptions. The off-peak westbound direction is within the acceptable range for both individual link flow and sum of all links for all hours except for the 5-6 PM hour, which is at 84% for individual link flows.

Table 5-4
Volume Calibration Results – Existing AM Peak Period (6-9 AM)

Measurement Type	Total Links	SR-91 Eastbound			Total Links	SR-91 Westbound		
		6-7 AM	7-8 AM	6-7 AM		6-7 AM	7-8 AM	6-7 AM
Individual Link Flows	42	100%	90%	93%	37	**78%**	86%	86%
Sum of All Link Flows		-2%	3%	3%	--	4%	1%	3%

Note: Calibration range based on FHWA Link Flow Criteria. Acceptable range is >85% of cases for individual link flows and within 5% for sum of all link flows. Bold numbers indicate values outside of accepted range.

Table 5-5
Volume Calibration Results – Existing PM Peak Period (3-7 PM)

Measurement Type	Total Links	SR-91 Eastbound				Total Links	SR-91 Westbound			
		3-4 PM	4-5 PM	5-6 PM	6-7 PM		3-4 PM	4-5 PM	5-6 PM	6-7 PM
Individual Link Flows	42	**76%**	**83%**	**81%**	**76%**	37	89%	89%	**84%**	95%
Sum of All Link Flows		-1%	2%	-2%	-2%	--	-2%	0%	-3%	1%

Note: Calibration range based on FHWA Link Flow Criteria. Acceptable range is >85% of cases for individual link flows and within 5% for sum of all link flows. Bold numbers indicate values outside of accepted range.

5.3.2 Travel Time Calibration Results

Travel time from the field (Bluetooth study) was compared to travel time from the VISSIM model using the FHWA criteria outlined in Section 5.2.1. Journey times from VISSIM should be within 15% of field-measured times, or within 1 minute, whichever is higher. Travel time was measured along the SR-91 GP lanes from west of the Weir Canyon Road interchange to east of the Serfas Club Drive/Auto Center Drive interchange, which is approximately 9.6 miles in length. Travel time results are presented in **Table 5-6** and **5-7** for the AM and PM periods.

Travel time results show that the VISSIM model is within the acceptable range for both the AM and PM periods for all hours and directions modeled, with the exception of the 6-7 AM hour.

Table 5-6
Travel Time Calibration Results – Existing AM Peak Period (6-9 AM)

Type	SR-91 Eastbound (minutes)			SR-91 Westbound (minutes)		
	6-7 AM	7-8 AM	6-7 AM	6-7 AM	7-8 AM	6-7 AM
Field-Measured	8.8	8.8	8.9	14.3	12.1	11.3
VISSIM	8.6	8.7	8.7	11.1	11.5	10.4
Percent Difference	-3%	-1%	-2%	**-22%**	-5%	-8%

Note: Calibration range based on FHWA Guidelines. Acceptable range is within 15% of field measured travel time, or within 1 minute, whichever is higher. Bold numbers indicate values outside of accepted range.

Table 5-7
Travel Time Calibration Results – Existing PM Peak Period (3-7 PM)

Type	SR-91 Eastbound (minutes)				SR-91 Westbound (minutes)			
	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Field-Measured	24.5	35.2	34.6	35.3	9.3	9.1	9.1	9.0
VISSIM	27.8	31.3	35.6	31.3	8.9	9.0	9.0	9.0
Percent Difference	13%	-11%	3%	-11%	-3%	-2%	-2%	-1%

Note: Calibration range based on FHWA Guidelines. Acceptable range is within 15% of field measured travel time, or within 1 minute, whichever is higher. Bold numbers indicate values outside of accepted range.

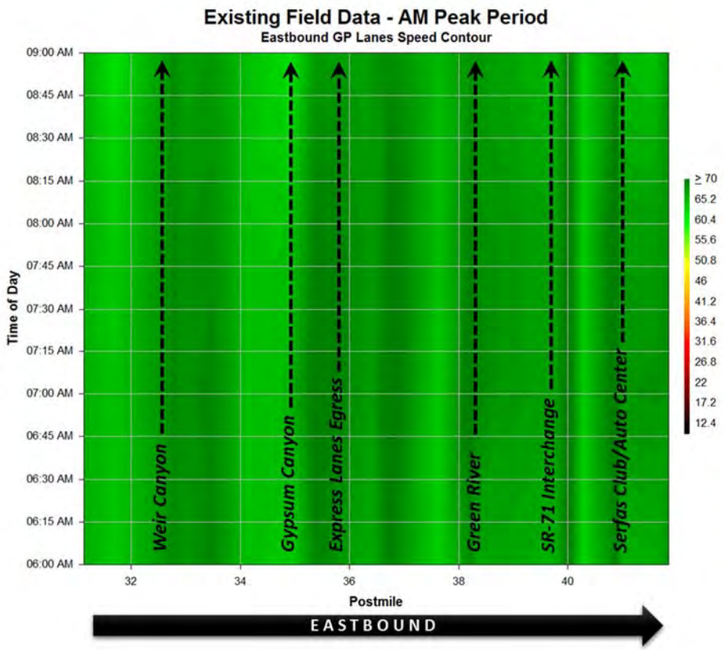
5.3.3 Visual Calibration Results

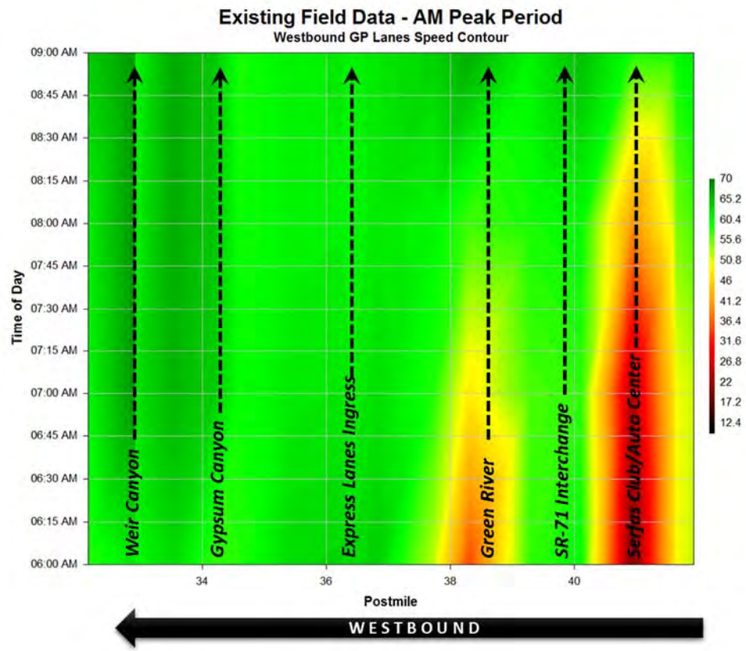
Temporal speed diagrams based on data from the field were compared with output data from VISSIM to verify the model was calibrated and replicating the traffic characteristics in the field. The data are based on speed measurements taken from the VISSIM model every 0.5 miles and every 15 minutes of simulation.

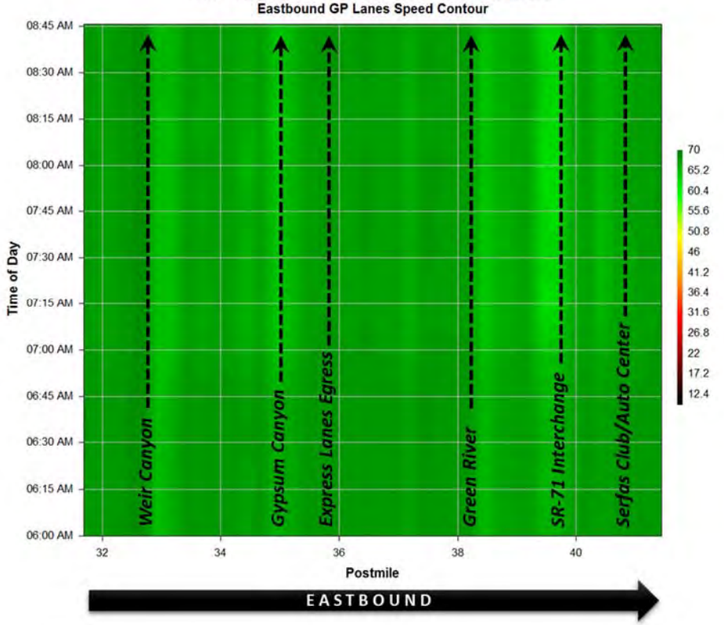
Figures 5-4 and **5-5** provide comparisons of the speed contour plots for the AM and PM peak periods in the GP lanes. The graph on the top illustrates the speed contours for the field data, and the graph at the bottom is for the VISSIM output.

The horizontal scale is the location (with a postmile reference); traffic moves from left to right in the eastbound direction and right to left in the westbound direction. The vertical scale is the time within the peak period (6 to 9 AM and 3 to 7 PM), with time progressing from bottom to top. Green colors indicate higher speeds (roughly 55 mph and higher) with red colors indicating speeds under 30 mph. In general, bottleneck locations are

FIGURE 5-4
SR-91 Temporal Speed Diagram – GP Lane Calibration Comparisons, AM Peak Period (6-9 AM)







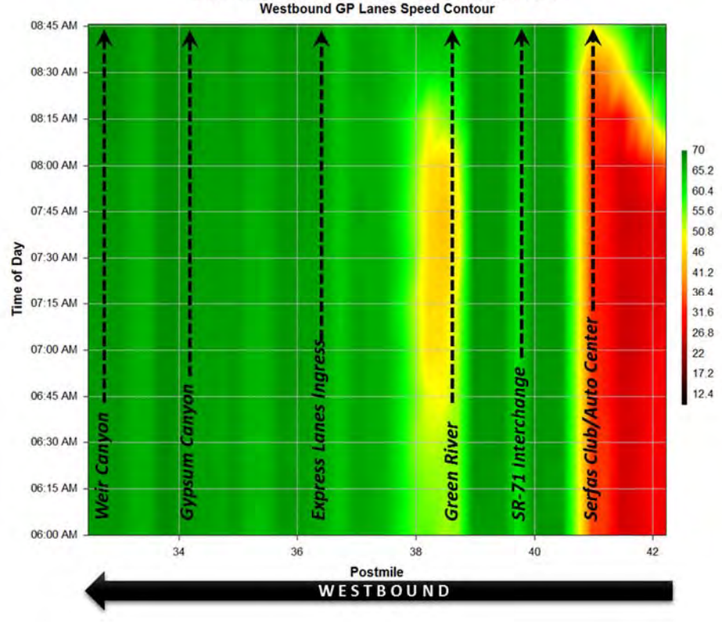
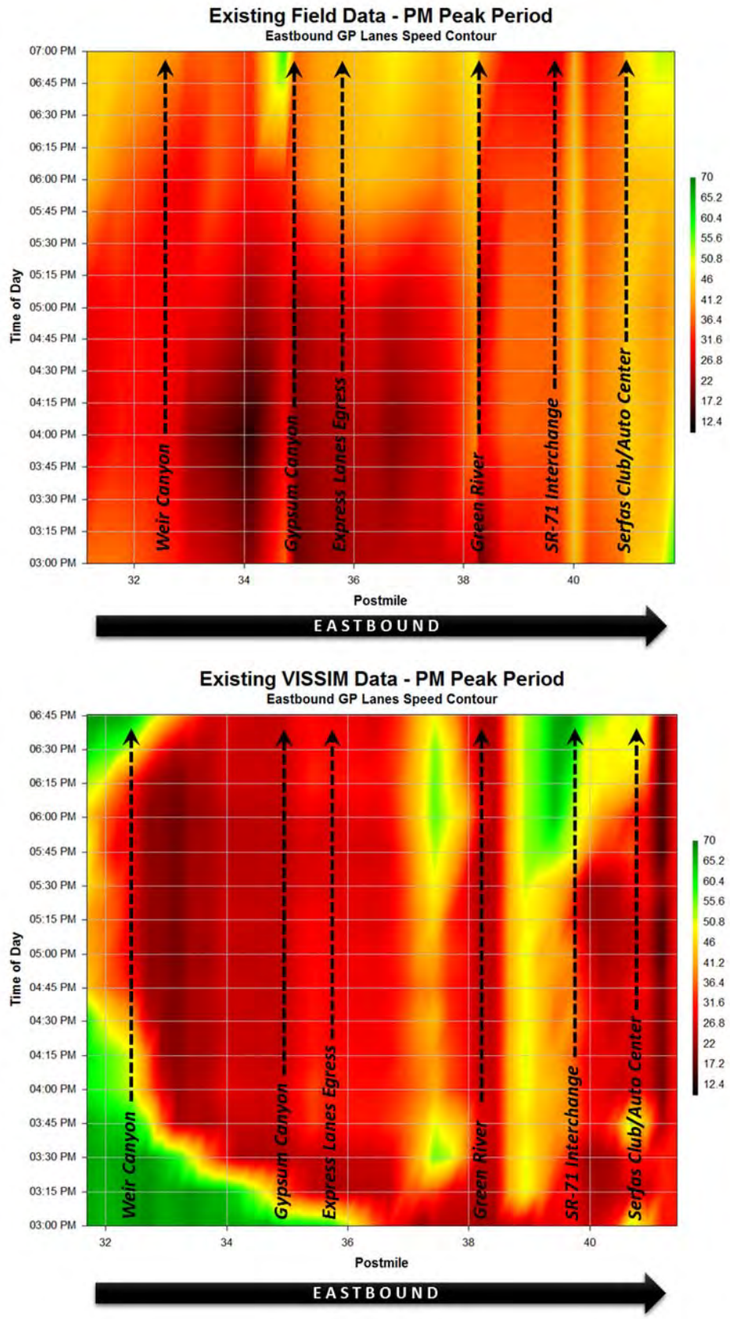
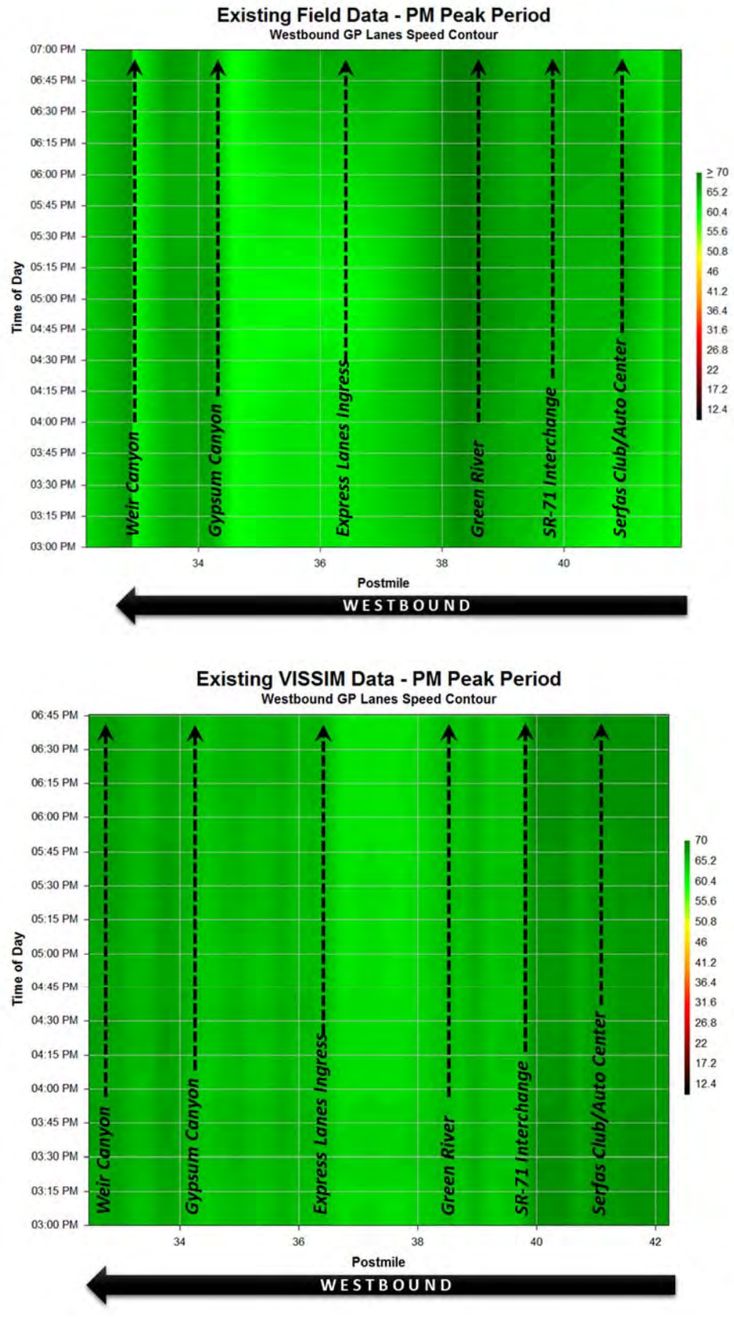


FIGURE 5-5
SR-91 Temporal Speed Diagram – GP Lane Calibration Comparisons, PM Peak Period (3-7 PM)





the vertical lines transitioning between red and green areas. The queues are the red colors upstream of the bottlenecks.

The speed contour plots were a critical tool to ensure that the operations observed in the simulation model approximate expectations for the freeway and network performance. Key focus areas were the location of bottlenecks, duration and extent of queues, and traffic patterns in the network. In general, a comparison of the field and VISSIM plots shows that the "recurring" bottlenecks observed in the existing field data are replicated in the VISSIM model. In the AM peak, the field data shows westbound SR-91 bottlenecks at the westbound Green River on-ramp and at the westbound Serfas Club Drive/Auto Center Drive on-ramp. Figure 5-4 shows that the calibrated VISSIM model replicates the field reported bottleneck locations, durations, and extent of queues. In the PM peak, the field data shows congestion on eastbound SR-91 throughout the entire study area. Overlapping bottlenecks at Serfas Club Drive/Auto Center Drive, SR-71, SR-241, and Gypsum Canyon Road cause low speeds and an extended queue through the entire eastbound SR-91 in the study area. Figure 5-5 shows that the calibrated VISSIM model replicates the field reported bottleneck locations, duration, and extent of queues.

AM Peak – GP Lanes

For the AM peak (**Figure 5-4**), in the eastbound direction on the GP lanes, the field and VISSIM speed contour plots match well. Generally, traffic conditions are near free flow speeds in both the field and the model.

In the westbound direction, the field data shows two areas with reduced speeds:

- Near the SR-71 interchange (postmile 40)
- Near the Express Lanes Ingress at the Riverside/Orange County line (postmile 37)

The model shows slowing in both of these locations (SR-71 interchange and the County boundary), although the model has less severe congestion starting at the Express Lane ingress (postmile 37) compared to field data. Although the speed contour plot shows overall higher speed from the model than field data in the AM period westbound direction, travel time and volume throughput are well calibrated during the AM peak hour of 7-8 AM.

PM Peak – GP Lanes

For the PM peak (**Figure 5-5**), in the westbound direction on the GP lanes, the field and VISSIM speed contour plots match well. Generally, traffic conditions are near free flow speeds in both the field and the model, with the exception of the SR-71 interchange (postmile 40) showing speeds dropping to around 50 mph in the field.

In the eastbound direction, the field data shows most locations within the study area with reduced speeds that last the entire duration of the PM period. The model shows slowing in the same locations and generally to the same degree and duration.

5.3.4 Calibration Summary

When reviewing the results, it is important to note that the calibration targets are guidelines (not absolute criteria). It is quite common for calibrated models to not meet all calibration targets over the entire study area. It is ultimately up to the reviewer to determine that the calibrated model is producing results that reflect field conditions at an acceptable level. The goal was not to meet every criterion but to demonstrate that the calibrated model was producing results that reflect field conditions at an acceptable level. After extensive calibration efforts, it was determined by the F/ETCA and the modeling team that the models were calibrated to an acceptable level. In the AM and peak periods, only one of the hours falls outside the target calibration range (>85%).

Based on the comparisons of volumes, travel times, and the temporal speed diagrams between the field and VISSIM data, the AM and PM VISSIM models were considered calibrated and acceptable for use in the development of the future models. The exceptions noted in Sections 5.3.1 and 5.3.2 are considered acceptable given the adherence to the remaining calibration targets (volume, speed, and travel time).

6 Traffic Forecasting Methodology

Future traffic demands were developed for each freeway segment and ramp within the project study limits. There are several traffic studies that have recently been completed or are currently in process that study the SR-91 corridor. The future traffic demands developed for this study were based on two recent traffic studies:

- SR-91 CIP Final Traffic Study Report (Parsons Brinckerhoff, 2010)
- SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study (Stantec, 2011)

To develop the future traffic demands for this study, the forecasts from these studies were compiled into a hybrid forecast that is generally consistent with the forecasts in the previous studies. No new travel/demand modeling was performed as part of this study.

The SR-91 Corridor A project is a long-range project that proposes to build an elevated four-lane facility along the SR-91 corridor from SR-241 to I-15. The design year demands for the 2040 model assumes the Corridor A improvements will not be in place. This assumption is consistent with the 2012 Southern California Association of Governments (SCAG) regional transportation planning (RTP) model (i.e., Corridor A is not included in the 2012 SCAG RTP model).

6.1 Overview of Future Year Demand Development

To develop an estimate of future freeway traffic demands, four data sources were used:

- Existing freeway and ramp volumes (2013)
- Existing travel/demand model data from the Orange County Transportation Analysis Model (OCTAM Version 3.2, provided by OCTA in January 2008)
- Short-term future (2015) travel/demand model data from the SR-91 CIP Final Traffic Study Report (prepared by Parsons Brinckerhoff in 2010)
- Long-term future (2035) travel/demand model data from the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study (prepared by Stantec in 2011)

Demand for the different years (existing, 2017 and 2040) were all derived from the different models and different studies listed above. When feasible, it is usually preferable to try to use the same model for different years to ensure consistency. However, the decision to use these models was made by the Project Development Team (PDT) prior to the start of the analysis during the development of the methods and assumptions. At that time, the group agreed to build upon the traffic forecasting that had already been done in the study area through the SR-91 CSMP Studies, SR-91 CIP Final Traffic Study Report, and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study. All of these models/studies have limitations. However, the approach in this study was to use the best sources of data which is not necessarily the same model for all years. A discussion of each of these data sources and how they were used to develop the future freeway traffic demands is provided in the following sections.

6.1.1 Existing Traffic Data

The first step in developing future freeway traffic demands was to extract existing traffic volume data from available sources, including PeMS and freeway traffic counts from Caltrans.

Existing traffic volumes were used to help validate the future travel/demand numbers. In cases where existing volumes were found to be higher than the future forecast, adjustments were made to show reasonable growth (i.e., demands that are higher than existing volumes).

6.1.2 Existing OCTAM Data

The OCTAM model incorporates modeling components that are consistent with the SCAG model and provides a regional travel forecasting base for transportation planning work in Orange County. The OCTAM model is regional in nature and suited for macro-level analysis.

The next step in developing future freeway traffic demands was to look at existing OCTAM model data. Peak hour and daily demands for existing conditions were provided to CH2M HILL as part of the SR-91 Express Lanes Extension and State Route 241 Connector Feasibility Study (prepared by CH2M HILL, 2009).

6.1.3 Short-Term Future Data

The SR-91 CIP Final Traffic Study developed 2015 traffic forecasts for the SR-91 corridor (between SR-241 and Magnolia Avenue). The 2015 traffic forecasts represent the opening year of the Initial SR-91 CIP Project. These forecasts were used to develop the 2017 forecasts in this study.

6.1.4 Long-Term Future Data

The SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study developed 2035 traffic forecasts for the SR-91 corridor (between SR-241 and Magnolia Avenue). The 2035 traffic forecasts represent the opening year of the Ultimate SR-91 CIP Project. These forecasts were used to develop the 2040 forecasts in this study.

6.2 Estimate Future Mainline/Ramp Demands

Future freeway traffic demands were a critical input to the traffic modeling. It is important to note that freeway traffic volumes are different than freeway traffic demands. With congestion, not all traffic can be served, so traffic demands are invariably higher than traffic volumes. Along a congested corridor such as SR-91, this issue affects all freeway traffic in the corridor, during both peak periods.

Data analysis of existing volumes and future traffic forecasts was conducted to validate the future mainline and ramp demands from the other studies. In all of the data, westbound SR-91 is the peak directional flow in the morning peak period and eastbound SR-91 is the peak directional flow in the afternoon peak period.

Section 7 discusses the analysis scenarios in detail. However, 2017 and 2040 are the future analysis years of this study. To develop 2017 and 2040 traffic demands from the 2015 and

2035 forecasts available from the SR-91 CIP Final Traffic Study and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue studies, an adjustment process was required.

The steps below outline the process used to develop the 2017 traffic demands for the mainline and ramps in the study area:

- Compared existing volumes with future demands (2015) to ensure that future demands are higher than existing volumes. There were no instances where the existing volumes were higher than the future demands.
- Compared existing OCTAM demands (2000) with future demands from the SR-91 CIP Final Traffic Study (2015) and calculated two average annual growth rates for two sub-areas:
    - Mainline segments and ramps from the west study limit (Weir Canyon) to the Orange/Riverside County line
    - Mainline segments and ramps from the Orange/Riverside County line to the east study limit (Serfas Club)
- Applied these growth rates in each sub-area to grow the 2015 demands from the SR-91 CIP Final Traffic Study by two years to develop 2017 traffic demands.
- Balanced the demands along the ramps so that the mainline demand entering the study area minus demands leaving the mainline (via off-ramps) plus demands entering the mainline (via on-ramps) equals the mainline demands leaving the study area.
- Express Lane demands were estimated based on input from OCTA staff to reflect peak operating conditions. These demands were also compared with the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study to ensure consistency.

The steps below outline the process used to develop the 2040 traffic demands for the mainline and ramps in the study area:

- Compared existing volumes with future demands (2035) to ensure that future demands are higher than existing volumes. There were no instances where the existing volumes were higher than the future demands.
- Compared the future demands from the SR-91 CIP Final Traffic Study (2015) with future demands from the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study (2035) and calculate two average annual growth rates for two sub-areas:
    - Mainline segments and ramps from the west study limit (Weir Canyon) to the Orange/Riverside County line
    - Mainline segments and ramps from the Orange/Riverside County line to the east study limit (Serfas Club)
- Applied these growth rates in each sub-area to grow the 2035 demands from the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study by five years to develop 2040 traffic demands.
- Balanced the demands along the ramps so that the mainline demand entering the study area minus demands leaving the mainline (via off-ramps) plus demands entering the mainline (via on-ramps) equals the mainline demands leaving the study area.

- Express Lane demands were estimated based on input from OCTA staff to reflect peak operating conditions. These demands were also compared with the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study to ensure consistency.

With a variety of studies recently completed in this area, it was not feasible to pick one set of forecasts that provided the future demand estimates for the study years in this analysis and also covered the entire study area. It was therefore necessary to use the synthesis approach outlined above, using forecasts from the most applicable studies (SR-91 CIP Final Traffic Study Report and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study).

While the PDT team and technical team determined this was the best approach, there are risks associated with using demand forecasts from multiple studies. The biggest risk associated with the traffic forecasting approach is the perception of error in the forecasts because they are different. In fact, this approach minimizes the likelihood of projection errors, because the forecasts most applicable to each scenario were used. Also, in the next phase of project development, additional traffic forecasting and traffic analysis will be performed as part of the tolling and revenue study. The more detailed forecasting will serve as a method to validate and adjust the traffic forecasts used in the analysis in this study.

6.3 Forecast Results in the Mixing Bowl

The future traffic forecasts served as a direct input into the future VISSIM traffic analysis models. The model results are discussed in Section 8. The subsections below provide more details on the forecasts.

6.3.1 2017 Forecasts

Figures 6-1 (no-build) and 6-2 (build) illustrate the 2017 AM traffic demands applied for the analysis in the mixing bowl area on westbound SR-91. These traffic demands were developed using the process outlined in Section 6.2. The forecasts show that the project will result in approximately 850 vehicles per hour shifting from westbound SR-91 to southbound SR-241. The demand change will lead to fewer vehicles on the westbound SR-91 GP lanes, west of the SR-91/SR-241 interchange. This traffic shift will have a positive effect, reducing the demand in the bottleneck area to the west. It is also important to note that the westbound Express Lane demand is highest (4,250 vehicles per hour) immediately upstream of the direct connector. Additional discussion of how this demand can be handled is provided in section 8.3.2 (westbound design variation).

FIGURE 6-1
2017 No-Build Demand Assumptions in the Mixing Bowl: Westbound SR-91, AM Peak Hour

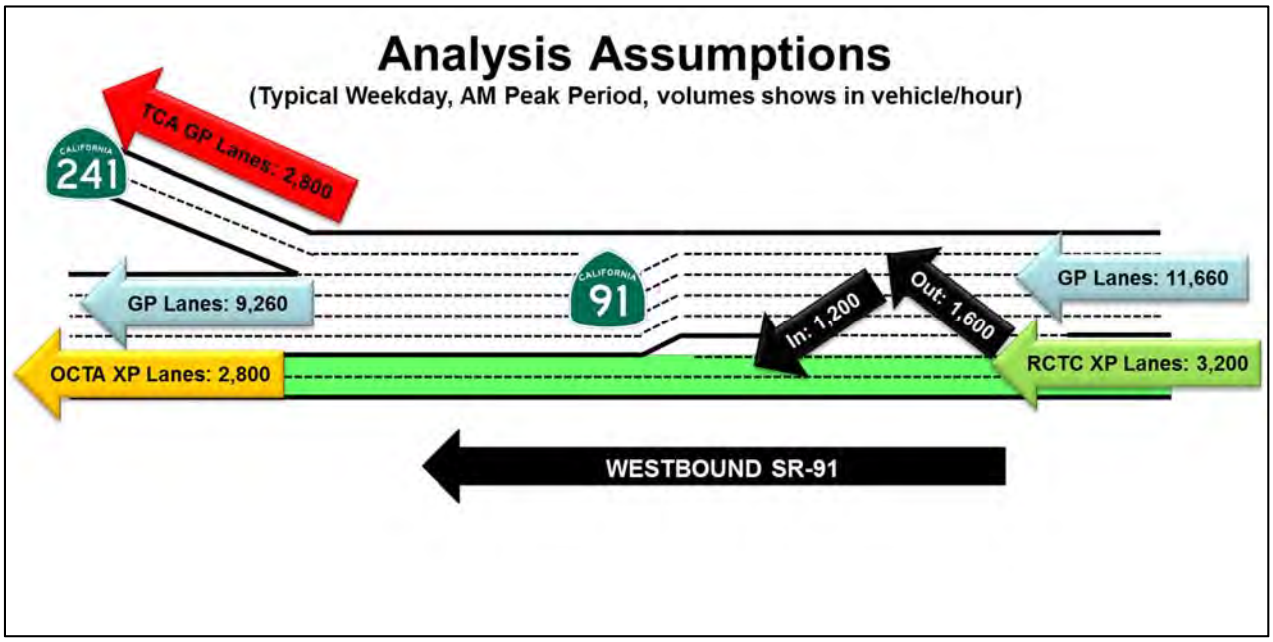
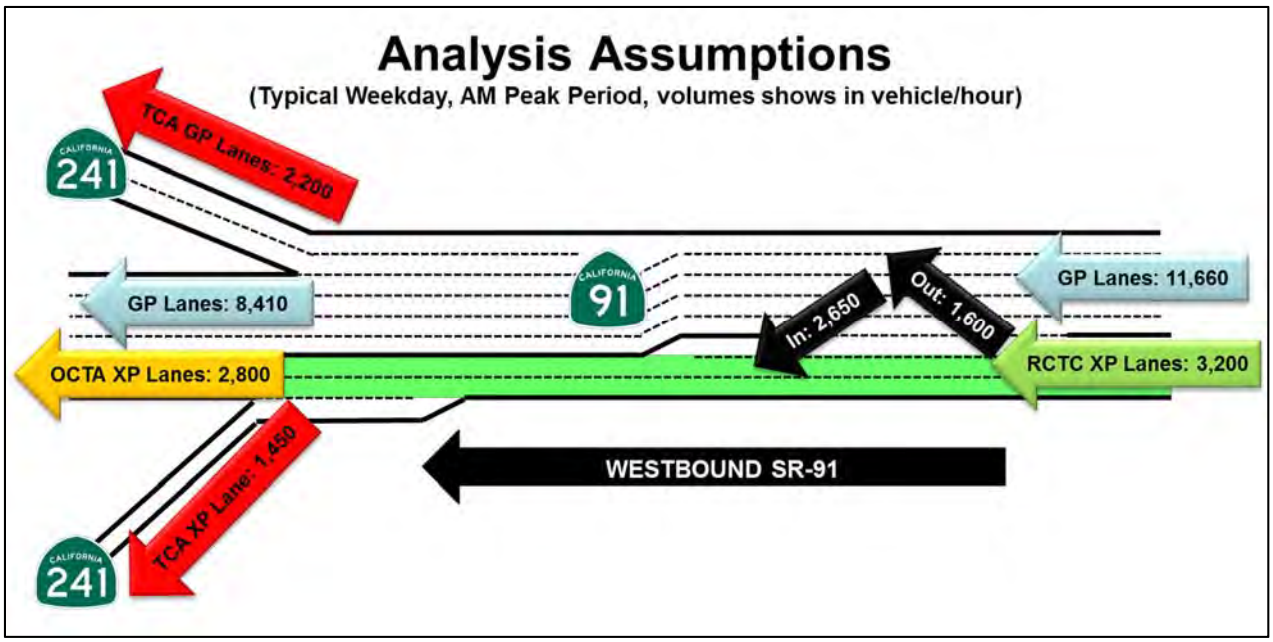


FIGURE 6-2
2017 Build Demand Assumptions in the Mixing Bowl: Westbound SR-91, AM Peak Hour



Figures 6-3 (no-build) and 6-4 (build) illustrate the 2017 PM traffic demands applied for the analysis in the mixing bowl area on eastbound SR-91. A total of 660 vehicles/hour will shift to northbound SR-241 from other routes (i.e., surface streets, SR-55, and SR-91) with the project. This total includes approximately 190 vehicles per hour that will shift from

eastbound SR-91 to northbound SR-241. The net result of the shifts will be changes in the number of vehicles on the eastbound SR-91 GP lanes. There will be fewer vehicles west of the SR-91/SR-241 interchange and more vehicles east of the SR-91/SR-241 interchange. This traffic shift will have a positive effect, reducing the demand in the bottleneck area to the west.

FIGURE 6-3
2017 No-Build Demand Assumptions in the Mixing Bowl: Eastbound SR-91, PM Peak Hour

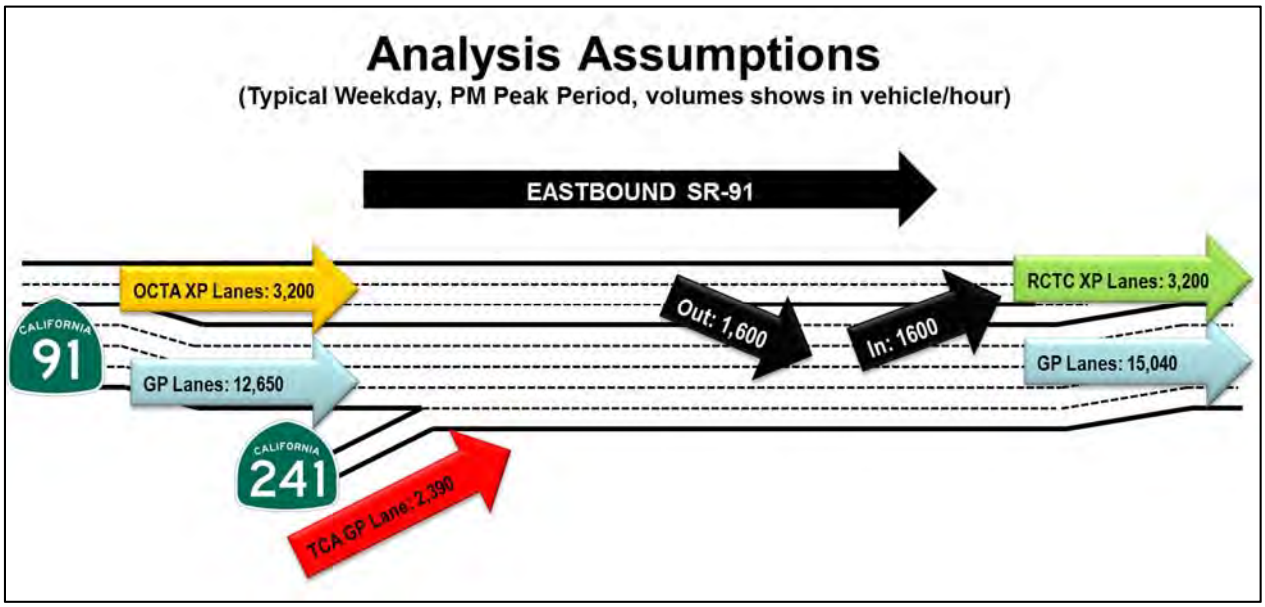
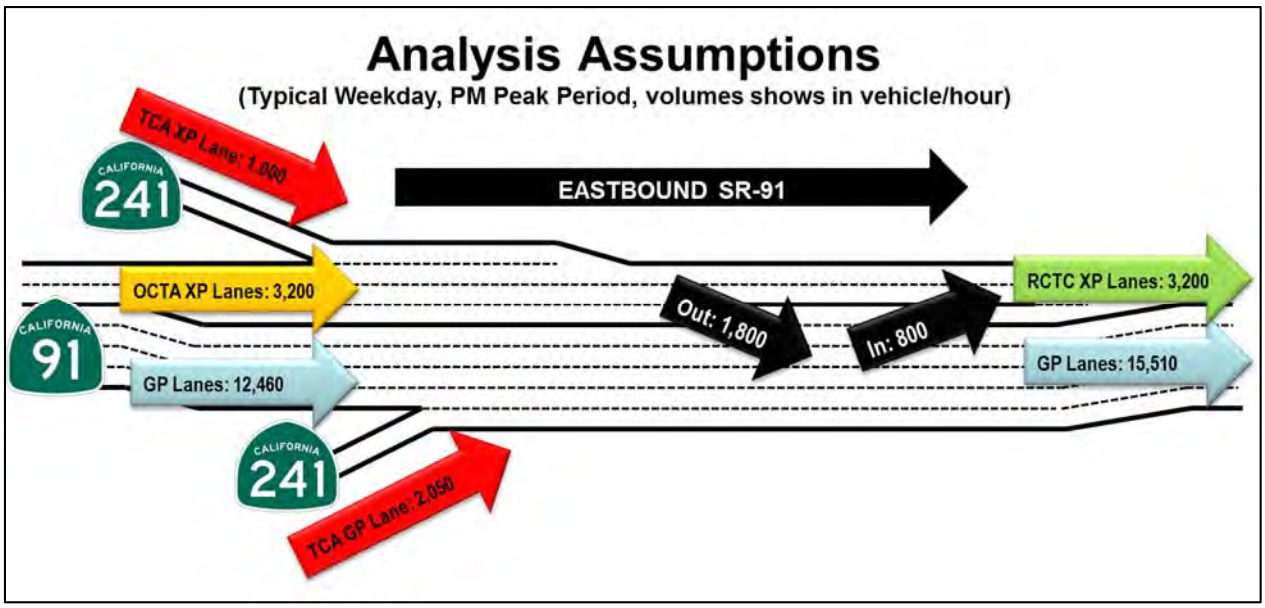


FIGURE 6-4
2017 Build Demand Assumptions in the Mixing Bowl: Eastbound SR-91, PM Peak Hour



6.3.2 2040 Forecasts

Figures 6-5 (no-build) and 6-6 (build) illustrate the 2040 AM traffic demands applied for the analysis in the mixing bowl area on westbound SR-91. The forecasts show that the project will result in approximately 1,320 vehicles per hour shifting from westbound SR-91 to southbound SR-241. The demand change will lead to fewer vehicles on the westbound SR-91 GP lanes, west of the SR-91/SR-241 interchange. This traffic shift will have a positive effect, reducing the demand in the bottleneck area to the west. The westbound Express Lane demand is highest (4,250 vehicles per hour) immediately upstream of the direct connector. Additional discussion of how this demand can be handled is provided in section 8.3.2 (westbound design variation).

FIGURE 6-5
2040 No-Build Demand Assumptions in the Mixing Bowl: Westbound SR-91, AM Peak Hour

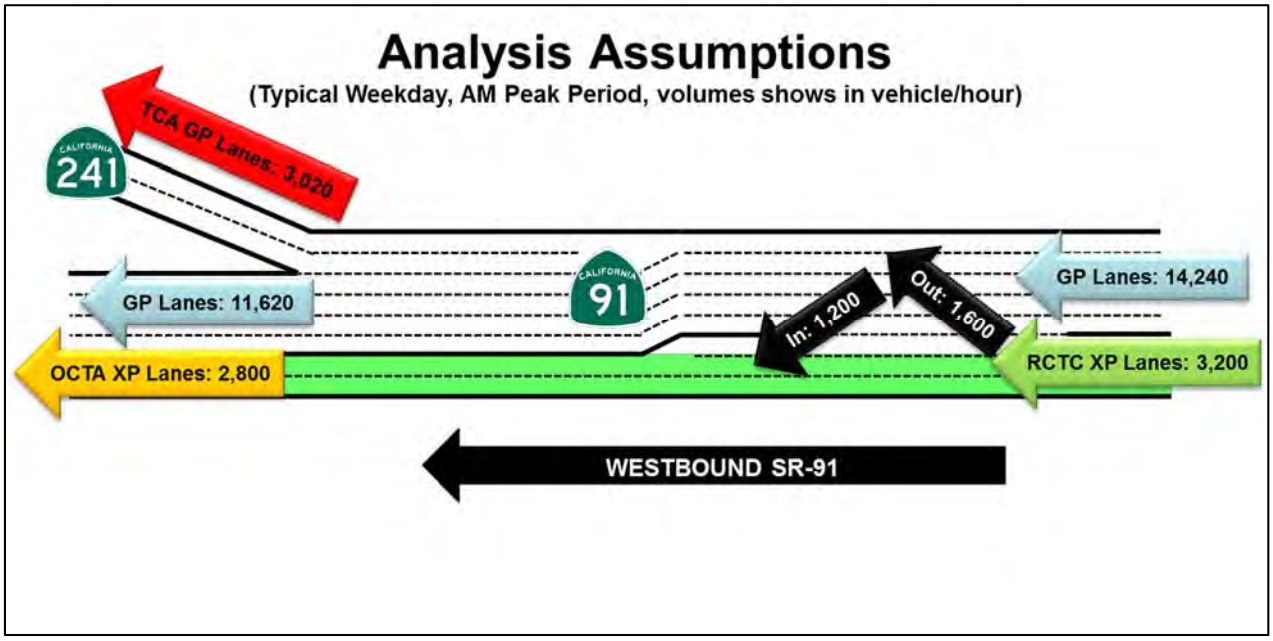
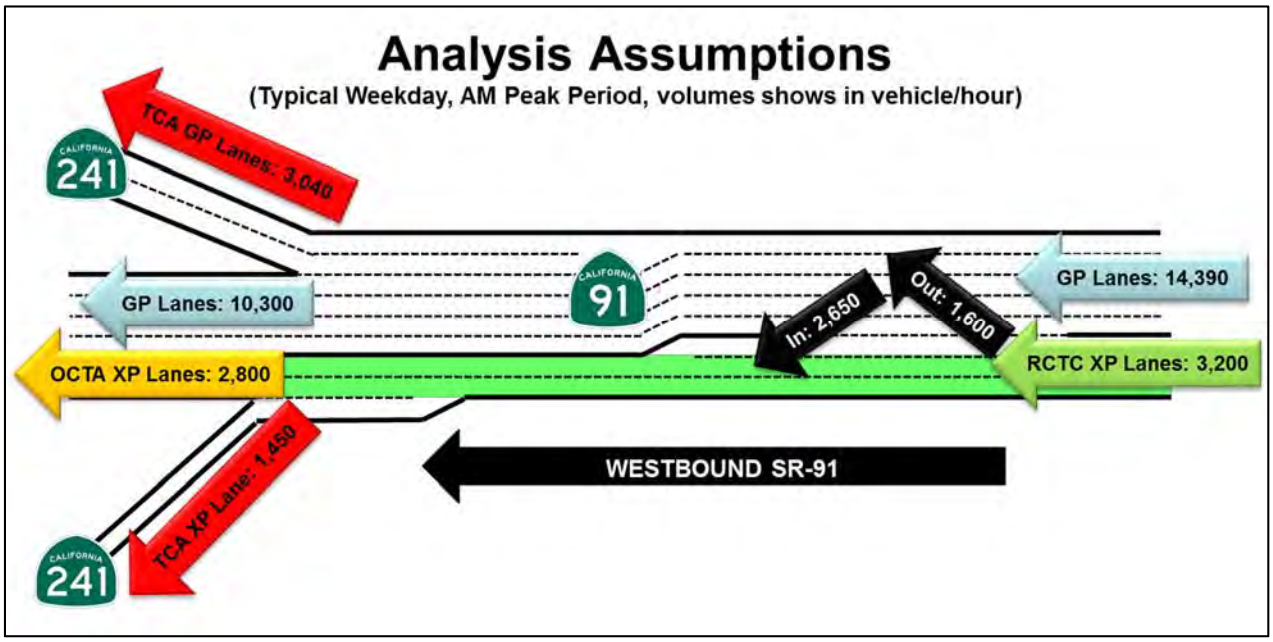


FIGURE 6-6
2040 Build Demand Assumptions in the Mixing Bowl: Westbound SR-91, AM Peak Hour



Figures 6-7 (no-build) and 6-8 (build) illustrate the 2040 PM traffic demands applied for the analysis in the mixing bowl area on eastbound SR-91. The forecasts show that the project will not cause traffic to shift from eastbound SR-91 or other routes (i.e., surface streets, SR-55) to northbound SR-241 in 2040.

FIGURE 6-7
2040 No-Build Demand Assumptions in the Mixing Bowl: Eastbound SR-91, PM Peak Hour

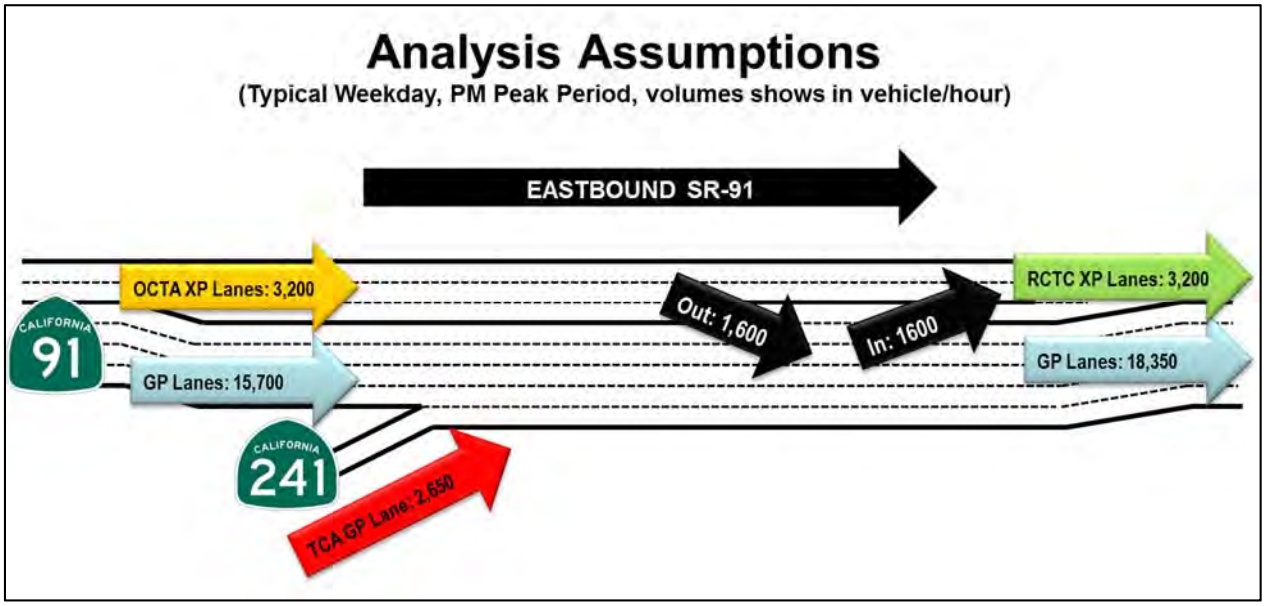
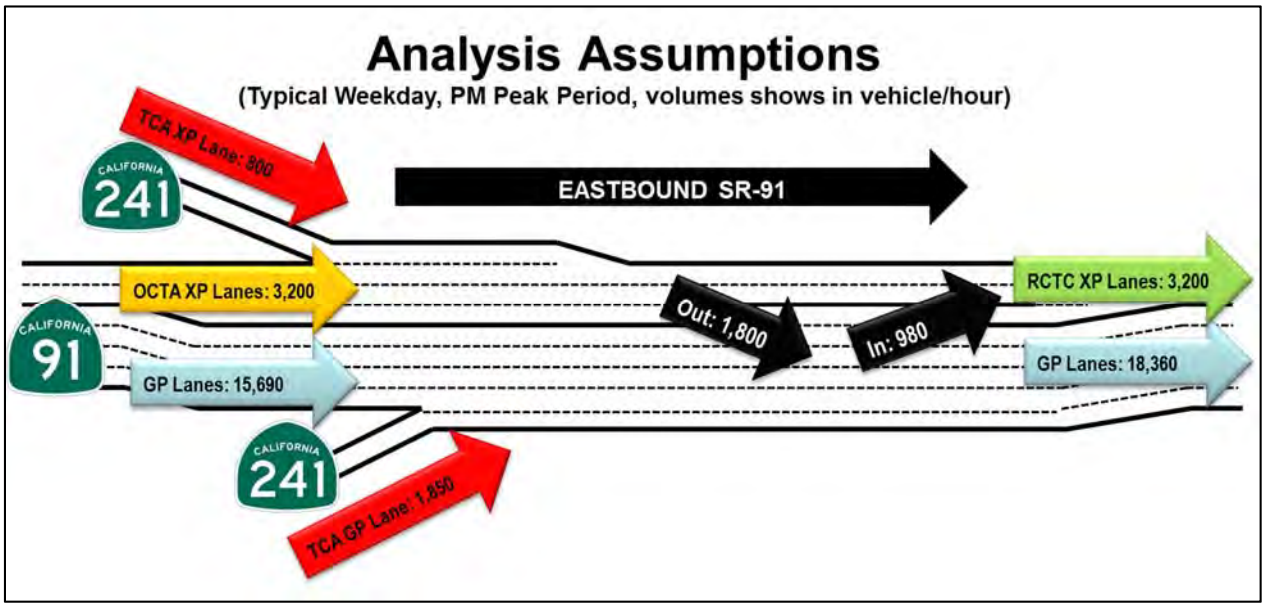


FIGURE 6-8
2040 Build Demand Assumptions in the Mixing Bowl: Eastbound SR-91, PM Peak Hour



6.3.3 Regional Shift to SR-241 with Project

Sections 6.3.1 and 6.3.2 indicate where traffic is projected to shift from other regional routes (SR-91, SR-55, surface streets) to SR-241. This regional shift is a result of the additional capacity of the new connector. The regional shift patterns discussed below are consistent with the data provided in the SR-91 CIP Final Traffic Study Report (Parsons Brinckerhoff, 2010) and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study (Stantec, 2011). As stated earlier in this chapter, the forecasts from the SR-91 CIP Final Traffic Study Report and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study were compiled into a hybrid forecast and used in this study.

In the AM peak period, more traffic is forecasted to travel from westbound SR-91 to southbound SR-241 in the build scenario. The resulting shift leads to fewer vehicles in the westbound SR-91 GP lanes (850 vehicles/hour in 2017 and 1,320 vehicles/hour in 2040), west of the SR-91/SR-241 interchange.

In the 2017 PM peak period, more traffic is forecasted to travel from northbound SR-241 to eastbound SR-91 in the build scenario. The resulting shift leads to fewer vehicles in the eastbound SR-91 GP lanes (190 vehicles/hour in 2017), west of the SR-91/SR-241 interchange. Once these vehicles shift to SR-241, they are projected to use the northbound SR-241 to eastbound SR-91 Express Lane Connector and continue on to the RCTC Express Lanes.

There is one scenario where no regional shift is predicted. By the 2040 Design Year, background growth and the additional eastbound capacity provided by the SR-91 Ultimate CIP project is anticipated to balance traffic demand within the corridor between the No Build and Build scenario. In 2040, the Ultimate CIP improvements on eastbound SR-91 improve operations to the point that fewer vehicles (200 vehicles/hr less than 2040 no-build)

choose to use the direct connector to access the express lanes because the eastbound GP lanes in the mixing bowl operate with high speeds. Therefore, for the 2040 PM peak, there is no eastbound SR-91 regional shift to SR-241 projected.

7 Traffic Analysis Methodology

7.1 Traffic Analysis Purpose

The goal of the traffic analysis was to identify any critical issues ("fatal flaws") with the traffic operations of the proposed project (and several variations of the proposed project). Since both existing and future operations on SR-91 will be heavily congested in the peak periods, the goal was not to achieve a specific level of service (LOS). Given the projected demands, the proposed project will not eliminate the congestion on SR-91. In fact, many of the benefits of the operational improvements associated with the proposed project could be hidden by the excess demand in the corridor. For example, if a given improvement reduces congestion at a bottleneck, the excess demand (that previously could not enter the corridor) will "fill in" the newly available capacity. Therefore, the traffic analysis was focused on identifying any new operational issues that could result from the project.

7.2 Overall Approach

The focus of the future year analysis was to assess the benefits of proposed improvements to the SR-91/SR-241 interchange and SR-91 mainline and Express Lanes. The tool for doing so was the VISSIM model, and the existing conditions calibrated model was the starting point for the future year analysis. The demand and supply features of the model were updated for the future year analysis.

- Traffic demands for 2017 and 2040 were coded as model input. The process for estimating the future traffic volumes is described in Chapter 6 (Traffic Forecasting).
- The network supply included the roadway configuration (number of lanes, connections, Express lanes, etc.). F/ETCA has developed plans for the SR-91/SR-241 Direct Connector improvements. RCTC has developed plans for the SR-91 CIP improvements.

Once the demand and supply features were updated, the VISSIM model was run for the 2017 and 2040 peak periods. The output results were compared for various future alternatives of the proposed project as described in Section 7.4.

7.3 Description of Scenarios

The following analysis scenarios were analyzed:

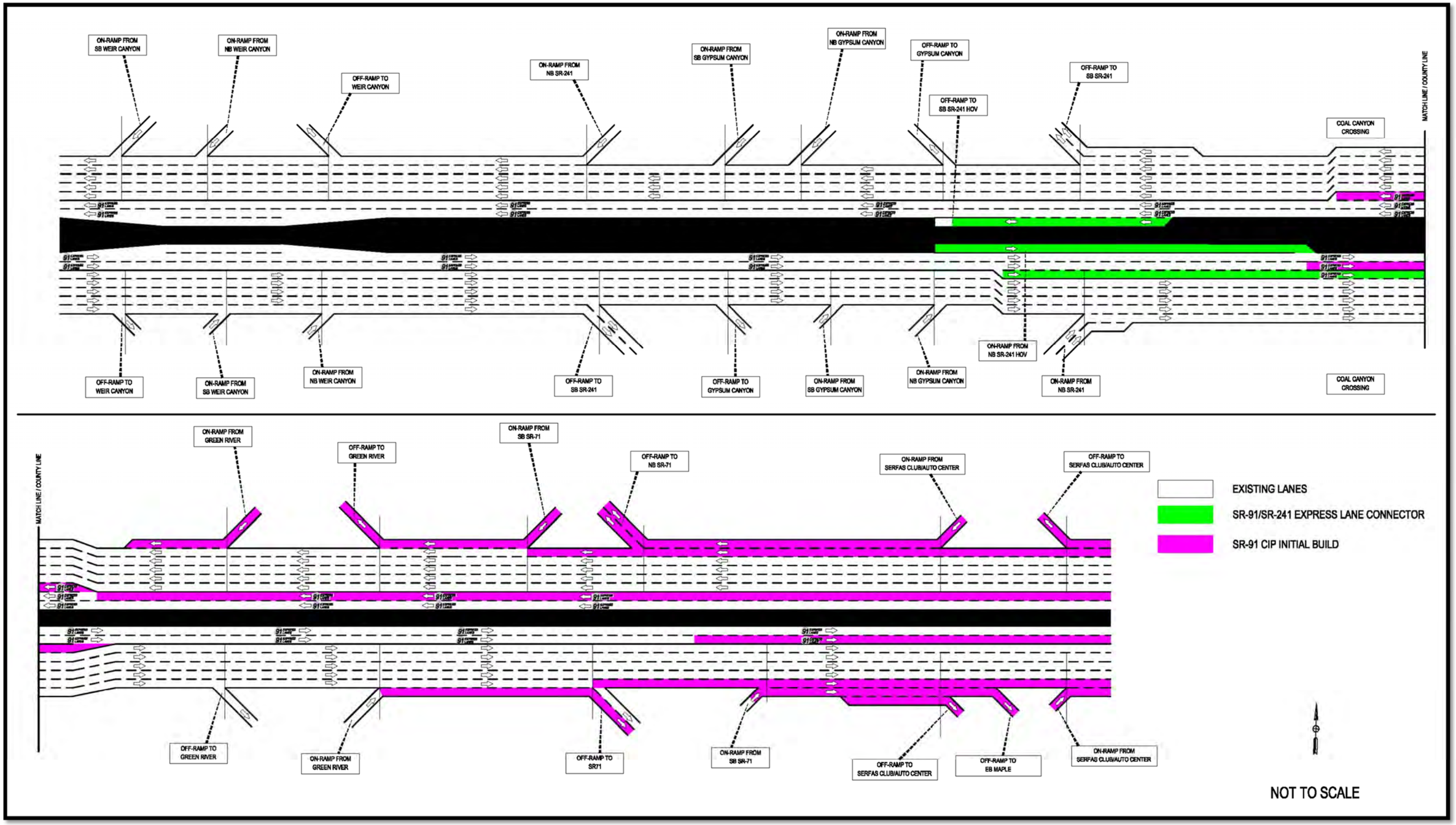
- Opening Year (2017) No Build
- Opening Year (2017) Build
- Design Year (2040) No Build
- Design Year (2040) Build

For each analysis scenario, the morning (6 to 9 AM) and evening (3 to 7 PM) peak periods were analyzed. Volumes were split by vehicle type (toll, non-toll, truck, etc.).

In the study area, there are several other projects that may be constructed before and after the opening of the SR-241/SR-91 Express Lane Connector project. These projects were considered in capturing the future lane geometry. Figures 7-1 and 7-2 illustrate the study area and lane geometry inputs that were used for the Opening Year and Design Year traffic analysis, respectively. The shaded lanes on the figures illustrate which project will provide lanes that do not exist today.

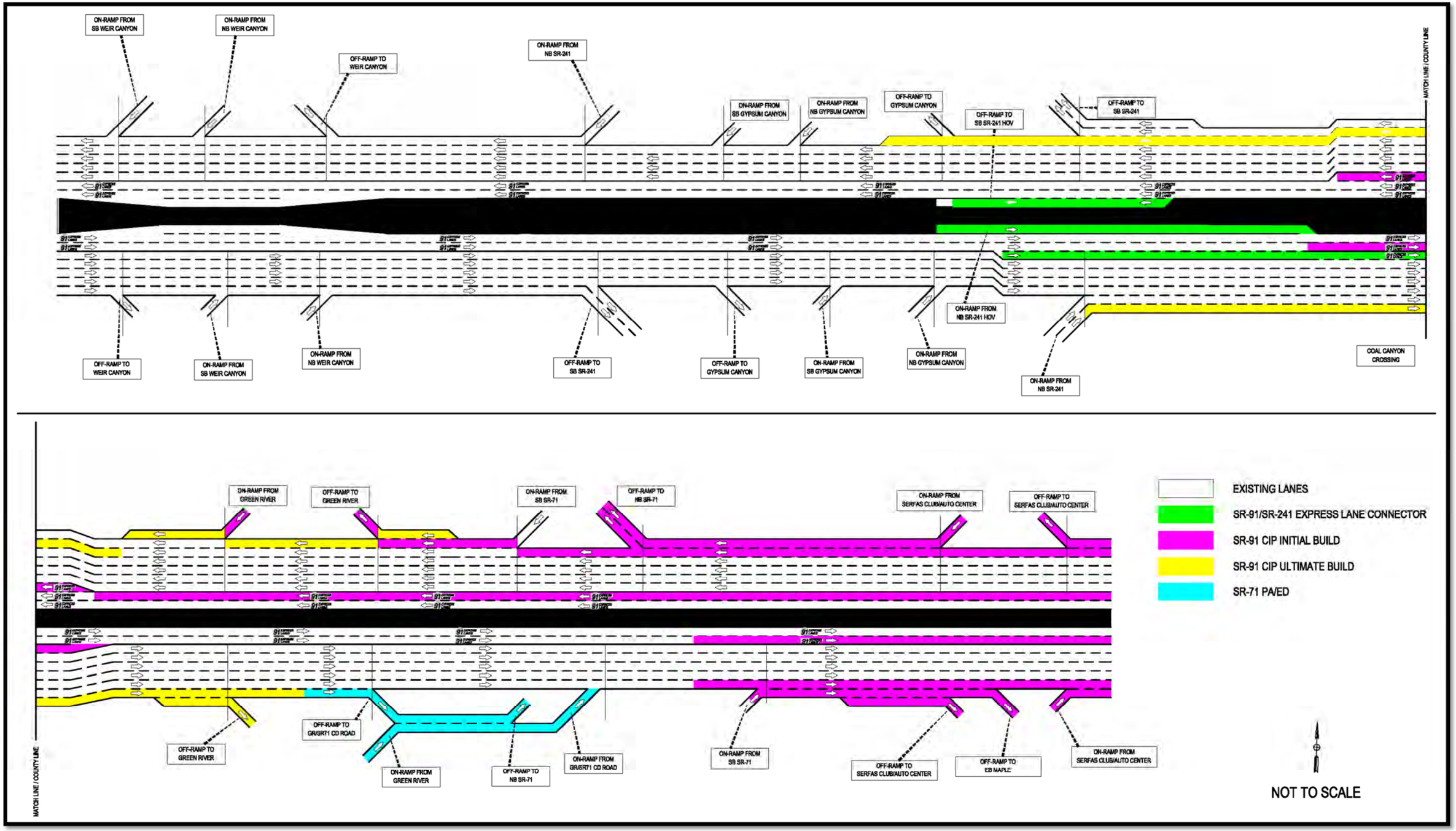
These results are summarized in Chapter 8.

FIGURE 7-1
Lane Geometry – Opening Year Analysis (2017)



Source: CH2M HILL

FIGURE 7-2
Lane Geometry – Design Year Analysis (2040 without Corridor A)



Source: CH2M HILL

8 Traffic Analysis Results

The results of the VISSIM model runs are discussed in this section. The detailed results are for an average of multiple runs (10) with different random number seeds. Detailed model output is provided in Appendix B through F.

Several MOEs are summarized for each scenario to best understand the relative differences between each scenario.

8.1 2017 Conditions (No-Build vs. Build)

8.1.1 Volume Served

Throughput volumes and percent of demand unserved were compared between the 2017 No-Build and Build scenarios. Throughput volume and percent of demand unserved are both measured by combining the GP and Express lanes along SR-91 between Weir Canyon Road and Serfas Club/Auto Center Drive in the AM and PM peak periods.

AM Peak Period

Table 8-1 compares volume throughput and percent demand unserved between the 2017 No-Build and Build scenarios in the AM peak period (6 to 9 AM). **Figure 8-1** illustrates the volume throughput comparisons in the westbound GP and Express lanes between the 2017 No-Build and Build scenarios in the AM peak hour (worst hour of the peak period). The No-Build and Build scenarios have similar combined demand (GP and Express lane trips) in the peak westbound direction of travel east of the SR-91/SR-241 interchange, but the Build scenario has approximately 7% lower combined demand (or 2,400 vehicles) west of the SR-91/SR-241 interchange, due to a shift of travel patterns that increases demand southbound on SR-241.

In the 2017 AM peak, building the connector will allow the corridor to serve more vehicles (about 2%) and more vehicles are able to enter the study area. This represents a significant improvement in the overall efficiency of the system.

Under the Build scenarios, the volume served on SR-91 westbound east of the SR-91/SR-241 interchange is on average 5% greater than the No-Build scenarios. Also, the Build scenario has similar throughput volume to the No-Build scenario west of the SR-91/SR-241 interchange, while the percent unserved is approximately 6% lower in the Build scenario compared to the No-Build scenario. The SR-91 westbound-to-SR-241 southbound ramps serve approximately 2,800 more vehicles in the AM peak period in the Build scenario compared to the No-Build scenario, due to the addition of the direct-connector ramp. The conclusion is that in the 2017 AM peak, building the connector will allow the corridor to serve more vehicles (about 2%) and more vehicles are able to enter the study area. This represents a significant improvement in the overall efficiency of the study area.

PM Peak Period

Table 8-2 compares volume throughput and percent demand unserved between the 2017 No-Build and Build scenarios in the PM peak period (3 to 7 PM). **Figure 8-2** illustrates the volume throughput comparisons in the eastbound GP and Express lanes between the 2017 No-Build and Build scenarios in the PM peak hour (worst hour of the peak period). The Build scenario has slightly less combined demand (GP and Express lane trips) in the peak eastbound direction of travel on SR-91 west of the SR-91/SR-241 interchange when compared to the No-Build scenario (approximately 700 vehicles less during the PM peak period). However, the Build scenario has slightly higher combined demand east of the SR-91/SR-241 interchange (approximately 1,800 vehicles more during the PM peak period). This is due to an increase in demand at the SR-241 northbound-to-SR-91 eastbound movement in the Build scenario caused by the addition of the direct-connector ramp. This implies that the project will pull trips to SR-241 from the regional freeway system (e.g. SR-55), and local arterials. Under the Build scenario, the changes in volume served are summarized below:

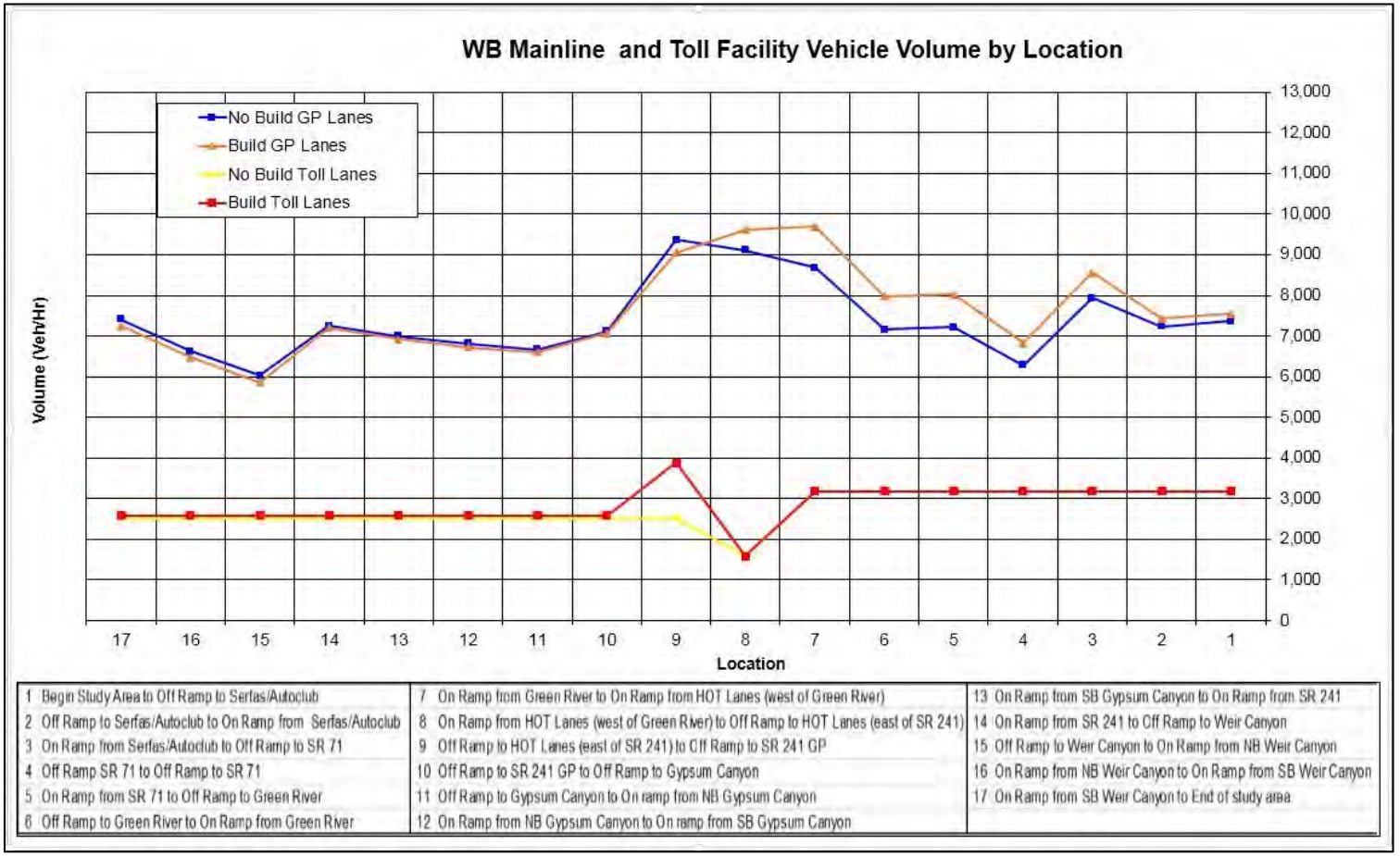
- West of the SR-91/SR-241 interchange, the volume served is slightly lower (approximately 940 total fewer vehicles during the PM peak period) than the No-Build scenario along the peak direction of travel (eastbound). This change is due to the heavy GP lane demand on SR-91 eastbound just downstream of the Express Lane egress/ingress.
- East of the SR-91/SR-241 interchange, the volume served is slightly higher (approximately 900 total more vehicles during the PM peak period) than the No-Build scenario along the peak direction of travel (eastbound). This change is due to the increase in demand through the Express Lanes in the mixing bowl with the project.

Table 8-2 shows that the 2017 PM overall average difference between the No-Build and Build scenarios in volume served in the eastbound direction is -0.3%. This is because of the negative and positive segment differences summarized in the bullets above. This overall eastbound corridor difference is considered nominal and the Build scenario is not projected to have a noticeable effect on the GP lanes in comparison to the No-Build scenario.

TABLE 8-1
Vehicle Throughput Comparison – SR-91 Westbound GP and Express Lanes, 2017 No-Build and Build, AM Peak Period (6-9 AM)

	2017 No-Build AM									2017 Build AM									Throughput Volume Difference	
	Demand Volume (3 hr volume)			Throughput Volume (3 hr volume)			Percent Unserved			Demand Volume (3 hr volume)			Throughput Volume (3 hr volume)			Percent Unserved				
Screenline Location	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	Abs Diff	% Diff
East of Serfas Club/Auto Center Drive	22367	9185	31552	21575	9143	30718	3.5%	0.5%	2.6%	22349	9184	31533	21866	9143	31009	2.2%	0.4%	1.7%	291	0.9%
Between Serfas Club/Auto Center Drive and SR-71	25820	9185	35005	24038	9143	33180	6.9%	0.5%	5.2%	25794	9184	34978	25261	9143	34405	2.1%	0.4%	1.6%	1225	3.7%
Between SR-71 and Green River Road	26530	9185	35715	21917	9143	31059	17.4%	0.5%	13.0%	26511	9184	35695	24077	9143	33220	9.2%	0.4%	6.9%	2161	7.0%
Between Green River Road and SR-241 Ramp (WB to SB)	33680	9185	42865	26256	9143	35398	22.0%	0.5%	17.4%	33659	9184	42843	29011	9143	38154	13.8%	0.4%	10.9%	2756	7.8%
Between SR-241 GP Ramp (WB to SB) and Gypsum Canyon Road	26790	8040	34830	21368	7421	28789	20.2%	7.7%	17.3%	24334	8033	32367	21119	7605	28724	13.2%	5.3%	11.3%	-66	-0.2%
Between Gypsum Canyon Road and SR-241 Ramp (NB to WB)	25631	8040	33671	20951	7421	28372	18.3%	7.7%	15.7%	23187	8033	31220	20641	7605	28245	11.0%	5.3%	9.5%	-127	-0.4%
Between SR-241 Ramp (NB to WB) and Weir Canyon Road	26493	8040	34533	21738	7421	29159	17.9%	7.7%	15.6%	24049	8033	32082	21456	7605	29061	10.8%	5.3%	9.4%	-99	-0.3%
West of Weir Canyon Road	26041	8040	34081	22091	7421	29512	15.2%	7.7%	13.4%	23598	8033	31631	21513	7605	29117	8.8%	5.3%	7.9%	-395	-1.3%
																			Average =	**2.1%**

FIGURE 8-1
SR-91 Westbound Mainline and Toll Facility Vehicle Volume by Location - 2017 No-Build and Build, AM Peak Hour (7-8 AM)



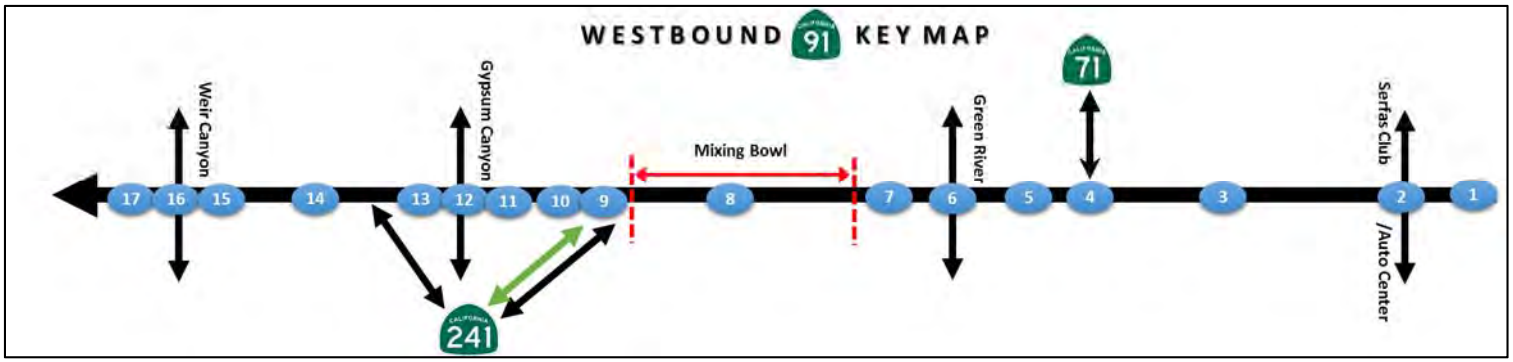
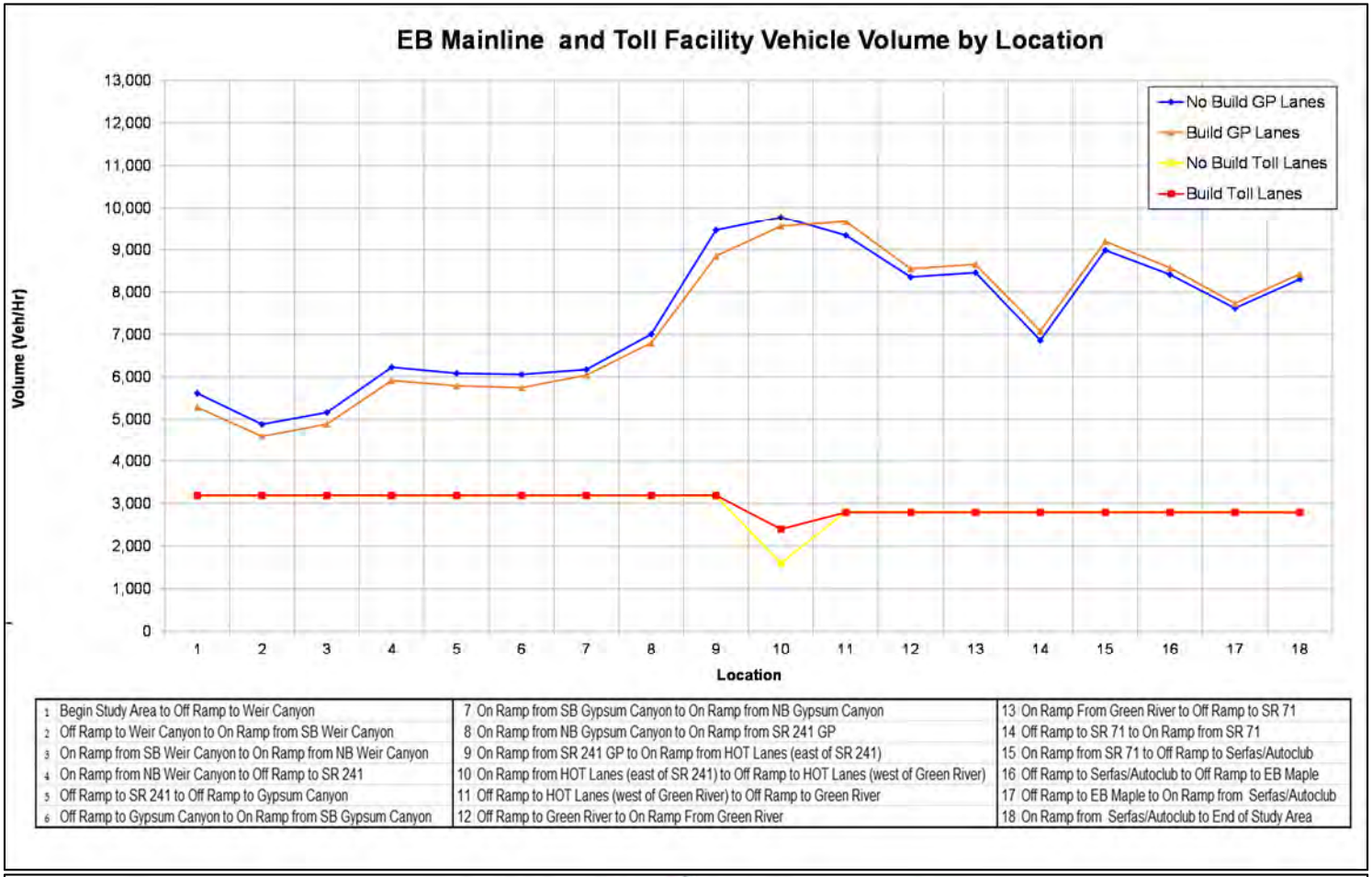


TABLE 8-2
Vehicle Throughput Comparison – SR-91 Eastbound GP and Express Lanes, 2017 No-Build and Build, PM Peak Period (3-7 PM)

Screenline Location	2017 No-Build PM									2017 Build PM									Throughput Volume Difference	
	Demand Volume (4 hr volume)			Throughput Volume (4 hr volume)			Percent Unserved			Demand Volume (4 hr volume)			Throughput Volume (4 hr volume)			Percent Unserved				
	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	Abs Diff	% Diff
West of Weir Canyon Road	44952	12164	57116	23492	12079	35570	47.7%	0.7%	37.7%	44278	12160	56438	22231	12147	34379	49.8%	0.1%	39.1%	-1192	-3.4%
Between Weir Canyon Road and SR-241 Ramp (EB to SB)	43963	12164	56127	25622	12079	37701	41.7%	0.7%	32.8%	43288	12160	55448	24469	12147	36616	43.5%	0.1%	34.0%	-1085	-2.9%
Between SR-241 Ramp (EB to SB) and Gypsum Canyon Road	42981	12164	55145	25006	12079	37084	41.8%	0.7%	32.8%	42303	12160	54463	23997	12147	36144	43.3%	0.1%	33.6%	-940	-2.5%
Between Gypsum Canyon Road and SR-241 Ramp (NB to EB)	46765	12164	58929	28490	12079	40569	39.1%	0.7%	31.2%	46080	12160	58240	27876	12147	40023	39.5%	0.1%	31.3%	-546	-1.3%
Between SR-241 Ramp (NB to EB) and Green River Road	56264	12160	68424	37201	10845	48046	33.9%	10.8%	29.8%	58075	12160	70235	38555	10804	49359	33.6%	11.2%	29.7%	1313	2.7%
Between Green River Road and SR-71	47246	12160	59406	33517	10845	44363	29.1%	10.8%	25.3%	49097	12160	61257	34409	10804	45213	29.9%	11.2%	26.2%	850	1.9%
Between SR-71 and Serfas Club/Auto Center Drive	46179	12160	58339	35152	10845	45997	23.9%	10.8%	21.2%	48034	12160	60194	36088	10804	46892	24.9%	11.2%	22.1%	895	1.9%
East of Serfas Club/Auto Center Drive	41019	12160	53179	32247	10845	43092	21.4%	10.8%	19.0%	42816	12160	54976	32876	10804	43680	23.2%	11.2%	20.5%	588	1.4%
																			Average =	**-0.3%**

FIGURE 8-2
Eastbound Mainline and Toll Facility Vehicle Volume by Location - 2017 No-Build and Build, PM Peak Hour (4-5 PM)



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

8.1.2 Speed

Average speeds along the SR-91 GP lanes were compared between the 2017 No-Build and 2017 Build scenarios using temporal speed diagrams for the peak period. The data are based on speed measurements taken from the VISSIM model every 0.5 miles and every 15 minutes of simulation. Average speeds were also compared along the SR-91 GP and Express lanes for the peak hour using line charts.

AM Peak Period

Figure 8-3 illustrates the average speed contours for the westbound GP Lanes on the SR-91 corridor in both the 2017 No-Build and Build AM peak period scenarios. The contour plots are assigned a different color and depict a profile of speeds along the corridor throughout the entire AM peak period. The speed profiles make it easy to identify the beginning and end locations and intensity of the congestion within the corridor. They also help identify the length of queues in a particular direction.

In the AM peak period, both the 2017 No-Build and Build scenarios show a similar congestion pattern upstream (or east) of the weaving segment between the SR-241 and the Green River Road interchange (the Express Lane ingress/egress area). The No Build scenario queue extends almost one mile further upstream (or east) than the Build scenario, which shows that the Build scenario provides some congestion relief.

In the 2017 AM Build scenario, an increase in speed of 13 mph is expected on the mainline westbound segments west of SR-241 interchange.

Figure 8-4 also illustrates the speed comparisons in the westbound GP and Express Lanes between the 2017 No-Build and Build scenarios in the AM peak hour (7 to 8 AM worst hour of the peak period). In the 2017 Build scenario, an increase in speed of approximately 13 miles per hour (mph) is expected on the mainline westbound segments east of SR-241 interchange (from 15 mph in the No-Build scenario up to 28 mph in the Build scenario.

The conclusion is the project will provide some congestion relief in the 2017 AM peak period by reducing the extent of the westbound bottleneck by approximately one mile.

PM Peak Period

Figure 8-5 illustrates the average speed contours for the eastbound GP Lanes on the SR-91 corridor in both the 2017 No-Build and Build PM peak period scenarios.

In the PM peak period, the mainline segments in the eastbound direction show the same congestion pattern in both 2017 No-Build and Build scenarios. In the 2017 Build scenario, a slight decrease in speed is expected on the GP segments east of the SR-91/SR-241 interchange between SR-241 and Green River Road interchange. The additional friction in the ingress/egress area between the Express Lanes and the slow-moving GP lanes is the reason for the slight decrease in speed in these areas with the addition of the project.

Figure 8-6 also illustrates the speed comparisons in the eastbound GP and Express Lanes between the 2017 No-Build and Build scenarios in the PM peak hour (worst hour of the peak period). In the 2017 Build scenario, a slight decrease in speed is expected on the mainline eastbound segments upstream (or west) of the Express Lane ingress/egress locations. This decrease is due to the increased demand on the GP lanes downstream of the Express Lane ingress/egress caused by the Build scenario. This slight decrease in speeds (one to six mph) on the eastbound GP lanes (west of the Express Lane ingress/egress locations) with the project is considered nominal given the increase in combined throughput (GP and Express Lanes) experienced in the same area (see Section 8.1.1).

FIGURE 8-3
SR-91 Westbound Temporal Speed Diagram – 2017 GP Lane Comparisons, AM Peak Period (6-9 AM)

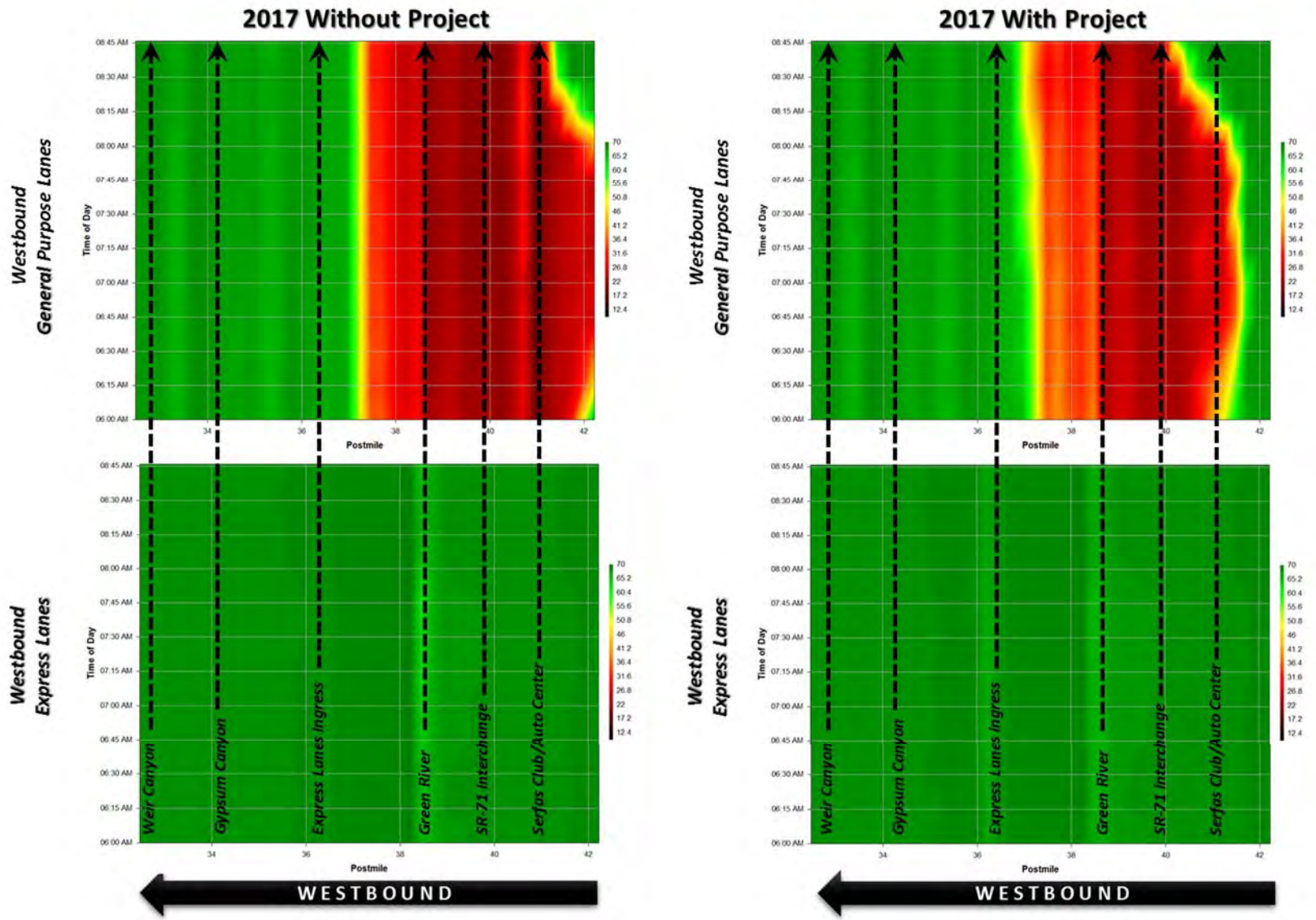
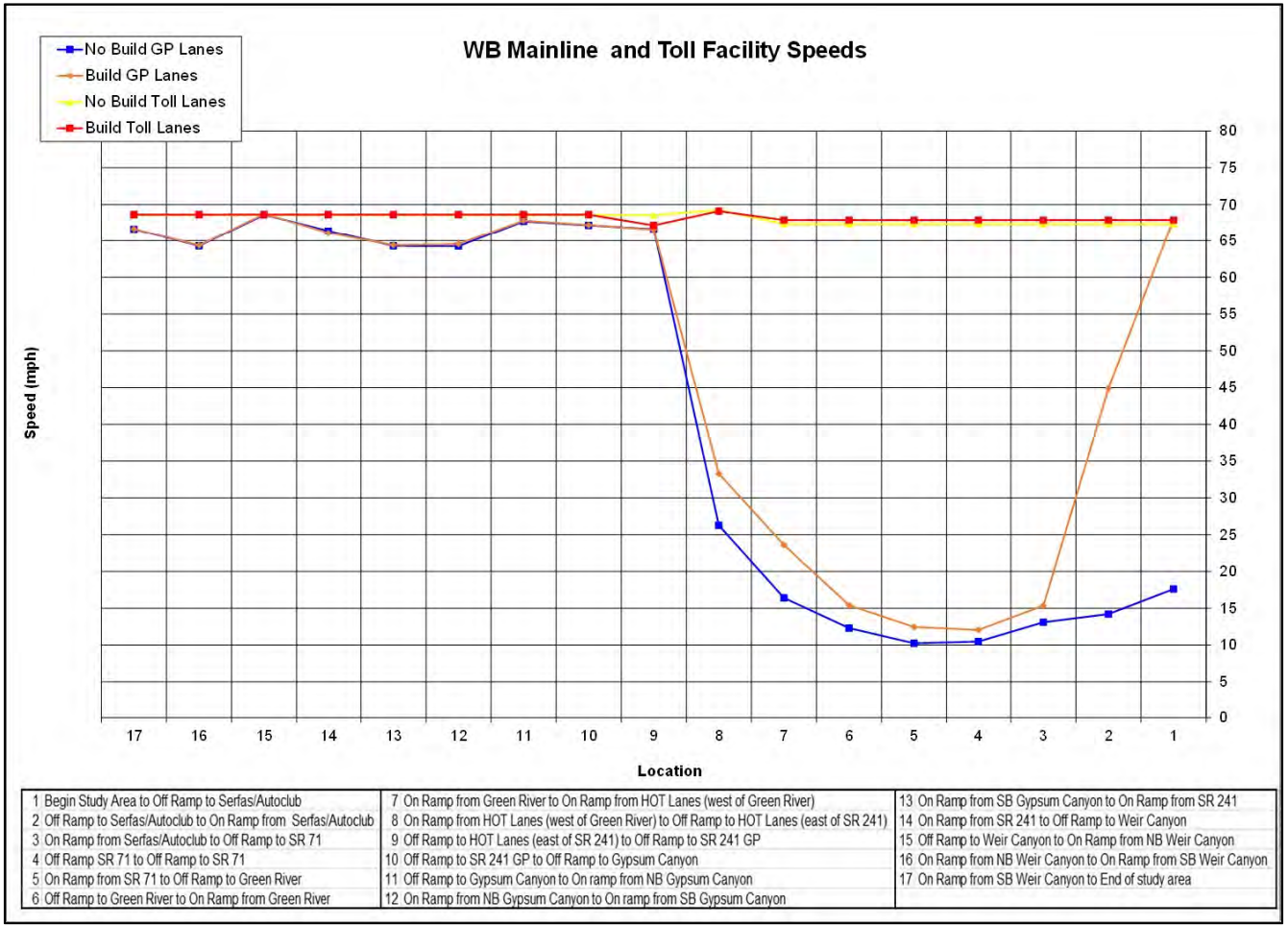


FIGURE 8-4
SR-91 Westbound Mainline and Toll Facility Speed Comparisons - 2017 No-Build and Build, AM Peak Hour (7-8 AM)



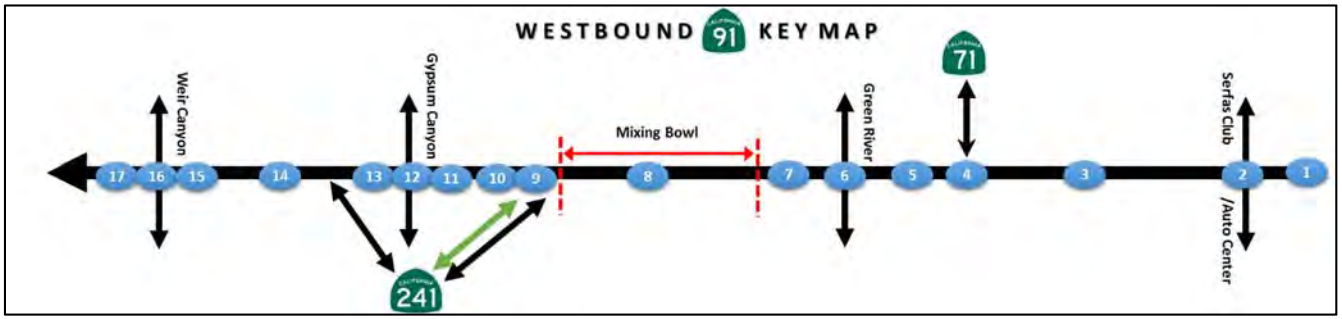


FIGURE 8-5
SR-91 Eastbound Temporal Speed Diagram – 2017 GP Lane Comparisons, PM Peak Period (3-7 PM)

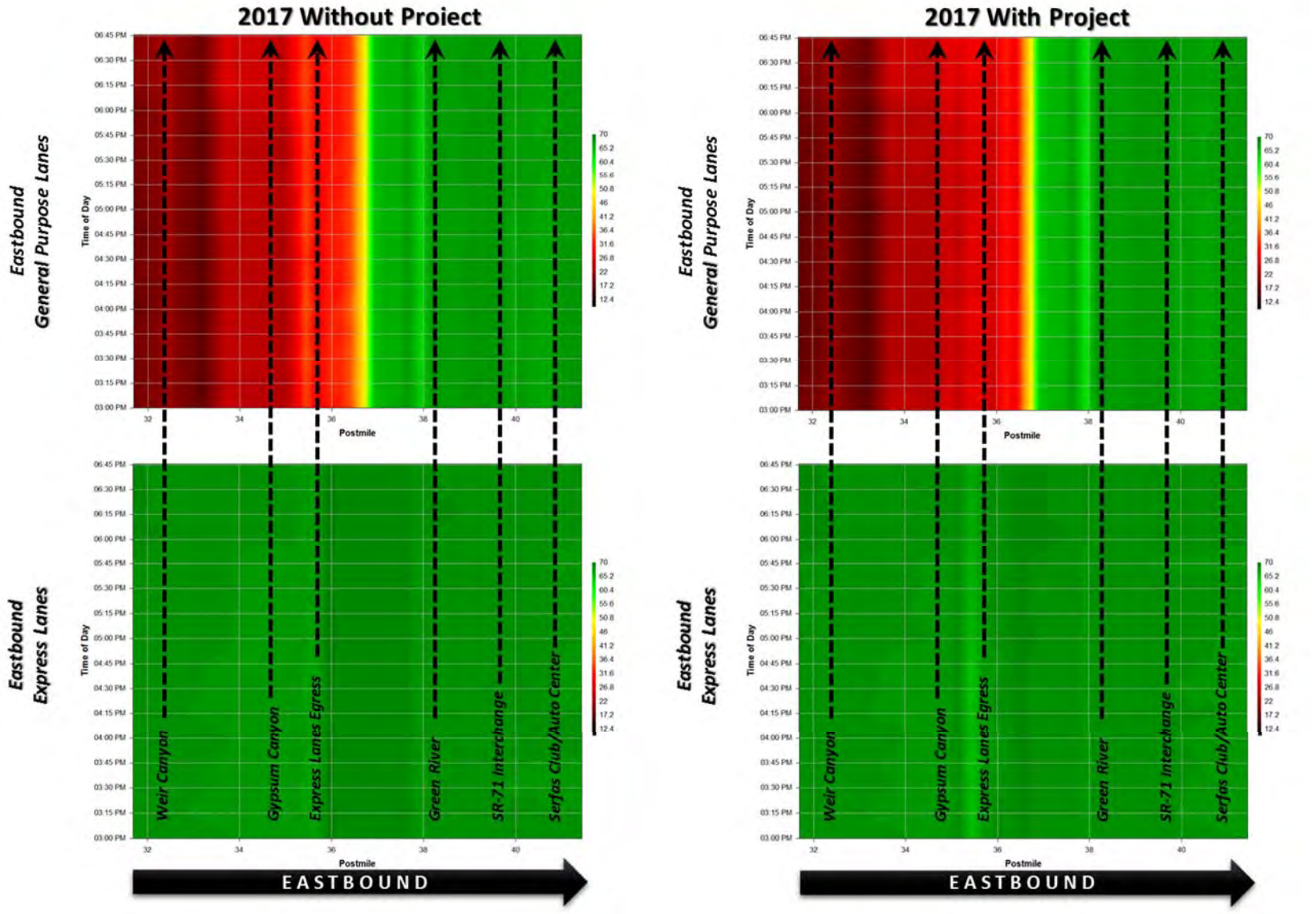
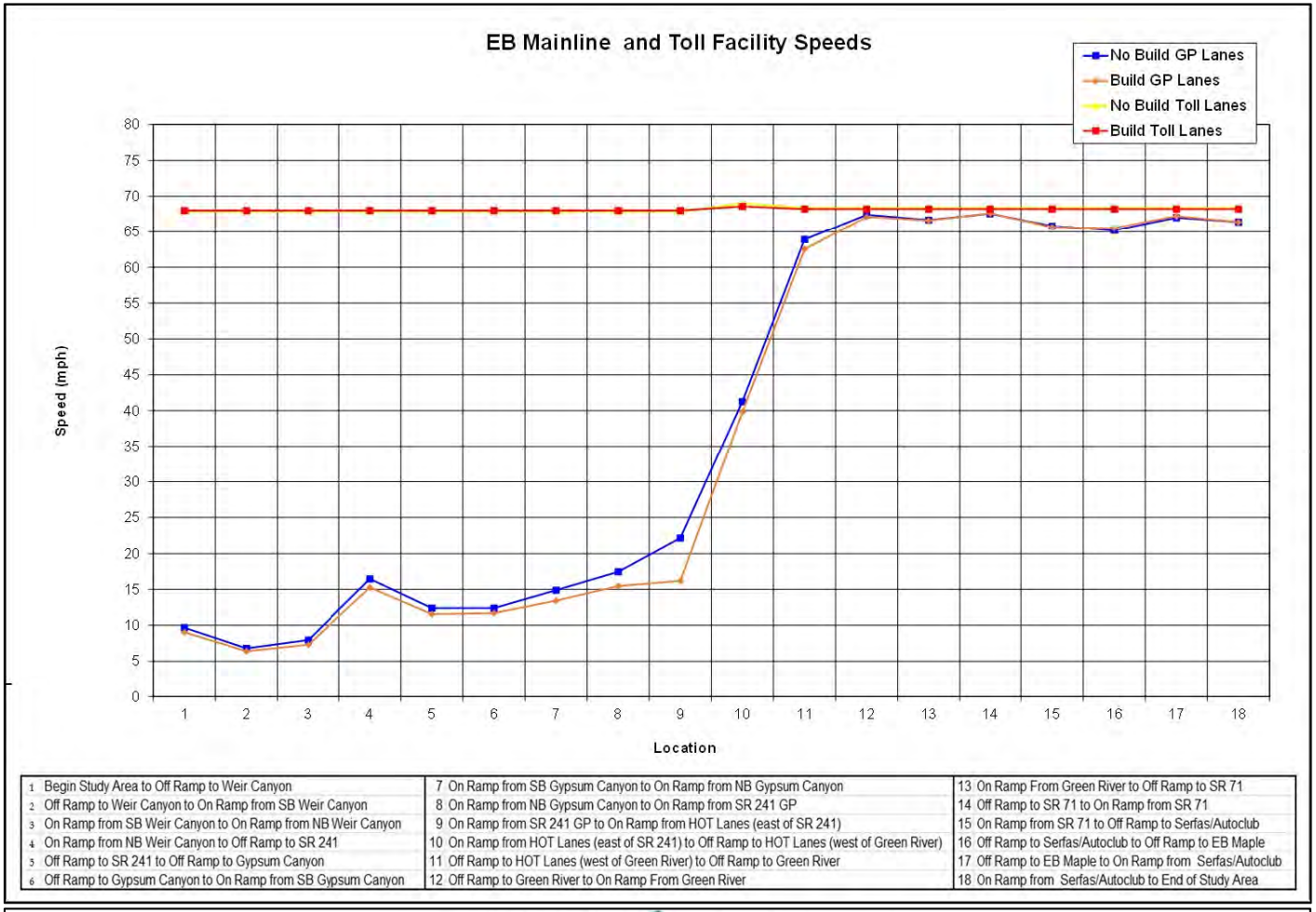
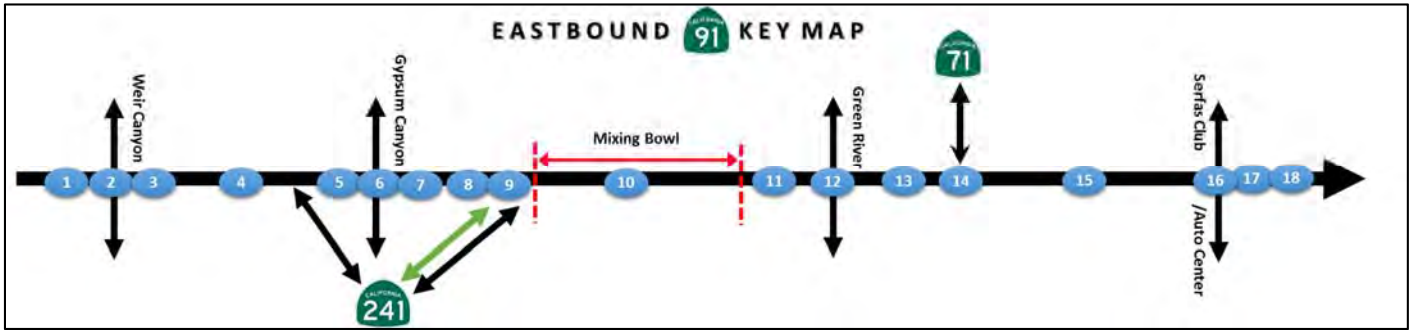


FIGURE 8-6
SR-91 Eastbound Mainline and Toll Facility Speed Comparisons - 2017 No-Build and Build PM Peak Hour (4-5 PM)



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



8.1.3 Density and LOS

AM Peak Period

Figure 8-7 is a summary of the traffic operational conditions based on freeway segment density measured in vehicles per mile per lane along the SR-91 GP lanes in the westbound AM peak direction. The Express Lane results are not reported because the Express Lanes are tolled in a manner that maintains LOS D or better operations throughout the study area during all times of the day.

In the AM peak hour (7 to 8 AM), the mainline segments in the westbound direction will operate at the same or better LOS in the 2017 Build scenario compared to the No-Build scenario. In the 2017 Build scenario, a slight decrease in density is expected on the westbound mainline segments already operating at LOS F in the No-Build scenario (east of SR-241).

In the AM peak hour (7 to 8 AM), the mainline segments in the westbound direction will operate at the same or better LOS in the 2017 Build scenario compared to the No-Build scenario.

The project will therefore slightly improve density/LOS in the 2017 AM peak period on the SR-91 GP lanes in the westbound direction between the Express Lane ingress/egress area and the eastern limits of the study area (Serfas Club Drive/Auto Center Drive).

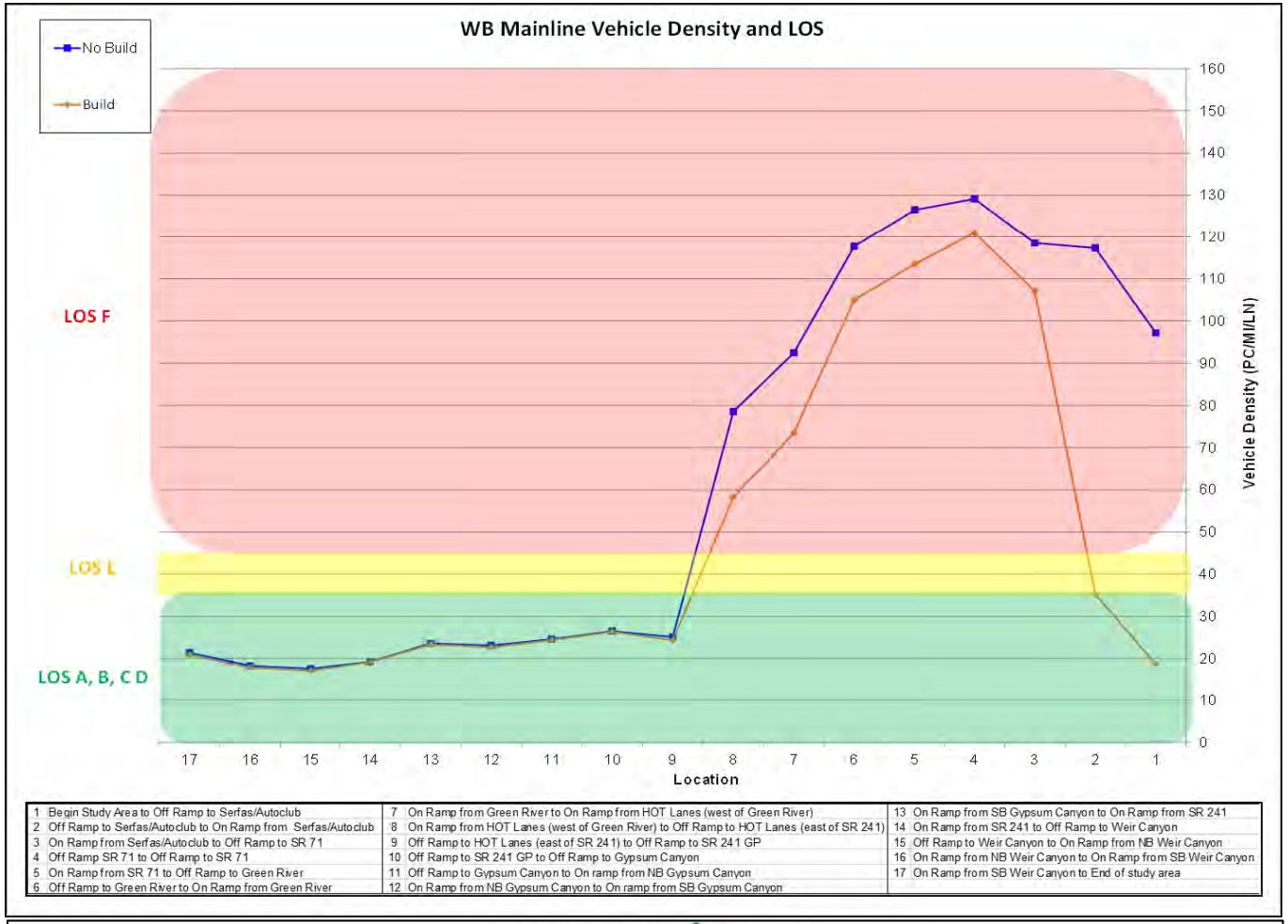
PM Peak Period

Figure 8-8 is a summary of the traffic operational conditions based on freeway segment density measured in vehicles per mile per lane along the SR-91 GP lanes in the eastbound PM peak direction.

In the PM peak hour (4-5 PM), the mainline segments in the eastbound direction west of the Express Lane ingress/egress will operate at the same LOS in both 2017 No-Build and Build scenarios. In the 2017 Build scenario, an increase in density is expected on the GP segments operating in LOS F (west of Green River Road interchange) due to an increase in demand in the GP lanes downstream of the Express Lane ingress/egress area between SR-241 and Green River Road interchange.

The project will therefore slightly worsen density/LOS in the 2017 PM peak period on the SR-91 GP lanes in the eastbound direction between the Express Lane ingress/egress area and the western limits of the study area (Weir Canyon Road), but is considered nominal given the increase in combined throughput (GP and Express Lanes) experienced in the same area (see Section 8.1.1). Density will increase in the eastbound SR-91 GP lanes by approximately 4.8% on average with the project in the 2017 PM peak period. However, combined throughput (GP and Express Lanes) will increase by 5.2% (approximately 600 veh/hr) in the eastbound SR-91 mixing bowl. The increase in combined throughput is considered to offset the relatively small increase in density. Potential mitigation measures for the GP lanes was also considered. However, physical improvements are not feasible given the right-of-way and topographical constraints.

FIGURE 8-7
SR-91 Westbound Mainline Vehicle Density and LOS Comparisons - 2017 No-Build and Build, AM Peak Hour (7-8 AM)



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

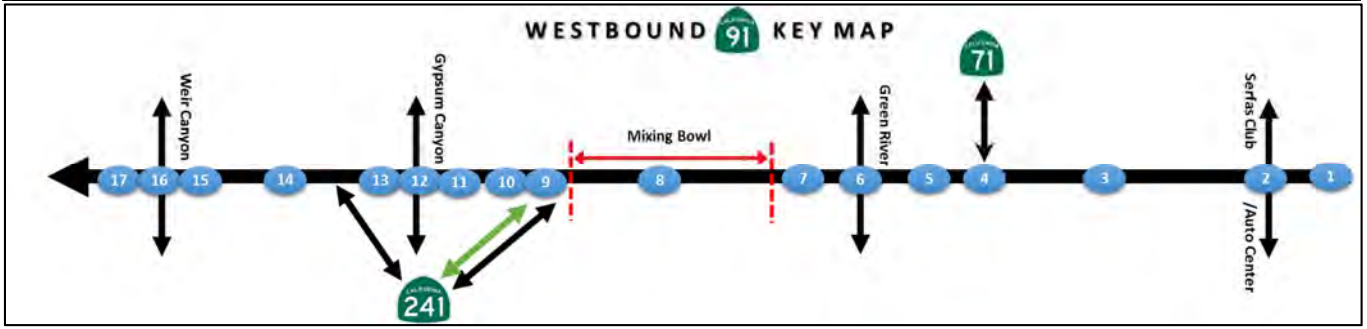
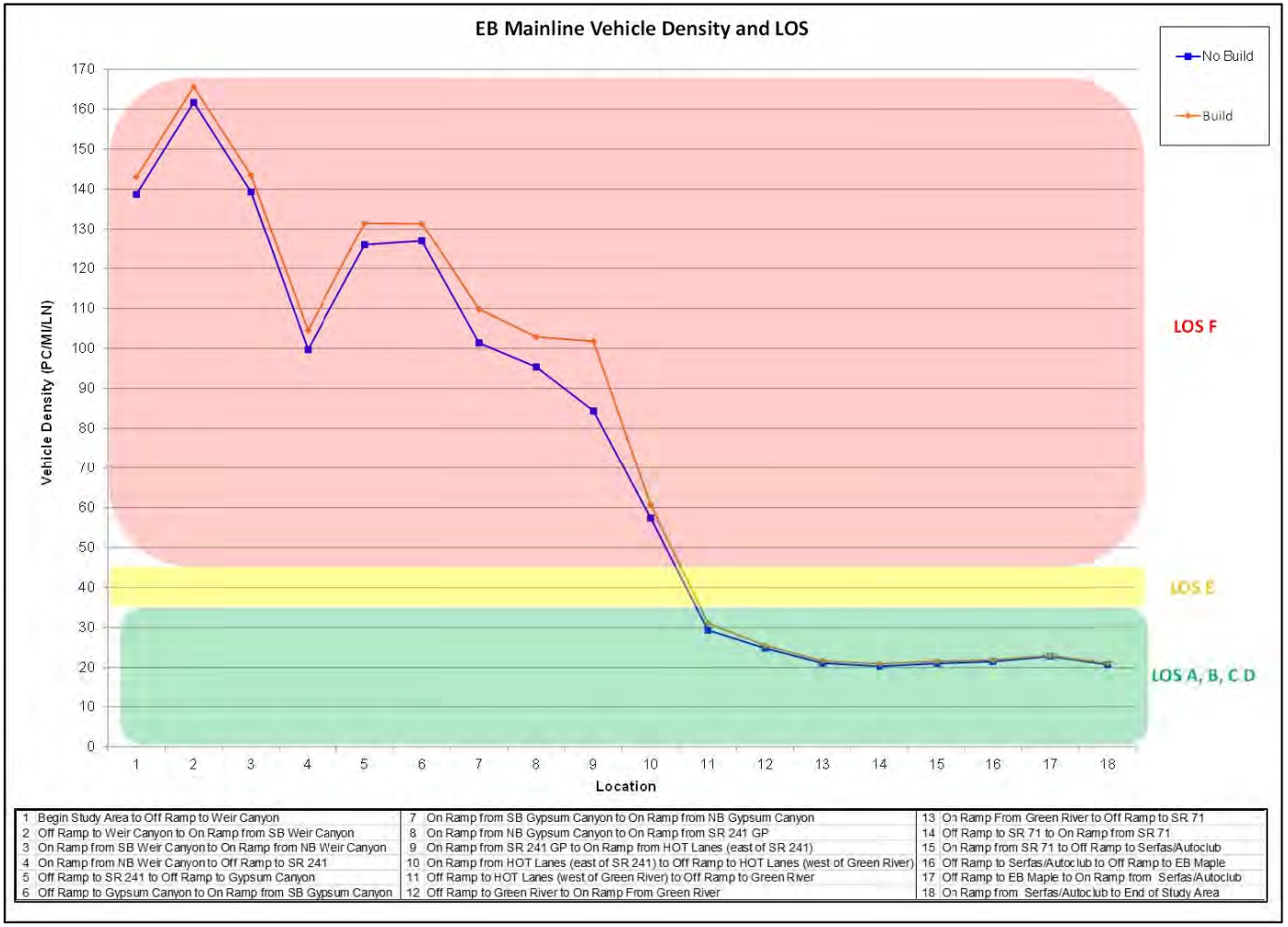
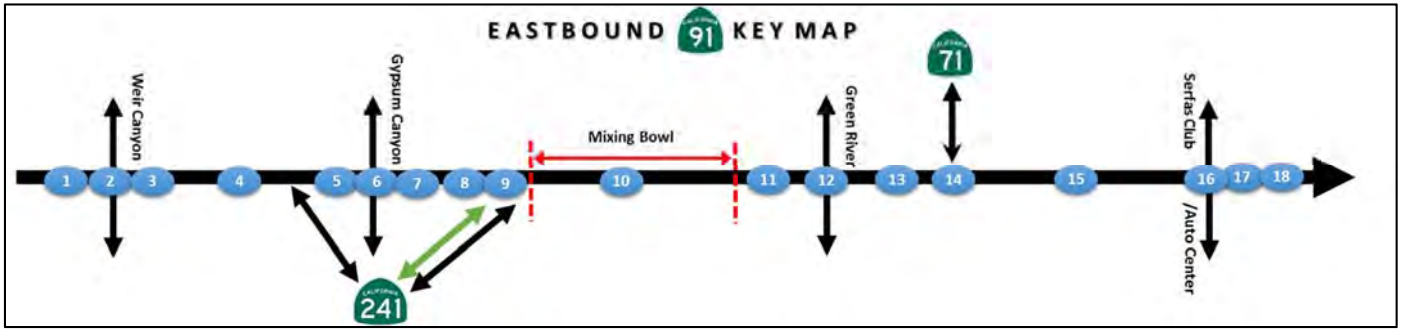


FIGURE 8-8
SR-91 Eastbound Mainline Vehicle Density and LOS Comparisons - 2017 No-Build and Build, PM Peak Hour (4-5 PM)



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



8.1.4 Travel Time

Travel time between major O-D points within the study area was compared between the 2017 No Build and Build scenarios using the VISSIM model. **Figure 8-9** shows how the O-D zones were numbered so that comparisons between No Build and Build can be made. The zones are as follows:

1. SR 91 GP Lanes west of Weir Canyon Road
2. SR 91 Express Lanes west of Weir Canyon Road
3. SR 91 GP Lanes east of Serfas Club Drive
4. SR 91 Express Lanes east of Serfas Club Drive
5. SR 241 (via GP ramp) south of SR 91
6. SR 241 (via Express Lanes ramp) south of SR 91
7. SR 71 north of SR 91

In the AM peak period, all of the travel times for the select O-D pairs will either decrease or stay the same in the westbound direction on SR-91 in the 2017 Build scenario due to the project improvements.

FIGURE 8-9
Travel Time – Origin/Destination Zones

AM Peak Period

Table 8-3 compares travel times between 2017 No-Build and Build scenarios in the AM peak period (6-9 AM) for selected O-D pairs. The O-D pairs were selected to represent all possible movements that capture end to end trips through the study area (e.g., the entry point on northbound SR-241 to the exit point on eastbound SR-91).

In the AM peak period, all of the travel times for the select O-D pairs will either decrease (between 3.3 and 4.5 minutes) or stay the same in the westbound direction on SR-91 in the 2017 Build scenario due to the project improvements. In addition, the travel time for the O-D pair between SR-71 southbound to SR-91 eastbound (off-peak direction) will also decrease (between 8.2 to 11.2 minutes), due to improvements on SR-91 westbound (peak direction) that reduce the queue spillback onto the SR-71 southbound direction that occurs in the No-Build scenario.

PM Peak Period

Table 8-4 compares travel times between 2017 No-Build and 2017 Build scenarios in the PM peak period (3-7 PM) for select O-D pairs.

In the 2017 PM peak period, the travel time for select O-D pairs for SR-91 eastbound GP lanes will slightly increase in the Build scenarios (between 1 to 2.5 minutes) due to an increase in demand in the Express Lane ingress/egress area between SR-241 and the Green River Road interchange. The travel time for the O-D pair for SR-241 northbound to SR-91 eastbound via the GP ramp will also increase in the Build scenario by approximately 1.5 minutes. However, the travel time for the O-D pair for SR-241 northbound to SR-91 eastbound via the new Express Lane ramp will decrease by 2.5 minutes. The travel time from northbound SR-241 to eastbound SR-91 via the GP connector is slightly longer in the build condition because the density on the eastbound SR-91 GP lanes is slightly worse with the project. The increase in the eastbound mixing bowl therefore leads to slower travel times in spite of the drop in demand on the northbound SR-241 to eastbound SR-91 GP connector. The increases in travel times for the SR-91 eastbound GP select O-D pairs discussed above is considered nominal given the increase in combined throughput (GP and Express Lanes) experienced in the same area (see Section 8.1.1).

TABLE 8-3
Travel Time Comparisons - 2017 No-Build and Build, AM Peak Period (6-9 AM)

#	Origin	#	Destination	2017 No Build VISSIM Travel Time (Minutes)			2017 Build VISSIM Travel Time (Minutes)			Change VISSIM Travel Time (Minutes)		
				6-7 AM	7-8 AM	8-9 AM	6-7 AM	7-8 AM	8-9 AM	6-7 AM	7-8 AM	8-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	8.6	8.7	8.6	8.7	8.7	8.6	0.1	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.6	8.6	8.6	8.6	8.6	8.6	0.0	0.0	0.0
		5	SR 241 SB south of SR 91	7.1	7.2	7.2	7.2	7.2	7.2	0.1	0.0	0.0
		7	SR 71 NB north of SR 91	11.0	11.1	11.0	11.1	11.1	11.0	0.1	0.0	0.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	8.5	8.5	8.5	8.5	8.5	8.5	0.0	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	10.9	10.9	10.9	10.9	11.0	10.9	0.0	0.1	0.0
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	23.1	24.8	24.1	18.7	20.4	19.5	-4.4	-4.4	-4.6
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	23.0	24.7	24.0	18.6	20.3	19.5	-4.4	-4.4	-4.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	25.4	27.1	26.5	21.1	22.8	22.0	-4.3	-4.3	-4.5
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	21.0	22.7	21.9	-4.4	-4.4	-4.6
		7	SR 71 NB north of SR 91	12.4	13.3	12.0	9.0	10.1	7.7	-3.4	-3.2	-4.3
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	12.0	12.4	12.6	11.1	11.4	11.9	-0.9	-1.0	-0.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.4	8.4	8.4	8.5	8.5	8.4	0.1	0.1	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	14.4	14.8	15.0	13.6	13.9	14.4	-0.8	-0.9	-0.6
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	10.8	10.9	10.8	-3.6	-3.9	-4.2
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	7.2	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	11.0	11.0	11.0	11.0	11.0	10.9	0.0	0.0	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	13.4	13.4	13.4	13.4	13.4	13.3	0.0	0.0	-0.1
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	n/a	n/a	n/a	10.9	10.9	10.9	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	n/a	n/a	n/a	10.8	10.8	10.8	-0.1	-0.1	-0.1
		7	SR 71 NB north of SR 91	n/a	n/a	n/a	13.3	13.4	13.3	-0.1	0.0	0.0
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	43.0	54.1	55.9	32.0	39.5	40.5	-11.0	-14.6	-15.4
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	42.9	54.0	55.8	31.9	39.4	40.5	-11.0	-14.6	-15.3
		3	SR 91 EB GP Lanes east of Serfas Club Rd	28.7	37.2	38.3	20.5	26.7	27.0	-8.2	-10.5	-11.3
		5	SR 241 SB south of SR 91 (Via GP Ramp)	45.3	56.4	58.3	34.4	42.0	43.1	-10.9	-14.4	-15.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	34.3	41.8	42.9	-11.0	-14.6	-15.4

Decrease in travel time with project is greater than 0.5 minutes

Increase in travel time with project is greater than 0.5 minutes

TABLE 8-4
Travel Time Comparisons - 2017 No-Build and Build, PM Peak Period (3-7 PM)

#	Origin	#	Destination	2017 No Build VISSIM Travel Time (Minutes)				2017 Build VISSIM Travel Time (Minutes)				Change VISSIM Travel Time (Minutes)			
				3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	28.3	29.6	29.4	27.6	30.3	31.9	32.0	29.4	2.0	2.3	2.6	1.8
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	28.3	29.5	29.4	27.6	30.3	31.9	31.9	29.4	2.0	2.4	2.5	1.8
		5	SR 241 SB south of SR 91	18.4	19.1	19.0	17.7	19.3	20.8	20.6	18.7	0.9	1.7	1.6	1.0
		7	SR 71 NB north of SR 91	30.6	31.9	31.8	30.0	32.7	34.3	34.3	31.7	2.1	2.4	2.5	1.7
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	10.4	10.5	10.5	10.5	11.2	11.3	11.3	11.2	0.8	0.8	0.8	0.7
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.4	8.4	8.4	8.4	8.5	8.5	8.5	8.4	0.1	0.1	0.1	0.0
		7	SR 71 NB north of SR 91	12.7	12.8	12.9	12.9	13.6	13.6	13.7	13.5	0.9	0.8	0.8	0.6
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.5	8.5	8.5	8.4	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10.9	11.0	10.9	10.9	10.9	10.9	10.9	10.9	0.0	-0.1	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	10.9	10.8	10.8	10.8	0.0	-0.2	-0.1	-0.1
		7	SR 71 NB north of SR 91	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.4	0.0	0.0	0.0	-0.1
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.7	-0.1	-0.1	-0.1	-0.2
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	13.4	13.5	13.6	13.6	15.0	15.2	15.1	14.9	1.6	1.7	1.5	1.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	13.4	13.4	13.5	13.5	15.0	15.2	15.1	14.8	1.6	1.8	1.6	1.3
		7	SR 71 NB north of SR 91	15.7	15.8	15.9	15.9	17.3	17.5	17.5	17.2	1.6	1.7	1.6	1.3
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	n/a	n/a	n/a	n/a	13.6	13.7	13.7	13.6	0.2	0.2	0.1	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.8	-2.6	-2.6	-2.7	-2.7
		7	SR 71 NB north of SR 91	n/a	n/a	n/a	n/a	15.9	16.0	16.0	15.9	0.2	0.2	0.1	0.0
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	10.2	10.2	10.1	9.9	10.2	10.2	10.1	9.9	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	10.2	10.2	10.0	9.9	10.2	10.2	10.0	9.8	0.0	0.0	0.0	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	6.4	6.7	6.2	5.8	6.5	6.6	6.2	5.8	0.1	-0.1	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	12.6	12.7	12.5	12.3	12.7	12.6	12.5	12.3	0.1	-0.1	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	12.6	12.6	12.4	12.2	0.0	-0.1	-0.1	-0.1

Decrease in travel time with project is greater than 0.5 minutes

Increase in travel time with project is greater than 0.5 minutes

8.1.5 Network Performance

In addition to freeway performance results, network performance measures were recorded. The network performance MOEs include:

- Total vehicle demand and volume served (vehicles)
- Total vehicle-miles traveled (VMT measured in miles)
- Total network travel time (hours)
- Average speed per vehicle (mph)
- Average delay time per vehicle (minutes/vehicle)

In the AM peak period, the average delay per vehicle decreases by approximately 28% (from 6.8 to 4.9 minutes per vehicle) in the Build scenario.

AM Peak Period

Table 8-5 compares the network performance results from the 2017 No-Build and Build scenarios in the AM peak period (6 to 9 AM). The following points highlight the 2017 No-Build versus Build comparisons in the AM peak period:

- The Build scenario will slightly increase demand in the study area (by an additional 940 vehicles or less than 1%) by attracting vehicles from surrounding roadways to SR-241.
- The Build scenario will increase vehicle throughput (by 4,500 vehicles or 5%) and decrease the percent of unserved traffic (from 9% in the No-Build scenario to 5% in the Build scenario).
- VMT increases by 6% in the Build scenario because vehicle throughput increases.
- The average speed per vehicle increases by approximately 6 mph (from 34 mph to 40 mph) in the Build scenario.
- The average delay per vehicle decreases by approximately 28% (from 6.8 to 4.9 minutes per vehicle) in the Build scenario.

PM Peak Period

Table 8-6 compares the network performance results from the 2017 No-Build and Build scenarios in the PM peak period (3 to 7 PM). The following points highlight the 2017 No-Build versus Build comparisons in the PM peak period:

- The Build scenario will increase demand in the study area (by an additional 2,800 vehicles or 2%) by pulling additional demand to SR-241 from surrounding roadways.
- The Build scenario will increase vehicle throughput (by 1,200 vehicles or 1%). Although the amount of unserved vehicles will increase in the Build scenario (by 1,600 vehicles), the percent of unserved vehicles will remain at 15% for both scenarios.
- VMT increases by 2% in the Build scenario because vehicle throughput increases.
- The average speed per vehicle decreases by 1 mph (from 39 to 38 mph) in the Build scenario due to the additional demand in the GP lanes downstream of the Express Lane ingress/egress.
- The average delay per vehicle increases by approximately 0.4 minutes (from 5.3 to 5.7 minutes) in the Build scenario.

The decrease in speed (-1.0 mph) and increase in travel time (+0.4 min/veh) are balanced by the benefits of the increase in vehicle throughput (+1,200 vehicles or 1%).

TABLE 8-5
Summary of Network Performance - No-Build vs. Build Scenarios, 2017 AM Peak Period (6-9 AM)

Performance Measure (all vehicle types, 6:00 - 9:00 AM)	No-Build Condition Value	Build Condition Value	Net Change with Project
Total Vehicle Demand (vehicles)	100,741	101,682	941
Total number of vehicles that did not reach their destination (vehicles)	9,016	5,420	-3,596
Total number of vehicles that have reached their destination (vehicles)	91,725	96,262	4,537
Total vehicle-miles traveled - VMT (miles)	796,551	845,966	49,415
Total travel time - VHT (hours)	23,068	21,012	-2,056
Average speed (mph)	34.5	40.3	5.8
Average delay time per vehicle (min/veh)	6.8	4.9	-1.9

Note: Results are based on the total three hours and are an average of all runs.

TABLE 8-6
Summary of Network Performance - No-Build vs. Build Scenarios, 2017 PM Peak Period (3-7 PM)

Performance Measure (all vehicle types, 3:00 - 7:00 PM)	No-Build Condition Value	Build Condition Value	Net Change with Project
Total Vehicle Demand (vehicles)	141,937	144,727	2,790
Total number of vehicles that did not reach their destination (vehicles)	20,812	22,405	1,593
Total number of vehicles that have reached their destination (vehicles)	121,125	122,322	1,197
Total vehicle-miles traveled - VMT (miles)	1,014,001	1,036,967	22,966
Total travel time - VHT (hours)	26,278	27,608	1,330
Average speed (mph)	38.6	37.6	-1.0
Average delay time per vehicle (min/veh)	5.3	5.7	0.4

Note: Results are based on the total four hours and are an average of all runs.

8.1.6 Express Lane Operations

AM Peak Period

Express lane operations were studied as part of the 2017 AM peak period analysis in both the No-Build and Build scenarios. Operational metrics such as volume served, speed, queues, and LOS were presented for the AM peak period earlier in Section 8. For quick reference, these metrics are summarized in **Table 8-7**. In the AM peak period, the westbound Express Lanes throughout the study area are projected to operate the same with and without the project. **Table 8-7** shows that there is no appreciable difference in volume served, speed, or LOS in the westbound Express Lanes with or without the project.

TABLE 8-7
Summary of Westbound Express Lane Operations - No-Build vs. Build Scenarios, 2017 AM Peak Period (6-9 AM)

		Study Segment		
Operational Metric	Scenario	Between SR-71 and Green River	Between Green River and SR-241 Express Lane Connector	Between SR-241 Express Lane Connector and Weir Canyon
Volume Served (percent of demand served)	No-Build	99.5%	99.5%	92.3%
	Build	99.6%	99.6%	94.7%
Speed	No-Build	68	69	69
	Build	68	68	69
Queues in the Express Lanes?	No-Build	No	No	No
	Build	No	No	No
Level of Service	No-Build	C	B	B
	Build	C	B	B

PM Peak Period

In the PM peak period, the eastbound Express Lanes throughout the study area are also projected to operate the same with and without the project in 2017. **Table 8-8** shows that there is no appreciable difference in volume served, speed, or LOS in the eastbound Express Lanes with or without the project.

TABLE 8-8
Summary of Eastbound Express Lane Operations - No-Build vs. Build Scenarios, 2017 PM Peak Period (3-7 PM)

		Study Segment		
Operational Metric	Scenario	Between Weir Canyon and SR-241 Express Lane Connector	Between SR-241 Express Lane Connector and Green River	Between Green River and SR-71
Volume Served (percent of demand served)	No-Build	99.3%	99.3%	89.2%
	Build	99.9%	99.9%	88.8%
Speed (mph)	No-Build	68	69	68
	Build	68	69	68
Queues in the Express Lanes?	No-Build	No	No	No
	Build	No	No	No
Level of Service	No-Build	C	B	C
	Build	C	B	C

Additional weaving analysis of the Express Lane operations in the mixing bowl was performed to supplement the microsimulation analysis. Per the Highway Design Manual (Section 504.7), the Leisch Method was applied to study the weaving condition in the mixing bowl. However, the Leisch method will not work for this study segment because the weaving volume (V_w) exceeds the "Turning Line for K" and the weaving section is greater than the chart boundary (7,400 feet). As noted on Figure 504.7A in the Highway Design Manual, extrapolation beyond the chart boundaries is not advised for the Leisch method. The Highway Capacity Manual (HCM) weaving analysis methodology was also attempted for the mixing bowl. However, based on the weaving volumes, the maximum weaving segment that can be analyzed is 4,093 feet. The mixing bowl segment is 7,400 feet and therefore cannot be analyzed using the HCM weaving methodology. Therefore, microsimulation is the only analysis tool that can be used for a segment as long as the mixing bowl. As summarized in this chapter, microsimulation analysis shows that weaving between the eastbound Express Lanes and eastbound GP lanes is not an issue due to the 7,400 foot mixing bowl segment.

8.2 2040 Conditions (No-Build vs. Build)

8.2.1 Volume Served

Throughput volumes and percent of demand unserved were compared between the 2040 No-Build and Build scenarios. Throughput volume and percent of demand unserved are both measured by combining the GP and Express lanes along SR-91 between Weir Canyon Road and Serfas Club Drive/Auto Center Drive in the AM and PM peak periods.

AM Peak Period

Table 8-9 compares volume throughput and percent demand unserved between the 2040 No-Build and Build scenarios in the AM peak period (6 to 9 AM). **Figure 8-10** illustrates the volume throughput comparisons in the westbound GP and Express lanes between the 2040 No-Build and Build scenarios in the AM peak hour (7 to 8 AM). The Build scenario has slightly higher combined demand on SR-91 westbound east of the SR-91/SR-241 interchange when compared to the No-Build scenario (approximately 440 vehicles during the AM peak period), but the Build scenario has approximately 9% lower demand west of the SR-91/SR-241 interchange (approximately 3,700 vehicles during the AM peak period). This is due to a shift of travel patterns that increases demand southbound on SR-241.

In the 2040 AM peak, building the connector will increase the volume served on SR-91 westbound by 1% upstream of the Express Lane weaving area and by 47% downstream of the weaving area along SR-241 southbound.

The Build scenario serves slightly more vehicles east of the SR-91/SR-241 interchange than the No Build scenario (approximately 430 more vehicles or 1%), but approximately 3,500 fewer vehicles in west of the SR-91/SR-241 interchange. However, the SR-91 westbound to SR-241 southbound movement serves approximately 3,300 more vehicles in the Build scenario compared to the No Build scenario due to the addition of the direct connector ramp, offsetting this difference. Furthermore, the average percent unserved traffic along the entire length of SR-91 is the same between the Build and No-Build scenarios. The

conclusion is that the Build scenario is able to serve the same or slightly more vehicles in the peak direction of SR-91 upstream of the Express Lane ingress/egress area, and more vehicles along SR-241 southbound. Due to a shift in travel patterns, the Build scenario serves more vehicles along southbound SR-241 and less vehicles along westbound SR-91 downstream of the Express Lane ingress/egress area. This represents a slight improvement in the overall efficiency of the system.

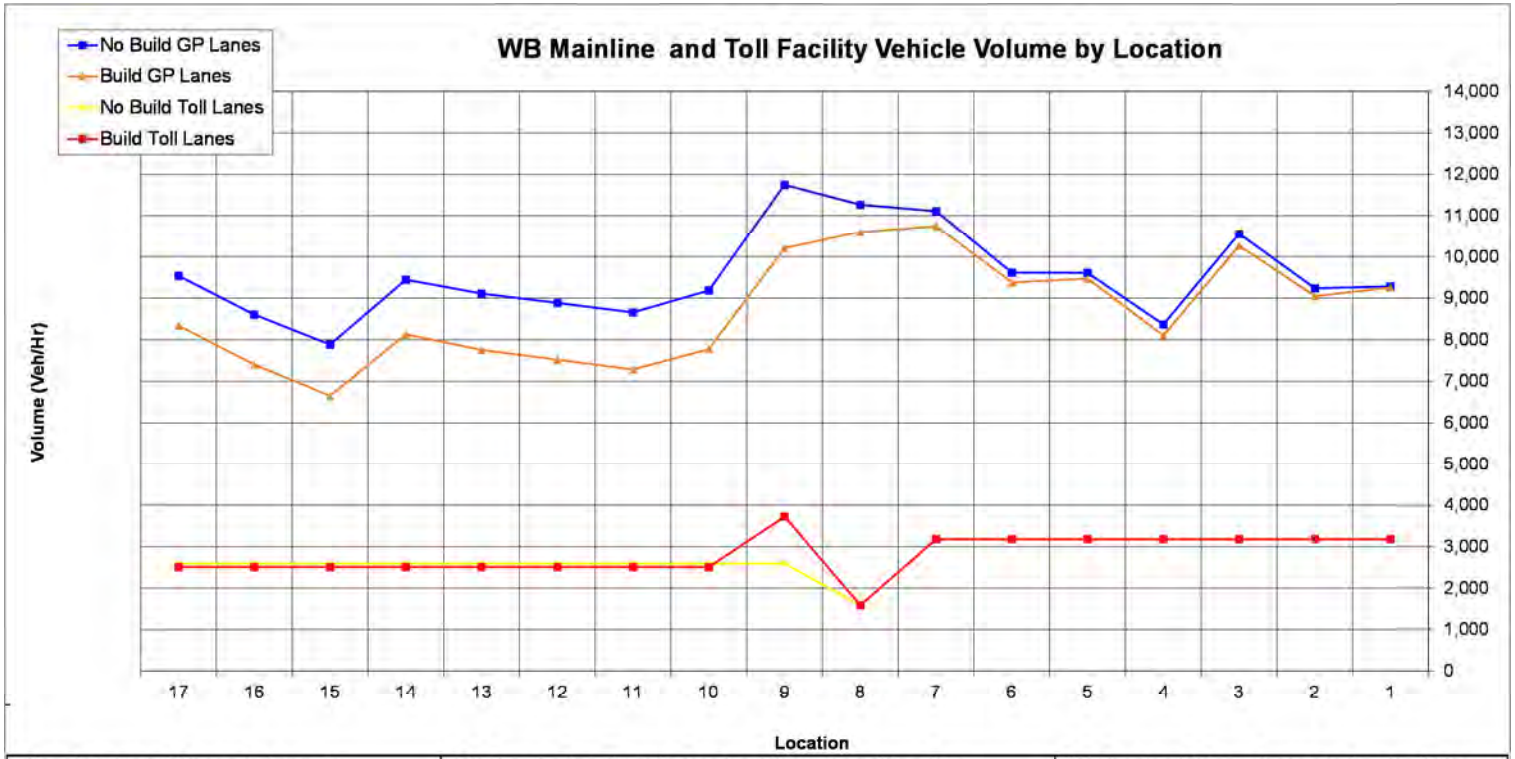
PM Peak Period

Table 8-10 compares volume throughput and percent demand unserved between the 2040 No-Build and Build scenarios in the PM peak period (3 to 7 PM). **Figure 8-11** illustrates the volume throughput comparisons in the eastbound GP and Express lanes between the 2040 No-Build and Build scenarios in the PM peak hour (4 to 5 PM). The Build scenario has the same combined demand (GP and Express lane trips) in the peak eastbound direction of travel when compared to the No-Build scenario. Under the Build scenario, the volume served is slightly greater (about 300 vehicles during the PM peak period) than the No-Build scenario in the peak direction of travel (eastbound). This change is due to the shift of approximately 800 peak hour trips from the SR-241 northbound to SR-91 eastbound GP ramp over to the Express Lane ramp, which slightly lowers demand in the GP lanes in that area. The conclusion is that the Build scenario is able to serve slightly more vehicles and more vehicles are able to enter the study area. With the project, there will be an improvement in the overall efficiency of the system.

TABLE 8-9
Vehicle Throughput Comparison – SR-91 Westbound GP and Express Lanes, 2040 No-Build and Build, AM Peak Period (6-9 AM)

Screenline Location	2040 No-Build AM									2040 Build AM									Throughput Volume Difference	
	Demand Volume (3 hr volume)			Throughput Volume (3 hr volume)			Percent Unserved			Demand Volume (3 hr volume)			Throughput Volume (3 hr volume)			Percent Unserved				
	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	Abs Diff	% Diff
East of Serfas Club/Auto Center Drive	27218	9185	36403	25992	9135	35127	4.5%	0.5%	3.5%	27744	9184	36928	27121	9136	36257	2.2%	0.5%	1.8%	1129	3.2%
Between Serfas Club/Auto Center Drive and SR-71	31564	9185	40749	30055	9135	39191	4.8%	0.5%	3.8%	31983	9184	41167	30821	9136	39956	3.6%	0.5%	2.9%	766	2.0%
Between SR-71 and Green River Road	32331	9185	41516	28451	9135	37586	12.0%	0.5%	9.5%	32744	9184	41928	28684	9136	37820	12.4%	0.5%	9.8%	234	0.6%
Between Green River Road and SR-241 Ramp (WB to SB)	41137	9185	50322	33034	9135	42169	19.7%	0.5%	16.2%	41540	9184	50724	32613	9136	41749	21.5%	0.5%	17.7%	-421	-1.0%
Between SR-241 GP Ramp (WB to SB) and Gypsum Canyon Road	33614	8040	41654	27200	7518	34718	19.1%	6.5%	16.7%	29804	8033	37837	23724	7364	31088	20.4%	8.3%	17.8%	-3630	-10.5%
Between Gypsum Canyon Road and SR-241 Ramp (NB to WB)	32124	8040	40164	27028	7518	34546	15.9%	6.5%	14.0%	28388	8033	36421	23641	7364	31005	16.7%	8.3%	14.9%	-3541	-10.3%
Between SR-241 Ramp (NB to WB) and Weir Canyon Road	33188	8040	41228	28005	7518	35523	15.6%	6.5%	13.8%	29444	8033	37477	24662	7364	32026	16.2%	8.3%	14.5%	-3497	-9.8%
West of Weir Canyon Road	32492	8040	40532	28228	7518	35746	13.1%	6.5%	11.8%	28894	8033	36927	25081	7364	32445	13.2%	8.3%	12.1%	-3301	-9.2%
																			Average =	**-4.4%**

FIGURE 8-10
SR-91 Westbound Mainline and Toll Facility Vehicle Volume by Location - 2040 No-Build and Build, AM Peak Hour (7-8 AM)



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

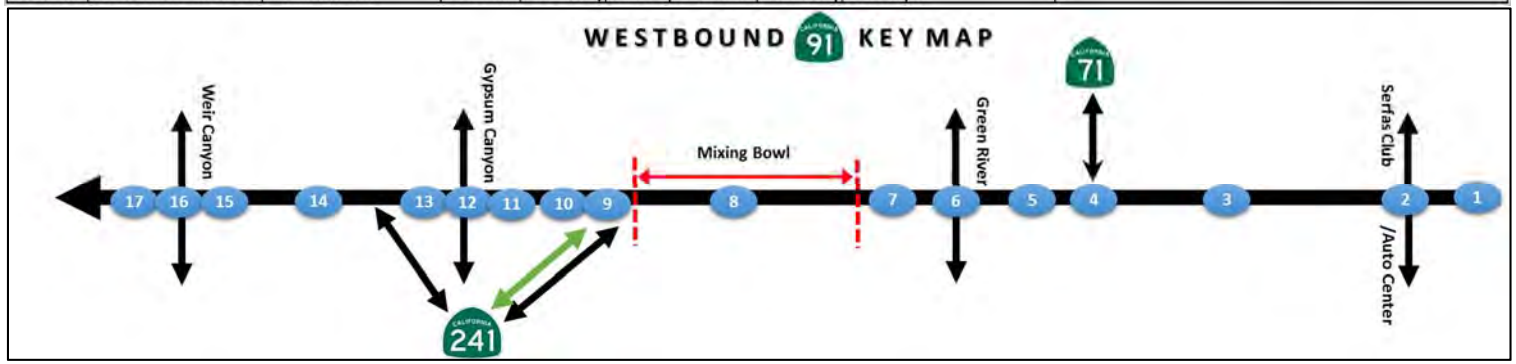
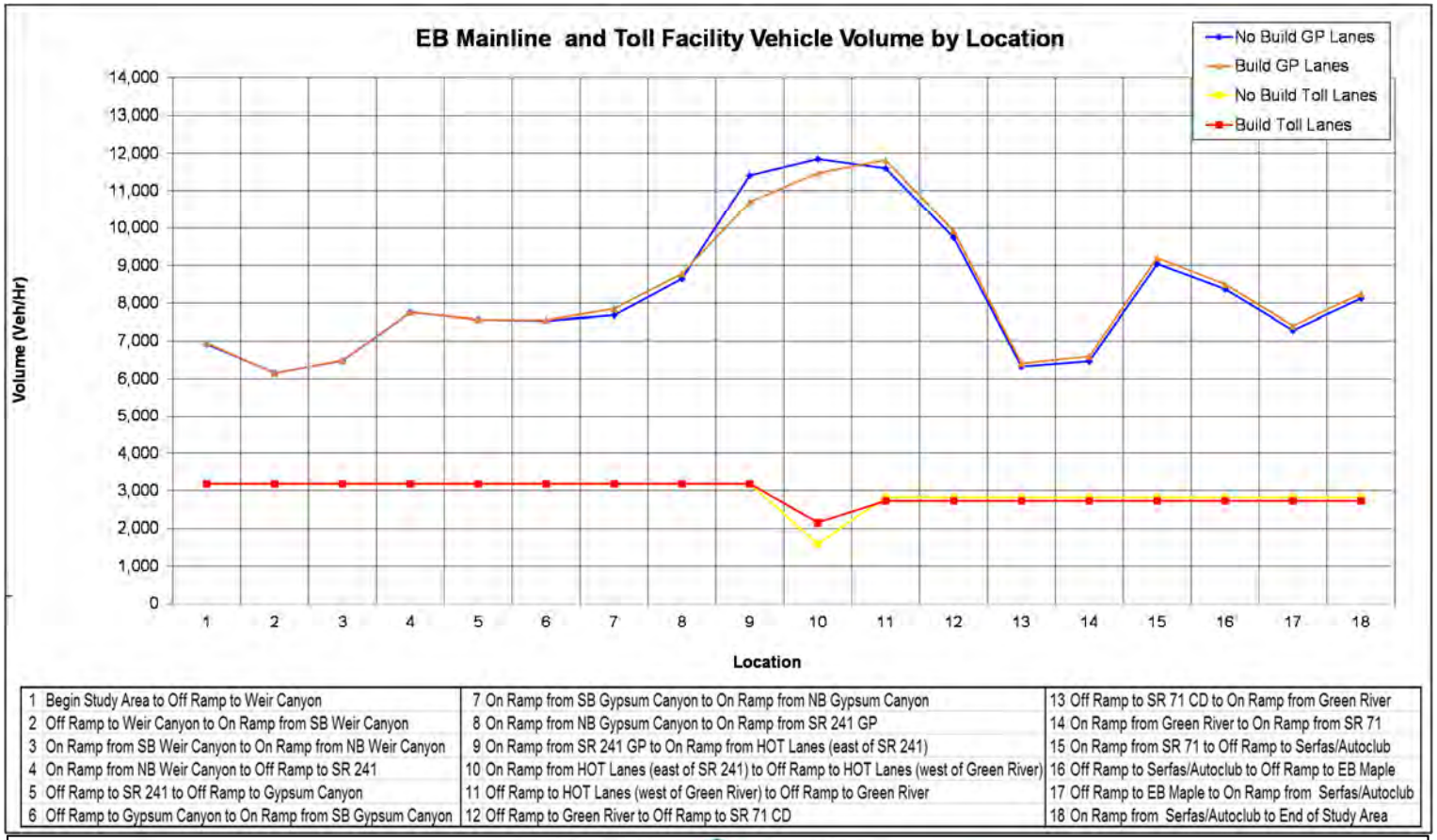


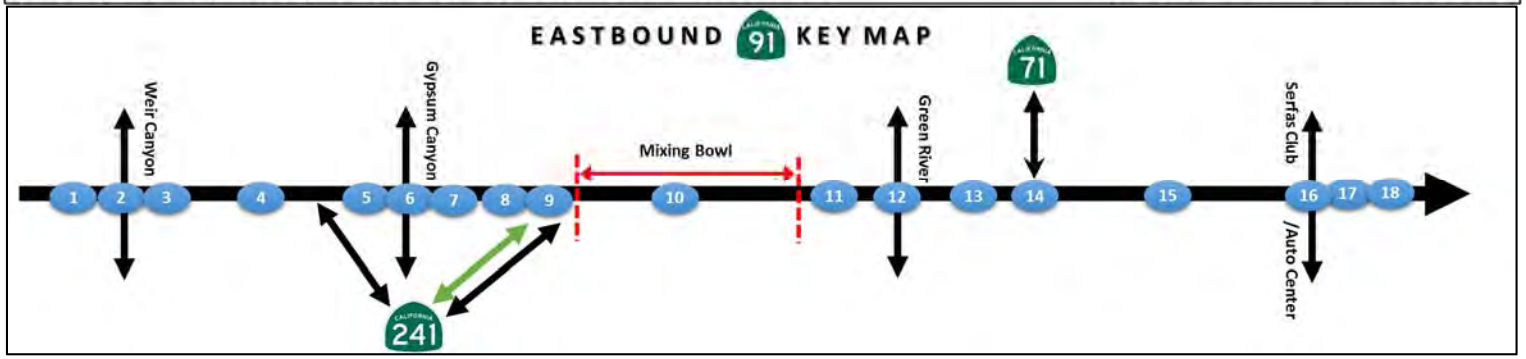
TABLE 8-10
Vehicle Throughput Comparison – SR-91 Eastbound GP and Express Lanes, 2040 No-Build and Build, PM Peak Period (3-7 PM)

Screenline Location	2040 No-Build PM									2040 Build PM									Throughput Volume Difference	
	Demand Volume (4 hr volume)			Throughput Volume (4 hr volume)			Percent Unserved			Demand Volume (4 hr volume)			Throughput Volume (4 hr volume)			Percent Unserved				
	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	Abs Diff	% Diff
West of Weir Canyon Road	55164	12164	67328	28247	12079	40326	48.8%	0.7%	40.1%	55162	12160	67322	28476	12121	40597	48.4%	0.3%	39.7%	270	0.7%
Between Weir Canyon Road and SR-241 Ramp (EB to SB)	54771	12164	66935	31232	12079	43311	43.0%	0.7%	35.3%	54614	12160	66774	31362	12121	43483	42.6%	0.3%	34.9%	172	0.4%
Between SR-241 Ramp (EB to SB) and Gypsum Canyon Road	53563	12164	65727	30457	12079	42536	43.1%	0.7%	35.3%	53382	12160	65542	30548	12121	42669	42.8%	0.3%	34.9%	134	0.3%
Between Gypsum Canyon Road and SR-241 Ramp (NB to EB)	58054	12164	70218	34548	12079	46627	40.5%	0.7%	33.6%	58009	12160	70169	35202	12121	47323	39.3%	0.3%	32.6%	696	1.5%
Between SR-241 Ramp (NB to EB) and Green River Road	68537	12160	80697	45851	10863	56714	33.1%	10.7%	29.7%	68157	12097	80254	46653	10539	57192	31.6%	12.9%	28.7%	478	0.8%
Between Green River Road and SR-71	35516	12160	47676	24751	10863	35614	30.3%	10.7%	25.3%	35662	12097	47759	25022	10539	35561	29.8%	12.9%	25.5%	-53	-0.1%
Between SR-71 and Serfas Club/Auto Center Drive	46089	12160	58249	35080	10863	45943	23.9%	10.7%	21.1%	46576	12097	58673	35683	10539	46223	23.4%	12.9%	21.2%	280	0.6%
East of Serfas Club/Auto Center Drive	39790	12160	51950	31361	10863	42224	21.2%	10.7%	18.7%	40044	12097	52141	31858	10539	42398	20.4%	12.9%	18.7%	174	0.4%
																			Average =	**0.6%**

FIGURE 8-11
SR-91 Eastbound Mainline and Toll Facility Vehicle Volume by Location – 2040 No-Build and Build, PM Peak Hour (4-5 PM)



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area



8.2.2 Speed

Average speeds along the SR-91 GP lanes were compared between the 2040 No-Build and Build scenarios during the peak period using temporal speed diagrams. The data are based on speed measurements taken from the VISSIM model every 0.5 miles and every 15 minutes of simulation. Average speeds were also compared along the SR-91 GP and Express Lanes during the peak hour using line charts.

AM Peak Period

Figure 8-12 illustrates the average speed contours for the westbound GP lanes on the SR-91 corridor in both the 2040 No-Build and Build AM peak period scenarios.

In the AM peak period, the project will increase speeds (from between 30 and 40 mph to 60 mph) between the Express Lane Ingress and Gypsum Canyon Road between 6:45 AM and 8:30 AM. This is due to an increase in the throughput volume in the ingress/egress area between the Green River Road interchange and SR-241. Speeds are also higher in the Build scenario (approximately 60 mph) east of the Serfas Club Drive/Auto Center Drive interchange during the 6-7 AM hour compared to the No Build scenario (approximately 30 mph).

Figure 8-13 also illustrates the speed comparisons in the westbound GP and Express lanes between the 2040 No-Build and Build scenarios in the AM peak hour (worst hour of the peak period). In the 2040 Build scenario, an increase in speed of approximately 30 mph (from 33 to 63 mph) is expected compared to the No Build scenario on the mainline segments west of SR-241 interchange.

The conclusion is the project will provide some congestion relief in the 2040 AM peak period by reducing the limits and duration of the westbound bottleneck.

PM Peak Period

Figure 8-14 illustrates the average speed contours for the eastbound GP lanes on the SR-91 corridor in both the 2040 No-Build and Build PM peak period scenarios.

In the PM peak period, the speeds in the GP lanes in the eastbound direction are generally the same between the No Build and Build scenarios, with the exception of the area between the SR-241 GP On Ramp and the Green River Road interchange. Speeds are approximately 5 mph higher in the Build scenario (60 to 65 mph) in this area compared to the No Build scenario (55 to 60 mph). The improvements associated with the ultimate SR-91 CIP improvements were found to provide enough capacity in 2040 to accommodate the friction between the Express Lanes and the GP lanes in the eastbound ingress/egress area.

In the 2040 PM peak, the speeds in the GP lanes in the eastbound direction are generally the same between the No Build and Build scenarios, with the exception of the area between the SR-241 GP On Ramp and the Green River Road interchange. In this area, speeds are 5 mph higher with the project.

Figure 8-15 also illustrates the speed comparisons in the eastbound GP and Express lanes between the 2040 No-Build and Build scenarios in the PM peak hour (worst hour of the peak period). Speeds along SR-91 eastbound are generally the same between the Build and No-Build scenario in most segments of the corridor, with the exception of the segment between the SR-241 on-ramp and SR-71 Collector-Distributor (C-D) off-ramp. Speeds are approximately 5 mph higher in the Build scenario in this area compared to the No-Build scenario. In the Express Lanes, the speeds are projected to remain near free-flow in the ingress/egress area. The project therefore provides benefit in terms of increased speeds in the eastbound general purpose lanes in the 2040 Build scenario.

FIGURE 8-12
SR-91 Westbound Temporal Speed Diagram – 2040 GP and Express Lane Comparisons, AM Peak Period (6-9 AM)

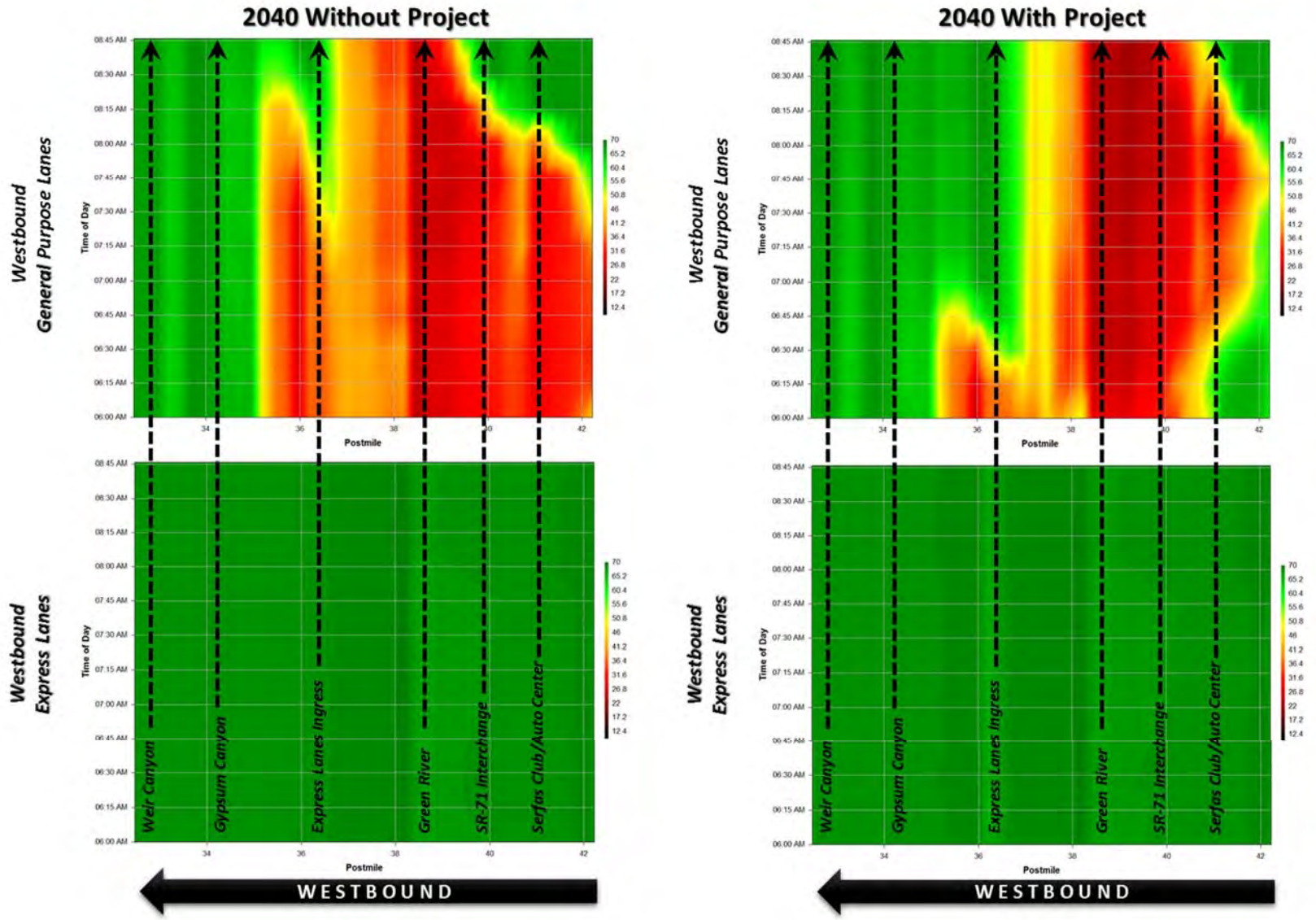
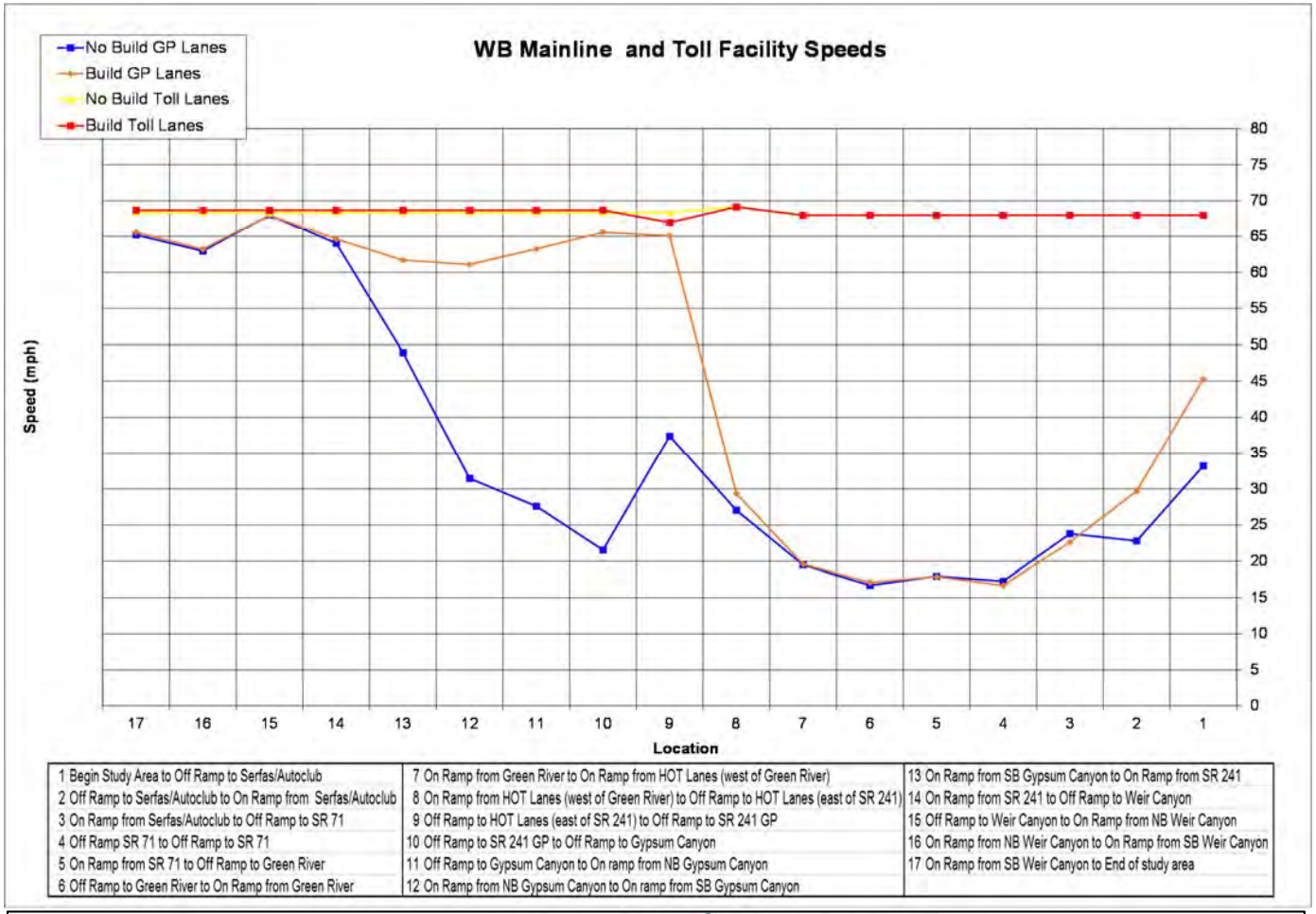


FIGURE 8-13
SR-91 Westbound Mainline and Toll Facility Speed Comparisons - 2040 No-Build and Build, AM Peak Hour (7-8 AM)



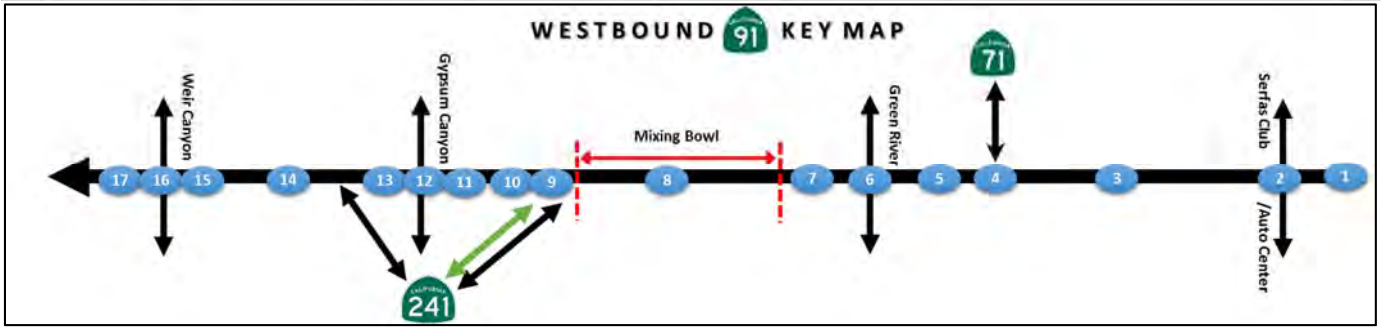


FIGURE 8-14
SR-91 Eastbound Temporal Speed Diagram – 2040 GP and Express Lane Comparisons, PM Peak Period (3-7 PM)

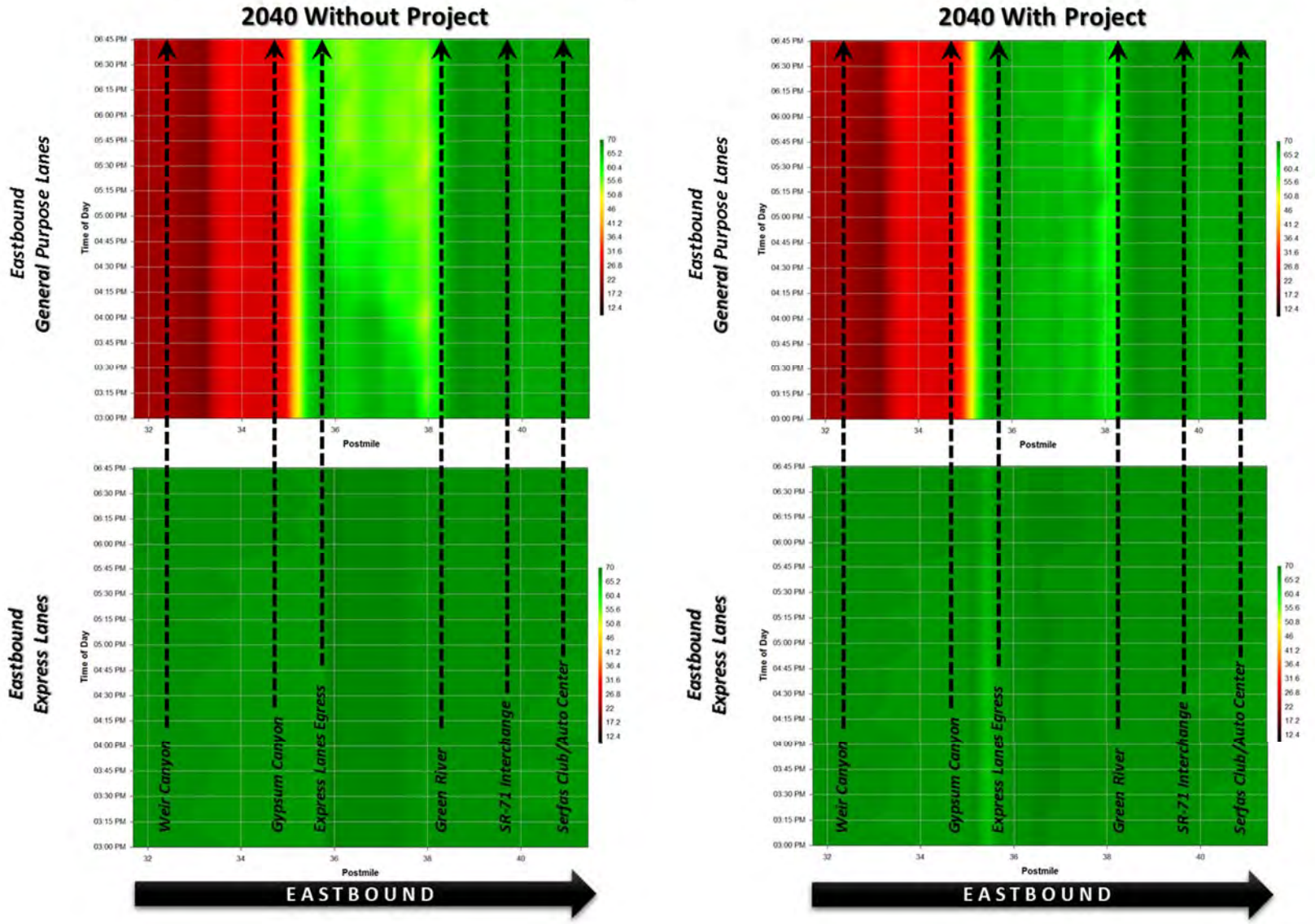
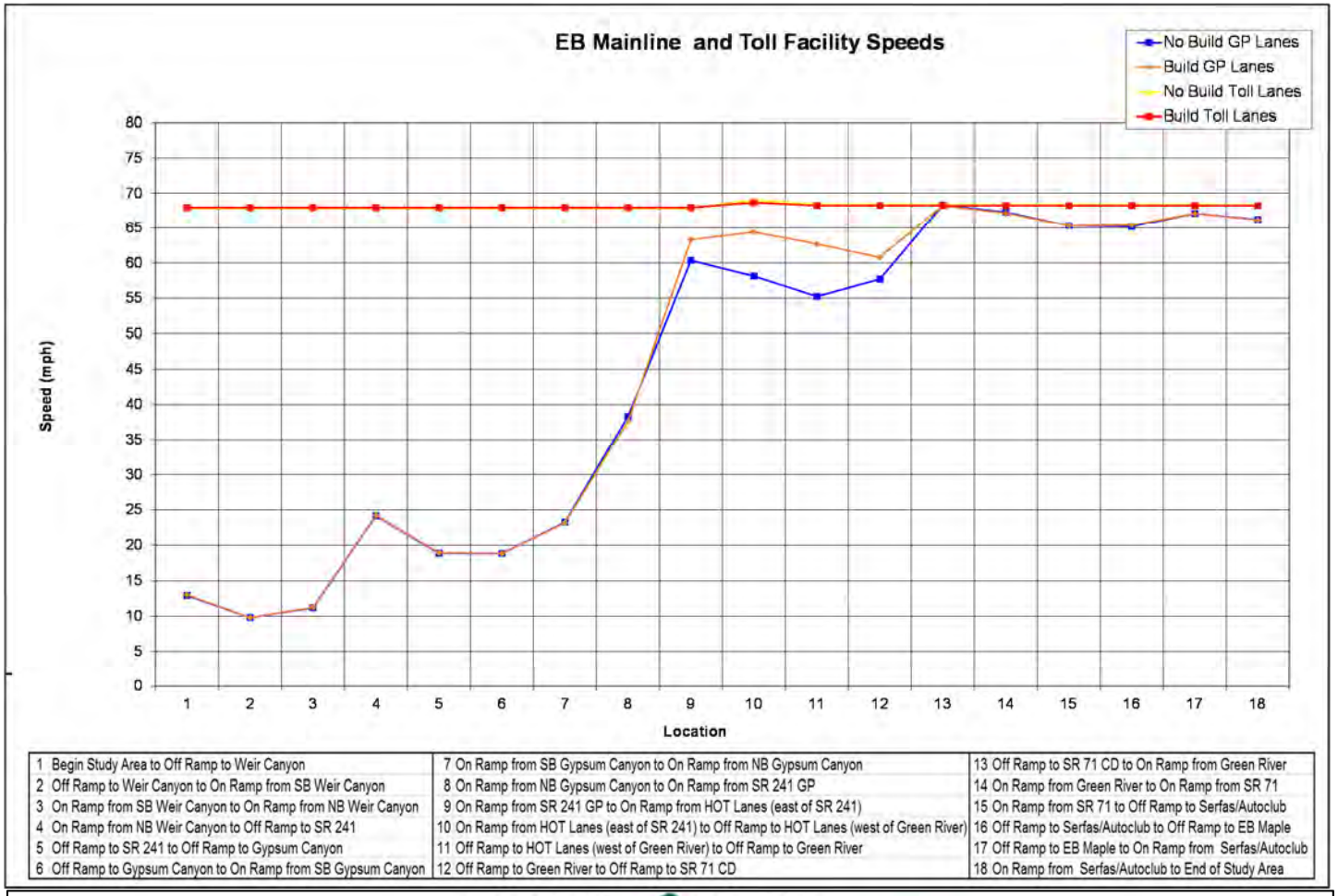
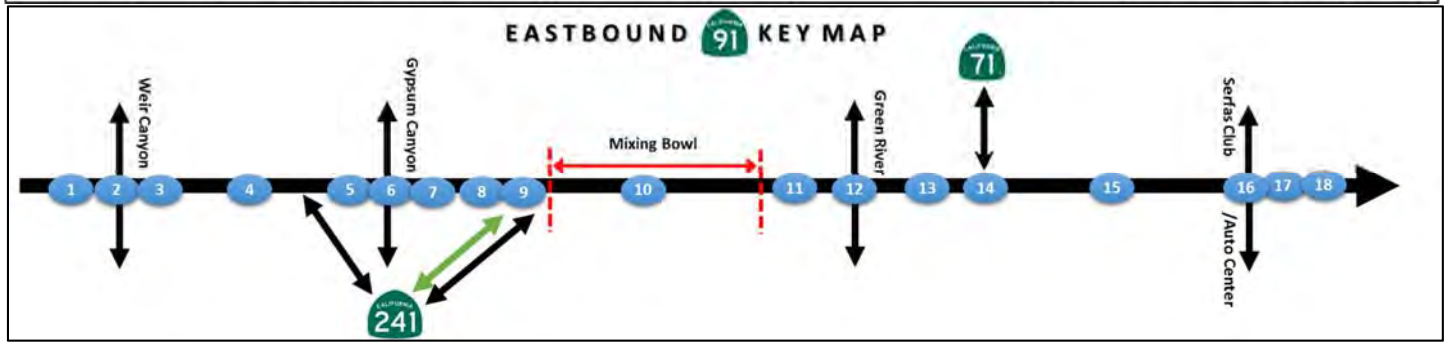


FIGURE 8-15
SR-91 Eastbound Mainline and Toll Facility Speed Comparisons - 2040 No-Build and Build, PM Peak Hour (4-5 PM)





8.2.3 Density and LOS

AM Peak Period

Figure 8-16 is a summary of the traffic operational conditions based on freeway segment density measured in vehicles per mile per lane along the SR-91 GP lanes in the westbound AM peak direction. The Express Lane results are not reported because the Express Lanes are tolled in a manner that maintains LOS D or better operations throughout the study area during all times of the day.

In the AM peak period, the GP lanes in the westbound direction will operate at the same LOS in both 2040 No-Build and Build scenarios except in the area between the Green River Road interchange and the SR-241 interchange. The GP lane segment between the Green River Road and SR-241 interchanges is expected to operate at LOS D or better in the Build scenario, compared to LOS F in the No-Build scenario. This is caused by higher demand in the GP lanes of this segment in the No-Build scenario compared to the Build scenario.

The project will therefore provide substantial improvements in density/LOS on the SR-91 GP lanes in the 2040 AM peak period in the westbound direction between the Express Lane ingress/egress area and the SR-241 interchange.

PM Peak Period

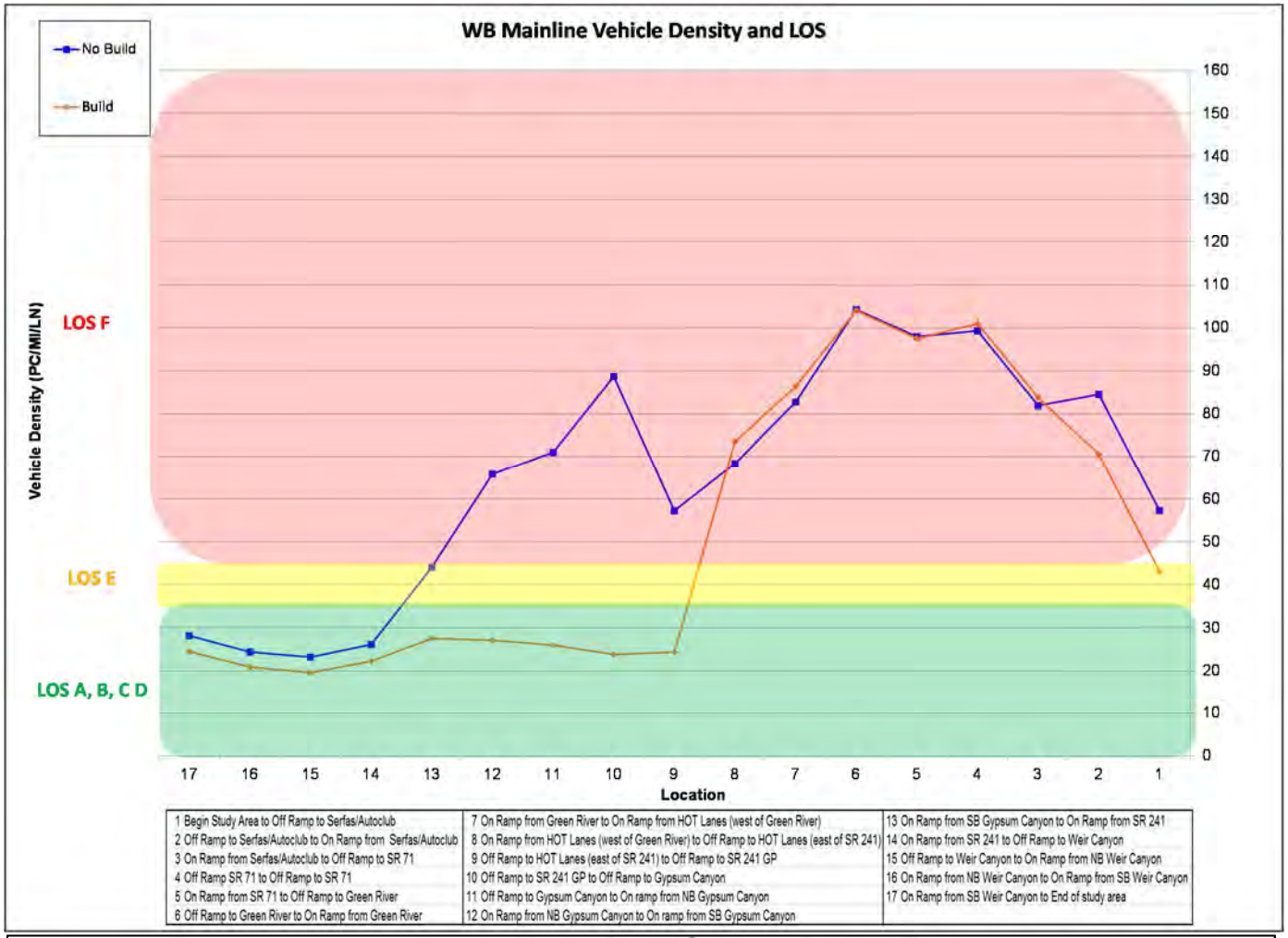
Figure 8-17 is a summary of the traffic operations based on freeway segment density measured in vehicles per mile per lane along the SR-91 GP lanes in the eastbound PM peak direction.

In the 2040 Build scenario, a decrease in density is expected in the GP lanes in the vicinity of the Express Lane ingress/egress area when compared to the No-Build scenario. These segments between the SR-241 and Green River Road interchanges are expected to operate at LOS E without the project compared to LOS D or better with the project. The decrease in density in the GP lanes is due to slightly lower demand in the Build scenario caused by the shift of approximately 800 trips from the SR-241 northbound-to-SR-91 eastbound GP ramp over to the Express Lane ramp.

In the 2040 PM peak, the project will lead to a decrease in density (and improvement in LOS) in the GP lanes in the vicinity of the Express Lane ingress/egress area.

The project will therefore slightly worsen the density/LOS in the 2040 PM peak period on the SR-91 GP lanes in the eastbound direction between the Express Lane ingress/egress area and the western limits of the study area (Weir Canyon Road), but is considered nominal given the increase in combined throughput (GP and Express Lanes) experienced in the same area (see Section 8.2.1).

FIGURE 8-16
SR-91 Westbound Mainline Vehicle Density and LOS Comparisons - 2040 No-Build and Build, AM Peak Hour (7-8 AM)



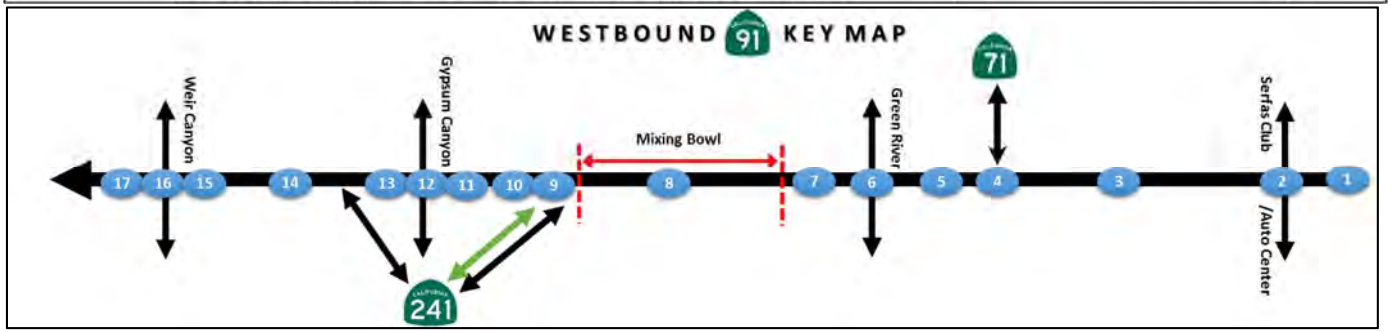
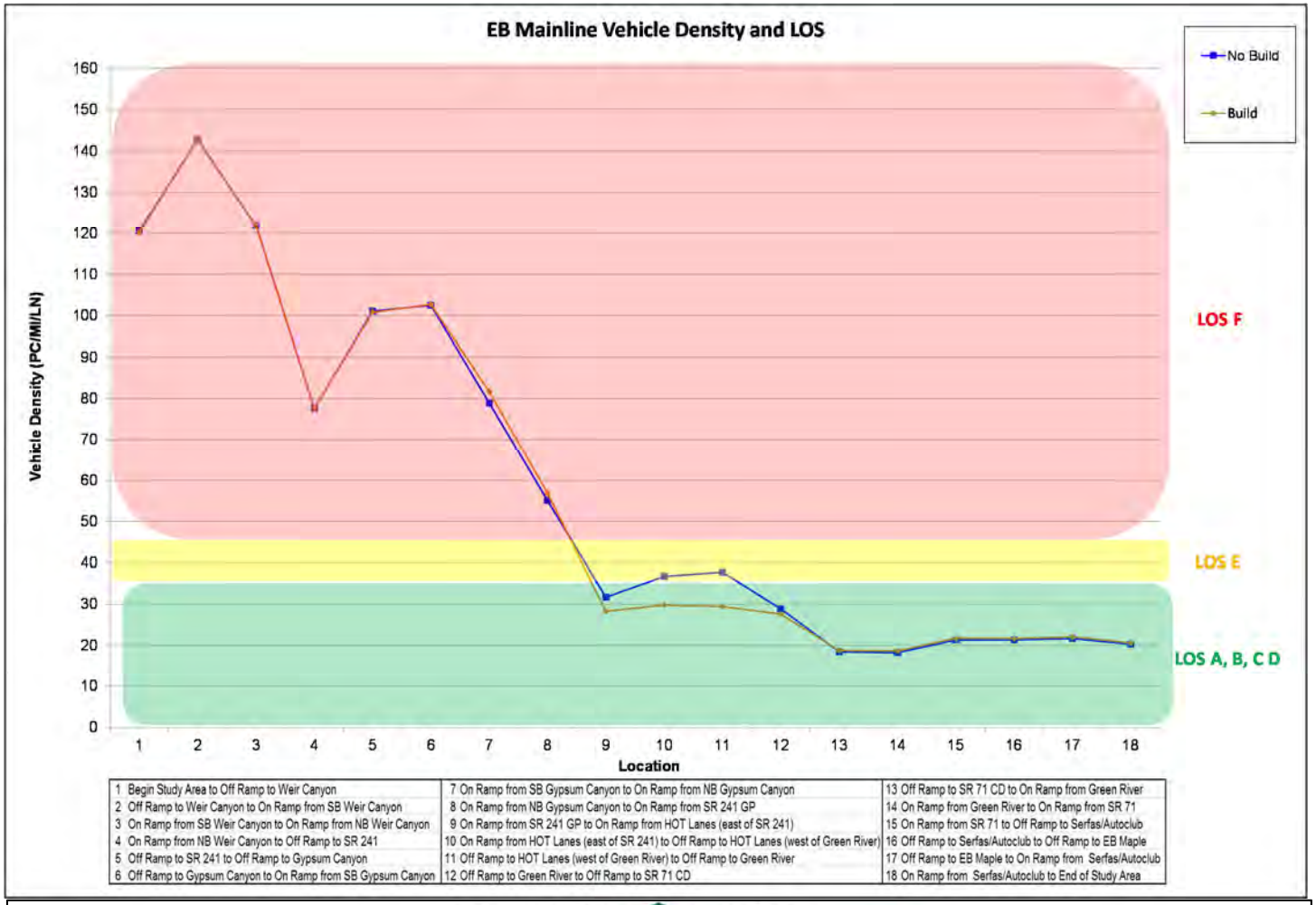


FIGURE 8-17
SR-91 Eastbound Mainline Vehicle Density and LOS Comparisons - 2040 No-Build and Build, PM Peak Hour (4-5 PM)



8.2.4 Travel Time

Travel time between major O-D points within the study area was compared between the 2040 No Build and Build scenarios using the VISSIM model. **Figure 8-9** shows how the O-D zones were numbered so that comparisons between No Build and Build can be made.

AM Peak Period

Table 8-11 compares westbound travel times between 2040 No-Build and Build scenarios in the AM peak hour for select O-D pairs.

In the AM peak period, travel times for most of the O-D pairs will either stay the same or decrease in the westbound direction on SR-91 in the 2040 Build scenario due to project improvements. Travel times in the SR-91 eastbound (off peak) direction are also expected to improve in the Build scenario compared to the No-Build scenario. This change is caused by a shift in regional travel patterns that causes lower GP lane demand on SR-91 eastbound west of the SR-241 interchange in the Build scenario.

PM Peak Period

Table 8-12 compares eastbound travel times between 2040 No-Build and Build scenarios in the PM peak hour for select O-D pairs in the study area.

In the PM peak period, all of the travel times for the select O-D pairs will either stay the same or decrease in the Build scenario compared to the No-Build scenario. The decrease in travel time is due to the shift of trips from the SR-241 northbound to SR-91 eastbound GP ramp over to the Express Lane ramp, which lowers the GP lane demand in the Express Lane ingress/egress area.

In the 2040 PM peak, all of the travel times for the select O-D pairs will either stay the same or decrease in the Build scenario compared to the No-Build scenario.

TABLE 8-11
Travel Time Comparisons - 2040 No-Build and Build, AM Peak Period (6-9 AM)

#	Origin	#	Destination	2040 No Build VISSIM Travel Time (Minutes)			2040 Build VISSIM Travel Time (Minutes)			Change VISSIM Travel Time (Minutes)		
				6-7 AM	7-8 AM	8-9 AM	6-7 AM	7-8 AM	8-9 AM	6-7 AM	7-8 AM	8-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	9.7	12.6	13.7	8.9	9.5	9.4	-0.8	-3.1	-4.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	9.5	12.4	13.5	8.8	9.4	9.3	-0.7	-3.0	-4.2
		5	SR 241 SB south of SR 91	7.9	10.7	12.0	7.3	7.7	7.9	-0.6	-3.0	-4.1
		7	SR 71 NB north of SR 91	11.0	13.9	15.0	10.2	10.8	10.7	-0.8	-3.1	-4.3
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	8.7	8.7	8.6	8.6	8.6	8.5	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.3	8.3	8.3	8.4	8.4	8.4	0.1	0.1	0.1
		7	SR 71 NB north of SR 91	10.0	10.0	9.9	9.9	9.9	9.9	-0.1	-0.1	0.0
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	22.8	21.2	16.3	18.1	19.4	20.0	-4.7	-1.8	3.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	20.8	19.3	15.4	16.4	19.2	19.9	-4.4	-0.1	4.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	23.2	21.8	17.8	18.9	21.7	22.4	-4.3	-0.1	4.6
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	18.8	21.6	22.3	-4.4	-0.2	4.5
		7	SR 71 NB north of SR 91	8.5	8.0	5.7	6.2	8.2	7.8	-2.3	0.2	2.1
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	15.0	14.5	13.2	14.1	12.9	13.5	-0.9	-1.6	0.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15.5	15.0	14.7	14.8	15.2	15.9	-0.7	0.2	1.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	10.8	10.8	10.8	-4.7	-4.2	-3.9
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	7.3	7.3	7.3	7.3	7.3	7.2	0.0	0.0	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	11.1	11.1	11.1	11.0	11.0	11.0	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	12.4	12.4	12.4	12.3	12.3	12.3	-0.1	-0.1	-0.1
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	n/a	n/a	n/a	11.0	11.0	11.0	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	n/a	n/a	n/a	10.8	10.8	10.8	-0.1	-0.1	-0.1
		7	SR 71 NB north of SR 91	n/a	n/a	n/a	12.3	12.3	12.3	-0.1	-0.1	-0.1
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	39.6	56.0	59.3	29.5	44.1	54.6	-10.1	-11.9	-4.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	37.6	54.2	58.4	27.8	44.0	54.5	-9.8	-10.2	-3.9
		3	SR 91 EB GP Lanes east of Serfas Club Rd	23.5	38.6	44.5	15.2	28.8	35.5	-8.3	-9.8	-9.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	40.1	56.6	60.9	30.2	46.4	57.0	-9.9	-10.2	-3.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	30.2	46.3	56.9	-9.9	-10.3	-4.0

Decrease in travel time with project is greater than 0.5 minutes

Increase in travel time with project is greater than 0.5 minutes

TABLE 8-12
Travel Time Comparisons - 2040 No-Build and Build, PM Peak Period (3-7 PM)

#	Origin	#	Destination	2040 No Build VISSIM Travel Time (Minutes)				2040 Build VISSIM Travel Time (Minutes)				Change VISSIM Travel Time (Minutes)			
				3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	19.8	20.3	20.9	20.5	19.6	19.7	19.6	18.7	-0.2	-0.6	-1.3	-1.8
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19.7	20.3	20.8	20.5	19.5	19.7	19.6	18.7	-0.2	-0.6	-1.2	-1.8
		5	SR 241 SB south of SR 91	14.7	14.7	14.6	14.3	14.5	14.7	14.6	14.0	-0.2	0.0	0.0	-0.3
		7	SR 71 NB north of SR 91	21.2	21.8	22.3	22.0	21.0	21.2	21.1	20.2	-0.2	-0.6	-1.2	-1.8
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	8.8	9.2	9.7	9.9	8.7	8.7	8.7	8.6	-0.1	-0.5	-1.0	-1.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.4	8.4	8.4	8.4	8.5	8.5	8.5	8.4	0.1	0.1	0.1	0.0
		7	SR 71 NB north of SR 91	10.2	10.6	11.2	11.4	10.1	10.2	10.2	10.1	-0.1	-0.4	-1.0	-1.3
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8.7	8.7	8.7	8.5	8.5	8.5	8.5	8.5	-0.2	-0.2	-0.2	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.4	-0.1	-0.1	-0.1	-0.1
		5	SR 241 SB south of SR 91 (Via GP Ramp)	11.0	11.1	11.0	10.9	10.9	11.0	10.9	10.9	-0.1	-0.1	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	10.9	10.9	10.8	10.8	-0.1	-0.2	-0.2	-0.1
		7	SR 71 NB north of SR 91	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8.6	8.7	8.6	8.5	8.5	8.5	8.5	8.5	-0.1	-0.2	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.4	8.4	8.4	8.3	8.4	8.4	8.4	8.4	0.0	0.0	0.0	0.1
		5	SR 241 SB south of SR 91 (Via GP Ramp)	11.0	11.0	11.0	10.9	10.9	10.9	10.9	10.9	-0.1	-0.1	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	10.8	10.8	10.7	10.7	-0.2	-0.2	-0.3	-0.2
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	7.2	7.2	7.5	7.3	7.2	7.2	7.3	7.2	0.0	0.0	-0.2	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	11.2	11.6	12.7	12.6	11.0	11.1	11.1	11.0	-0.2	-0.5	-1.6	-1.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	11.2	11.6	12.7	12.5	11.0	11.0	11.0	11.0	-0.2	-0.6	-1.7	-1.5
		7	SR 71 NB north of SR 91	12.6	13.1	14.2	14.0	12.5	12.5	12.5	12.5	-0.1	-0.6	-1.7	-1.5
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	n/a	n/a	n/a	n/a	11.0	11.0	11.1	11.0	-0.2	-0.6	-1.6	-1.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.8	-0.4	-0.8	-1.9	-1.7
		7	SR 71 NB north of SR 91	n/a	n/a	n/a	n/a	12.5	12.5	12.5	12.5	-0.1	-0.6	-1.7	-1.5
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	10.0	10.1	10.0	9.8	9.9	9.9	9.9	9.8	-0.1	-0.2	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9.9	10.0	9.9	9.8	9.8	9.8	9.8	9.7	-0.1	-0.2	-0.1	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	5.7	5.7	5.6	5.4	5.8	5.9	5.6	5.4	0.1	0.2	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	12.4	12.5	12.4	12.2	12.3	12.3	12.3	12.2	-0.1	-0.2	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	12.2	12.2	12.2	12.1	-0.2	-0.3	-0.2	-0.1

Decrease in travel time with project is greater than 0.5 minutes

Increase in travel time with project is greater than 0.5 minutes

8.2.5 Network Performance

AM Peak Period

Table 8-13 compares the network performance results from the 2040 No-Build and Build scenarios in the AM peak period (6 to 9 AM). The following points highlight the 2040 No-Build versus Build comparisons in the AM peak period:

In the 2040, the project will increase vehicle throughput by 1% in the AM and PM peak periods.

- The No Build and Build scenario have generally the same demand.
- The Build scenario will increase vehicle throughput (by an additional 930 vehicles or 1%) and decrease percent unserved (from 9% in No-Build to 8% in Build).
- VMT increases by 1% in the Build scenario because vehicle throughput increases.
- The average speed per vehicle increases by approximately 4 mph (from 34 mph to 38 mph) in the Build scenario.
- The average delay per vehicle decreases by approximately 20% (from 7.0 to 5.6 minutes per vehicle) in the Build scenario.

PM Peak Period

Table 8-14 compares the network performance results from the 2040 No-Build and Build scenarios in the PM peak period (3 to 7 PM). The following points highlight the 2040 No-Build versus Build comparisons in the PM peak period:

- The No Build and Build scenario have generally the same demand.
- The Build scenario will increase vehicle throughput (by 1,450 vehicles or 1%) while decreasing the amount of unserved vehicles (by 1,000 vehicles). The percent unserved will decrease from 16% in the No-Build scenario to 15% for the Build scenario.
- VMT increases by 2% in the Build scenario because vehicle throughput increases.
- The average speed per vehicle increases in the Build scenario by about 2 mph (from 45 to 47 mph).
- The average delay per vehicle slightly decreases with the Build scenario by less than half a minute (from 3.4 to 3.1 minutes) when compared to the No Build scenario.

TABLE 8-13
Summary of Network Performance - No-Build vs. Build Scenarios, 2040 AM Peak Period (6-9 AM)

Performance Measure (all vehicle types, 6:00 - 9:00 AM)	No-Build Condition Value	Build Condition Value	Net Change with Project
Total Vehicle Demand (vehicles)	119,605	120,167	562
Total number of vehicles that did not reach their destination (vehicles)	10,264	9,895	-369
Total number of vehicles that have reached their destination (vehicles)	109,342	110,273	931
Total vehicle-miles traveled - VMT (miles)	939,671	953,732	14,061
Total travel time - VHT (hours)	27,641	25,219	-2,422
Average speed (mph)	34.0	37.8	3.8
Average delay time per vehicle (min/veh)	7.0	5.6	-1.4

Note: Results are based on the total three hours and are an average of all runs.

TABLE 8-14
Summary of Network Performance - No-Build vs. Build Scenarios, 2040 PM Peak Period (3-7 PM)

Performance Measure (all vehicle types, 3:00 - 7:00 PM)	No-Build Condition Value	Build Condition Value	Net Change with Project
Total Vehicle Demand (vehicles)	168,494	168,944	450
Total number of vehicles that did not reach their destination (vehicles)	26,918	25,914	-1,004
Total number of vehicles that have reached their destination (vehicles)	141,576	143,030	1,454
Total vehicle-miles traveled - VMT (miles)	1,173,727	1,193,635	19,908
Total travel time - VHT (hours)	26,063	25,477	-586
Average speed (mph)	45.1	46.9	1.8
Average delay time per vehicle (min/veh)	3.4	3.1	-0.3

Note: Results are based on the total four hours and are an average of all runs.

8.2.6 Express Lane Operations

AM Peak Period

Express lane operations were studied as part of the 2040 AM peak period analysis in both the No-Build and Build scenarios. Operational metrics such as volume served, speed, queues, and LOS were presented for the AM peak period earlier in Section 8. For quick reference, these metrics are summarized in **Table 8-15**. In the AM peak period, the westbound Express Lanes throughout the study area are projected to operate the same with and without the project. **Table 8-15** shows that there is relatively no difference in volume served, speed, or LOS in the westbound Express Lanes with or without the project.

TABLE 8-15
Summary of Westbound Express Lane Operations - No-Build vs. Build Scenarios, 2040 AM Peak Period (6-9 AM)

Operational Metric	Scenario	Study Segment Between SR-71 and Green River	Between Green River and SR-241 Express Lane Connector	Between SR-241 Express Lane Connector and Weir Canyon
Volume Served (percent of demand served)	No-Build	99.5%	99.5%	93.5%
	Build	99.5%	99.5%	91.7%
Speed	No-Build	68	69	68
	Build	68	68	69
Queues in the Express Lanes?	No-Build	No	No	No
	Build	No	No	No
Level of Service	No-Build	C	B	B
	Build	C	B	B

PM Peak Period

In the PM peak period, the eastbound Express Lanes throughout the study area are also projected to operate the same with and without the project in 2040. **Table 8-16** shows that there is relatively no difference in volume served, speed, or LOS in the eastbound Express Lanes with or without the project.

TABLE 8-16
Summary of Eastbound Express Lane Operations - No-Build vs. Build Scenarios, 2040 PM Peak Period (3-7 PM)

Operational Metric	Scenario	Study Segment Between Weir Canyon and SR-241 Express Lane Connector	Between SR-241 Express Lane Connector and Green River	Between Green River and SR-71
Volume Served (percent of demand served)	No-Build	99.3%	99.3%	89.3%
	Build	99.7%	99.7%	87.1%
Speed (mph)	No-Build	68	69	68
	Build	68	69	68
Queues in the Express Lanes?	No-Build	No	No	No
	Build	No	No	No
Level of Service	No-Build	C	B	C
	Build	C	B	C

Additional weaving analysis of the Express Lane operations in the mixing bowl was performed to supplement the microsimulation analysis. Per the Highway Design Manual (Section 504.7), the Leisch Method was applied to study the weaving condition in the mixing bowl. However, the Leisch method will not work for this study segment because the weaving volume (V_w) exceeds the "Turning Line for K" and the weaving section is greater than the chart boundary (7,400 feet). As noted on Figure 504.7A in the Highway Design Manual, extrapolation beyond the chart boundaries is not advised for the Leisch method. The Highway Capacity Manual (HCM) weaving analysis methodology was also attempted for the mixing bowl. However, based on the weaving volumes, the maximum weaving segment that can be analyzed is 4,093 feet. The mixing bowl segment is 7,400 feet and therefore cannot be analyzed using the HCM weaving methodology. Therefore, microsimulation is the only analysis tool that can be used for a segment as long as the mixing bowl.

8.3 Additional Design Variations

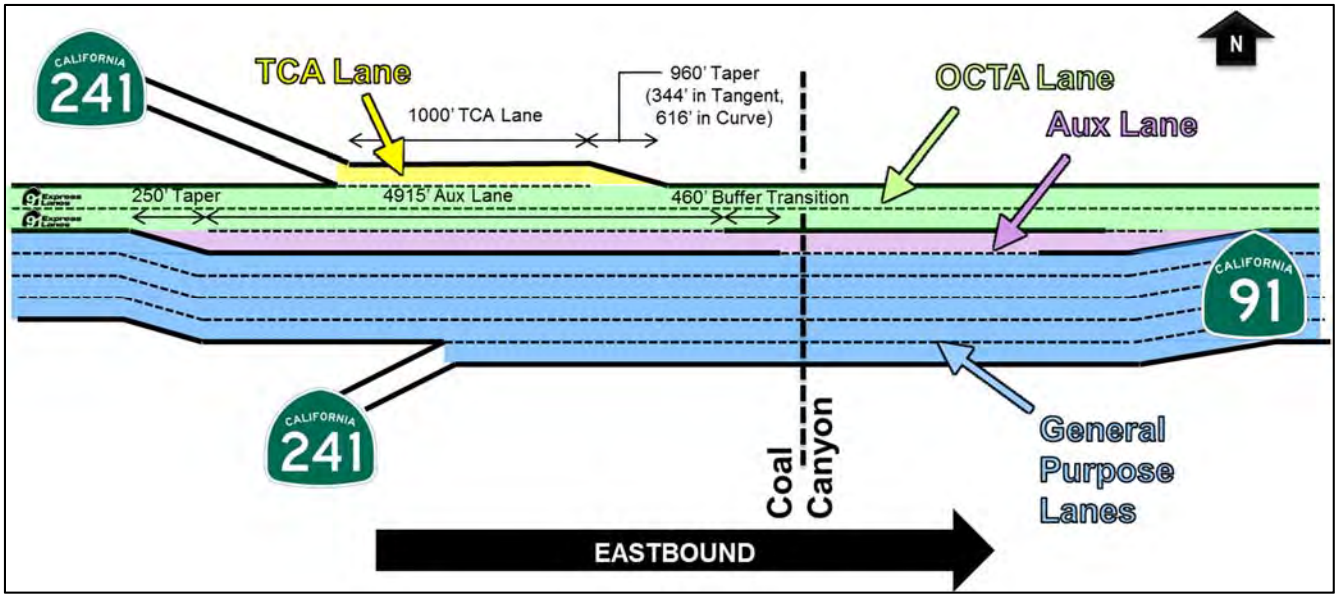
The proposed improvements evaluated in this analysis focused on a single build alternative: a new direct connection between SR-241 and the SR-91 Express Lanes. That alternative proposes to construct direct connectors from northbound SR-241 to the eastbound SR-91 Express Lanes, and the westbound SR-91 Express Lanes to southbound SR-241 (one lane in each direction). However, several design variations of the project were analyzed in VISSIM to determine the optimal configuration. Three eastbound design variations (Design Variations 1, 2, and 3) and one westbound design variation (Design Variation 4) are summarized in the following sub-sections (8.3.1 through 8.3.4). Design Variation 2 was found to optimize operations and was therefore carried forward for the 2017 and 2040 Build scenarios to be compared to the No Build scenario. The layout plan for this project (Design Variation 2) is included in Appendix G.

8.3.1 Eastbound Design Variations

Design Variation 1

Figure 8-18 illustrates the geometric configuration of Design Variation 1 (not to scale). The northbound-to-eastbound SR-241/SR-91 Express Lane Connector has a minimum length of 1,000 feet followed by a 960-foot left-side merge taper with the inside OCTA Express Lane. In addition, the Express Lane Connector joins the OCTA Express Lanes with no buffer (i.e., Express Lane Connector traffic can merge with OCTA Express Lane traffic immediately). There is approximately 3,900 feet of total weaving distance provided in Design Variation 1 between the Express Lane Connector and the entrance to the GP lanes, although this movement is not anticipated to have any demand.

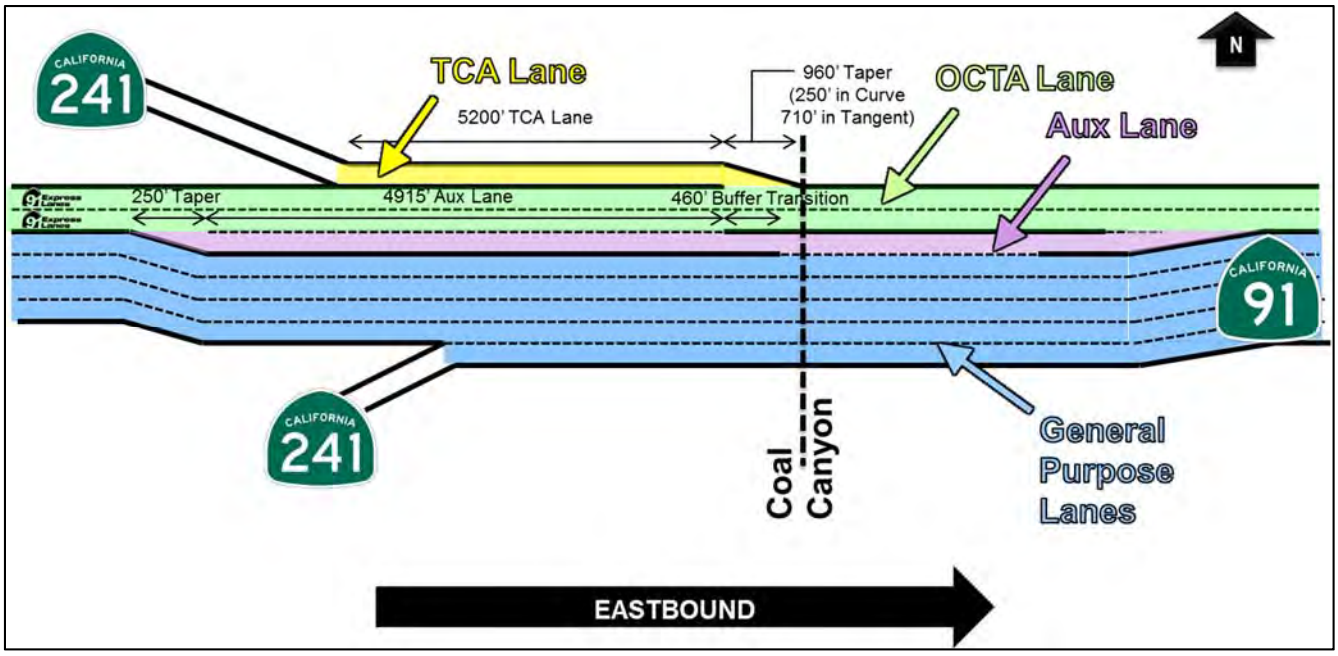
FIGURE 8-18
SR-91 Eastbound Express Lanes – Design Variation 1


CALIFORNIA
241
TCA Lane
1000' TCA Lane
960' Taper
(344' in Tangent,
616' in Curve)
OCTA Lane
Aux Lane
N
250' Taper
4915' Aux Lane
460' Buffer Transition
CALIFORNIA
91
CALIFORNIA
241
Coal
Canyon
General
Purpose
Lanes
EASTBOUND

Design Variation 2

Figure 8-19 illustrates the geometric configuration of Design Variation 2 (not to scale). The Express Lane Connector (northbound SR-241 to eastbound SR-91) tapers off at Coal Canyon and merges with the inside OCTA Express Lane (i.e., has a length longer than 1,000 feet). In this variation, part of the taper occurs in the SR-91 curve, west of Coal Canyon. In addition, the Express Lane Connector joins the OCTA Express Lanes with a 4-foot buffer (i.e., Express Lane Connector traffic cannot merge with OCTA Express Lanes due to the buffer and must merge at the end of the buffer limit).

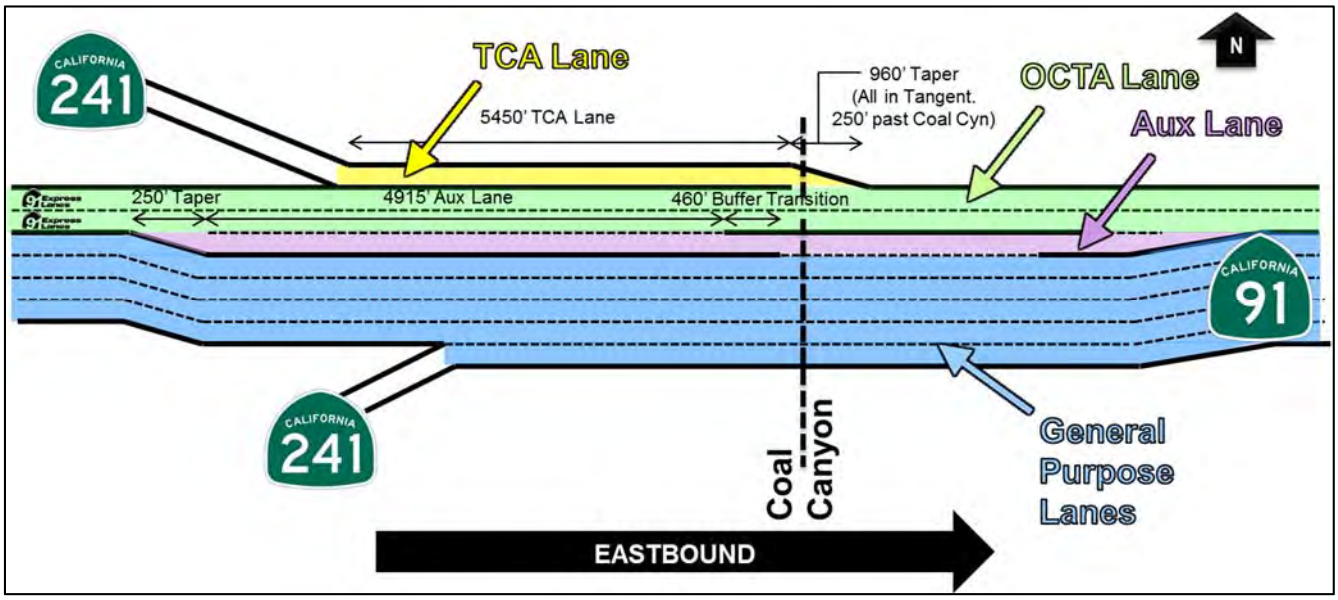
FIGURE 8-19
SR-91 Eastbound Express Lanes – Design Variation 2



Design Variation 3

Figure 8-20 illustrates the geometric configuration of Design Variation 3 (not to scale). The Express Lane Connector (northbound SR-241 to eastbound SR-91) tapers off east of the Coal Canyon project limit and merges with the inside OCTA Express Lane (i.e., has a length longer than 1,000 feet). In this variation, part of the taper occurs on the tangent section of SR-91, west of Coal Canyon. In addition, the Express Lane Connector joins the OCTA Express Lanes with a four-foot buffer (i.e., Express Lane Connector traffic cannot merge with OCTA Express Lanes due to the buffer and must merge at the end of the buffer limit).

FIGURE 8-20
SR-91 Eastbound Express Lanes – Design Variation 3



8.3.2 Eastbound Design Variation Results Comparison

The results from the VISSIM analysis of the three eastbound design variations is discussed below. The 2017 and 2040 PM peak period was used to make the comparison, as the PM peak period is the worst case for demand volume in this segment of the SR-91 Eastbound Express Lanes. MOEs used to compare the design variations include volume served, speed, density, travel time, and network performance. The results from the VISSIM analysis of the three design variations showed there was very little difference in traffic operations, and that the configuration should be based on other design elements. Design Variation 2 was carried forward for the 2017 and 2040 Build scenarios to be compared to the No Build scenario. The build scenario results shown in Sections 8.1 and 8.2 represent the results of Design Variation 2.

Volume Served

Throughput volumes were measured at the SR-91 Eastbound GP and Express Lanes between the SR-241 interchange and the Express Lane egress ramps and compared between the three design variations and No Build scenario. **Table 8-15** compares volume throughput for both the 2017 and 2040 PM peak hour (4-5 PM). All three design variations have similar throughput volumes (within 0.3%).

TABLE 8-15
Vehicle Throughput Comparison –SR-91 Eastbound between SR-241 and Express Lane egress, PM Peak Hour (4-5 PM)

Scenario	2017 PM				2040 PM			
	Throughput Volume (veh/hr)			Overall Change from No Build	Throughput Volume (veh/hr)			Overall Change from No Build
	GP Lanes	Express Lanes	Overall		GP Lanes	Express Lanes	Overall	
No Build	9468	3174	12641	0.0%	11409	3174	14583	0.0%
Option 1	8866	4202	13068	3.4%	10702	3926	14628	0.3%
Option 2	8850	4200	13050	3.2%	10702	3941	14642	0.4%
Option 3	8886	4200	13086	3.5%	10707	3941	14648	0.4%

Speed and Density

Speed and density were measured along SR-91 eastbound in both the GP and Express Lanes upstream, within, and downstream of the mixing bowl and compared among the three design variations and No Build scenario. **Figures 8-21 and 8-22** compares speed and density, respectively, during the 2017 and 2040 PM peak hour (4-5 PM) for all three design variations. The results show there is very little difference in either speed or density within the areas evaluated.

FIGURE 8-21
Speed Comparison – SR-91 Eastbound GP and Express Lanes at the SR-241 Mixing Bowl, PM Peak Hour (4-5 PM)

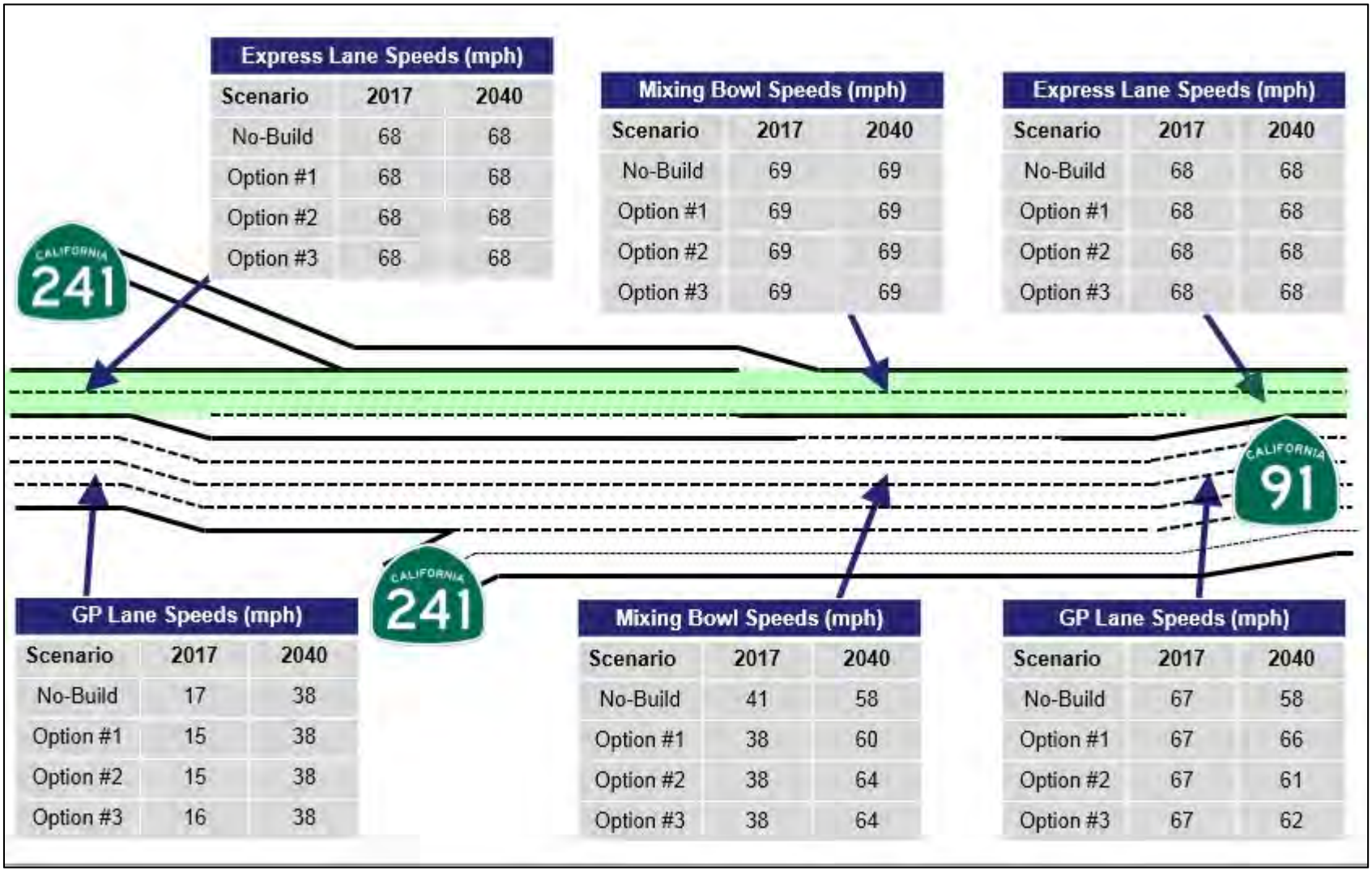
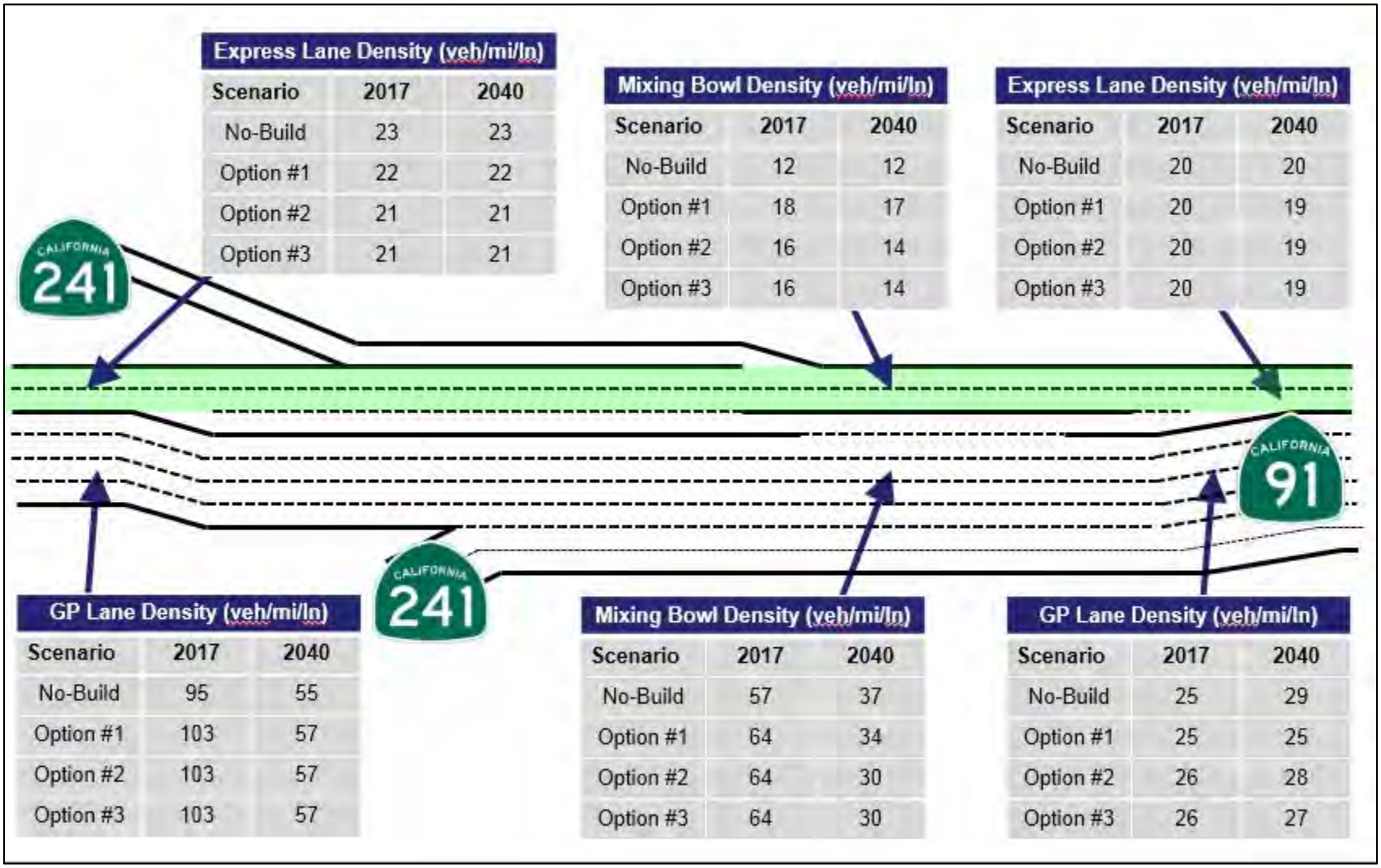


FIGURE 8-22
Density Comparison – SR-91 Eastbound GP and Express Lanes at the SR-241 Mixing Bowl, PM Peak Hour (4-5 PM)



8.3.3 Westbound Design Variations

Design Variation 4

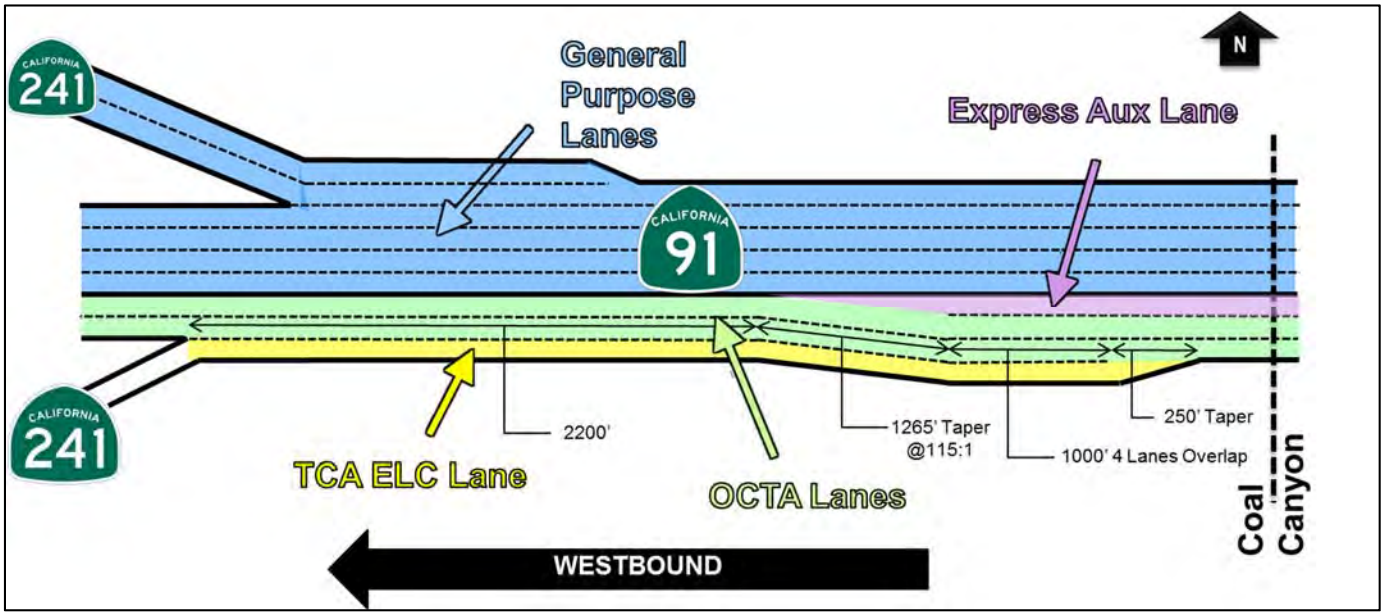
Figure 8-23 illustrates the geometric configuration of Design Variation 4 (not to scale). Design Variation 4 is similar to the base design and only involves modification of the westbound SR-91 Express Lane geometry between the westbound ingress/egress area and the SR-241 direct connector. In this design variation, the Express Lane Connector lane is extended to the east so that there is a 1000-foot section where there are four lanes in the Express Lanes (one Express Lane auxiliary lane, two OCTA Express Lanes, one Express Lane Connector lane). Similar to the baseline geometry, the Express Lane auxiliary lane merges into the outside OCTA Express Lane. At this point, the Express Lane cross section will be three lanes until the Express Lane Connector lane diverges.

OCTA's tolling policy is to maintain a maximum vehicle flow rate of approximately 1,700 vehicles per hour per lane (1,600 vehicles per hour per lane is preferred). As noted in Section 6.3.1 and Section 6.3.2, the future forecasts show that the project will generate a demand of 4,250 vehicles per hour in the AM peak period between the westbound ingress/egress area and the Express Lane connector. This equates to 2,125 vehicles per hour per lane in the baseline design concept where there are only two lanes between the westbound ingress/egress area and the Express Lane connector (see Figures 7-1 and 7-2). Design Variation 4 would provide three lanes in this critical Express Lane area and would equate to approximately 1,420 vehicles per hour per lane which is in compliance with OCTA's per lane tolling policy parameters.

The configuration of Design Variation 4 provides optimal lane balance and utilization. Westbound Express Lane drivers travelling from the RCTC Express Lanes who wish to continue through to the OCTA Express Lanes do not need to change lanes to make this movement. As shown in Figure 8-23, the two westbound RCTC Express Lanes channel directly into the two OCTA Express Lanes. This configuration provides for optimal lane balance and lane utilization in the westbound Express Lane ingress/egress area.

Additional traffic analysis was not needed for Design Variation 4 because the operations are projected to be better than the base design. The base design, which narrows down to two lanes between the westbound ingress/egress area and the Express Lane connector, was found to operate with speeds in excess of 65 mph (see Section 8.1.2 and 8.2.2). Design Variation 4 would provide three to four lanes in this critical Express Lane area so this additional capacity will only improve the operations in the Express Lanes. These findings were discussed with F/ETCA, OCTA, and Caltrans in a meeting on October 16, 2014. In this meeting, it was agreed that additional traffic analysis was not required for Design Variation 4 due to the reasons stated above.

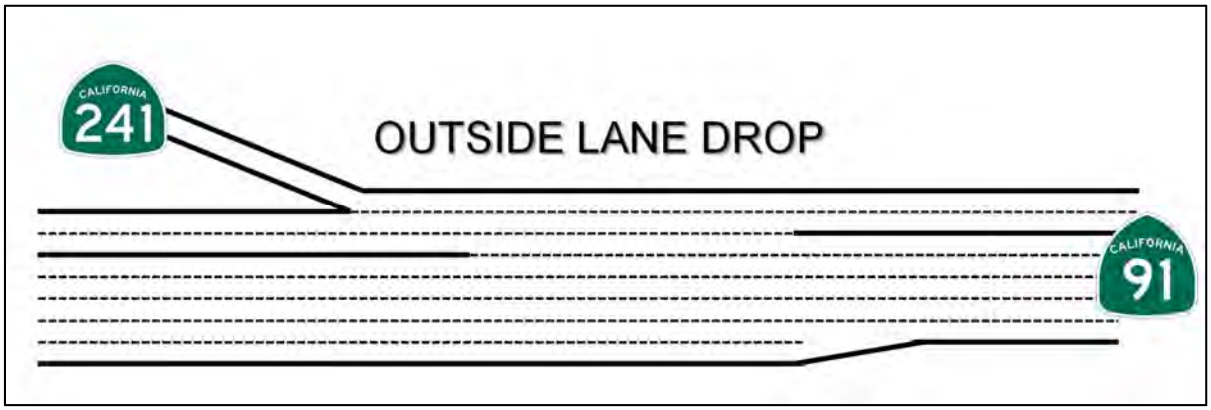
FIGURE 8-23
SR-91 Westbound Express Lanes – Design Variation 4



8.3.4 Design Variations Considered during Earlier Stages of Project Development

In earlier phases of project development for this project, a variety of other design variations were considered and analyzed. During the Project Study Report/Project Report (PSR/PR) phase of the project, the way in which the outside eastbound Express Lane was terminated at the end of the mixing bowl was analyzed using VISSIM. As part of this analysis, an alternative method for dropping the third eastbound SR-91 Express Lane was analyzed. The alternative method for dropping the third Express Lane was to drop it in the outside GP lane. Figure 8-24 illustrates the geometric configuration of the outside lane drop.

FIGURE 8-24
SR-91 Eastbound Express Lanes - Outside Lane Drop Schematic



The analysis showed that dropping the 3rd Express Lane via an outside GP lane drop increased congestion in GP lanes compared to project baseline, created a bottleneck at end of weaving section, and caused the Express lanes to operate below 50 mph. For these reasons, the outside lane drop alternative was dropped from further consideration and therefore not considered in the PA/ED analysis.

9 Summary of Findings

The purpose of this report is to document the traffic analysis for the SR-241/SR-91 Express Lane Connector Project Study Report/Project Report. The goal of the traffic analysis is to conduct operational analysis to refine the PA/ED alternative, focused on the interaction of the Express Lane weaving section with the congested GP lanes. This section summarizes the overall findings of the traffic analysis.

9.1 Overall Traffic Operations Findings

Table 9-1 summarizes the overall traffic operational benefits of the proposed project.

FIGURE 9-1
Overall Project Benefit Summary[1]

Measure	Year	Results
Increase in Throughput in the Mixing Bowl	2017	2,586 vehicles in the peak direction (+7%)
	2040	1,239 vehicles in the peak direction (+3%)
Increase in Corridor VMT	2017	34,301 (+4%)
	2040	17,403 (+2%)
Change in Speed	2017	+1.9 mph (+6%)
	2040	+2.7 mph (+7%)
Change in Delay	2017	-0.6 minutes/vehicle (-12%)
	2040	-0.8 minutes/vehicle (-17%)

[1] Based on seven hours of results for the combined AM peak (three hours) and PM peak (four hours).

In the build scenario, the overall findings of the traffic analysis can be summarized as follows:

- The overall throughput on SR-91 increases.
- On the eastbound SR-91 GP lanes, more vehicles must exit the OCTA Express Lanes and enter the GP lanes and fewer cars can leave the GP lanes and enter the RCTC Express Lanes. More vehicles are in the Express Lanes in the mixing bowl area because the northbound SR-241 to eastbound SR-91 Express Lane Connector adds more traffic to the mixing bowl. To help handle the additional vehicles in the Express lanes, the project does add an additional two lanes of capacity in the mixing bowl. More vehicles will exit, increasing friction, because the downstream constraint remains the same (3,200 vehicles/hour in the RCTC Express Lanes).

- However, there is also a reduction in friction due to fewer vehicles weaving from the northbound SR-241 to eastbound SR-91 GP ramp to the RCTC Express lanes with the project (i.e., most of these vehicles will now use the SR-241 to SR-91 Express Lane Connector).
- The result is an overall net zero effect on the eastbound SR-91 GP lanes with the project in the PM peak period. The overall average difference in vehicle throughput (Build minus No-Build) in the 2017 PM peak period is -0.3% and 0.6% in the 2040 PM peak period.

A more detailed summary of the overall findings of the traffic analysis for the SR-241/SR-91 Express Lane Connector Project is provided below:

- Traffic is projected to shift from other regional routes (SR-91, SR-55, surface streets) to SR-241. This regional shift is a result of the additional capacity of the new connector.
- In the AM peak period, more traffic is forecasted to travel from westbound SR-91 to southbound SR-241 in the build scenario. The resulting shift leads to fewer vehicles in the westbound SR-91 GP lanes (850 vehicles/hour in 2017 and 1,320 vehicles/hour in 2040), west of the SR-91/SR-241 interchange.
- A design variation for the westbound Express Lanes between the ingress/egress area and the Express Lane Connector was assessed (Design Variation 4). In this design variation, the Express Lane Connector lane is extended to the east so that there is a 1000-foot section where there are four lanes in the Express Lanes (one Express Lane auxiliary lane, two OCTA Express Lanes, one Express Lane Connector lane). Similar to the baseline geometry, the Express Lane auxiliary lane merges into the outside OCTA Express Lane. At this point, the Express Lane cross section will be three lanes until the Express Lane Connector lane diverges. Design Variation 4 would provide three lanes in this critical Express Lane area and would equate to approximately 1,420 vehicles per hour per lane which is in compliance with OCTA's per lane tolling policy parameters. Additional traffic analysis was not needed for Design Variation 4 because the operations are projected to be better than the base design. The base design, which narrows down to two lanes between the westbound ingress/egress area and the Express Lane connector, was found to operate with speeds in excess of 65 mph. Design Variation 4 would provide three to four lanes in this critical Express Lane area and there is therefore assumed that this additional capacity will only improve the operations in the Express Lanes (i.e., speeds will be 65 mph or higher).
- In the 2017 PM peak period, more traffic is forecasted to travel from northbound SR-241 to eastbound SR-91 in the build scenario. The resulting shift leads to fewer vehicles in the eastbound SR-91 GP lanes (190 vehicles/hour in 2017), west of the SR-91/SR-241 interchange. Once these vehicles shift to SR-241, they are projected to use the northbound SR-241 to eastbound SR-91 Express Lane Connector and continue on to the RCTC Express Lanes. By the 2040 Design Year, background growth and the additional eastbound capacity provided by the SR-91 Ultimate CIP project is anticipated to balance traffic demand within the corridor between the No Build and Build scenario. Therefore, for the 2040 PM peak, there is no eastbound SR-91 regional shift to SR-241 projected.
- The project increases the toll road system throughput and revenue in both 2017 and 2040.
- The project will reduce the length of the northbound SR-241 to eastbound SR-91 queue on the general purpose ramp in the PM peak period.

- The project provides measureable system benefits in the AM peak period in the form of increased vehicle throughput on SR-91 in the mixing bowl (7% in 2017 and 3% in 2040), increased corridor-wide VMT (4% in 2017 and 2% in 2040), increased average speed (+1.9 mph in 2017 and +2.7 mph in 2040), and reduced average delay (-0.6 minutes/vehicle in 2017 and -0.8 minutes/vehicle in 2040).
- During the PM peak period, system benefits are mixed in 2017 but show an overall improvement by 2040. SR-91 vehicle throughput and VMT both increase in 2017, but the average speed drops (1 mph) and delay increases (0.4 minutes/vehicle) due to the regional shift that increases demand in the GP lanes. However, all system measures show positive impact by 2040 (average speed increases by 2 mph and delay decreases by 0.4 minutes/vehicle).
- At the SR-91 westbound mainline bottleneck between the Green River Road interchange and the Express Lane Ingress (AM peak period), the project provides benefit in the form of shorter queues, higher vehicle throughput, higher speed and lower density, and shorter travel times in both 2017 and 2040.
- At the SR-91 eastbound mainline bottleneck between the Express Lane Ingress and the Green River Road interchange (PM peak period), the project increases vehicle throughput in both 2017 and 2040. By the 2040 Design Year, the project will improve conditions at the bottleneck by increasing average speed (5 mph) and vehicle throughput (between 0.5 and 1.5%) while reducing density and lowering travel time (from 1 to 4.5 minutes depending on path).
- With the project, high-speed operations of the SR-91 Express Lanes can be maintained with a maximum eastbound exiting Express Lane volume of 1800 vehicles/hour in 2017 (1600 vehicles/hour in 2040). The mix of OCTA/F/ETCA/RCTC toll traffic is critical to the successful operations of the mixing bowl.
- Analysis of three design variations for the SR-91 Eastbound Express Lane weaving section shows that there is very little difference between the variations from a traffic operations perspective, and the optimal configuration should be chosen based on other design considerations.
- The VISSIM modeling done as part of this analysis does not include dynamic behavior based on toll rate policy. Instead, the modeling is intended to optimize operations within the study area and assumes that tolling policies will be set to match the travel-demand assumptions used on the toll facilities in the VISSIM model. A separate tolling and revenue study will determine toll rates.

9.2 Overall Advantages

The proposed SR-241/SR-91 Express Lane Connector Project has several advantages:

- The direct connection closes the gap between two major toll systems (SR-91 Express Lanes and SR-241 Toll Roads)
- The project improves vehicle throughput in SR-91 corridor since more vehicles can be pushed through the SR-91 Express Lanes (i.e., the project brings more cars into the express lanes in the mixing bowl and therefore the combined GP and Express Lane throughput increases in the mixing bowl). The Express Lanes throughput upstream and downstream of the mixing bowl (i.e., in the OCTA and RCTC Express Lanes) remains the same with or

without the project (approximately 3,200 vehicles/hour), consistent with the OCTA and RCTC tolling policy assumptions.
- The project improves vehicle miles traveled throughout study area.
- The project will pull 1,700 vehicles during the peak hours (AM/PM) from I-5, SR-55 and surrounding local arterials to SR-241 in the 2017 Opening Year.
- Travel time will be reduced by 24% for northbound SR-241 to eastbound SR-91 toll users in the 2017 Opening Year.

9.3 Overall Challenges

The proposed project also has challenges that will need to be addressed in future design/operations efforts:

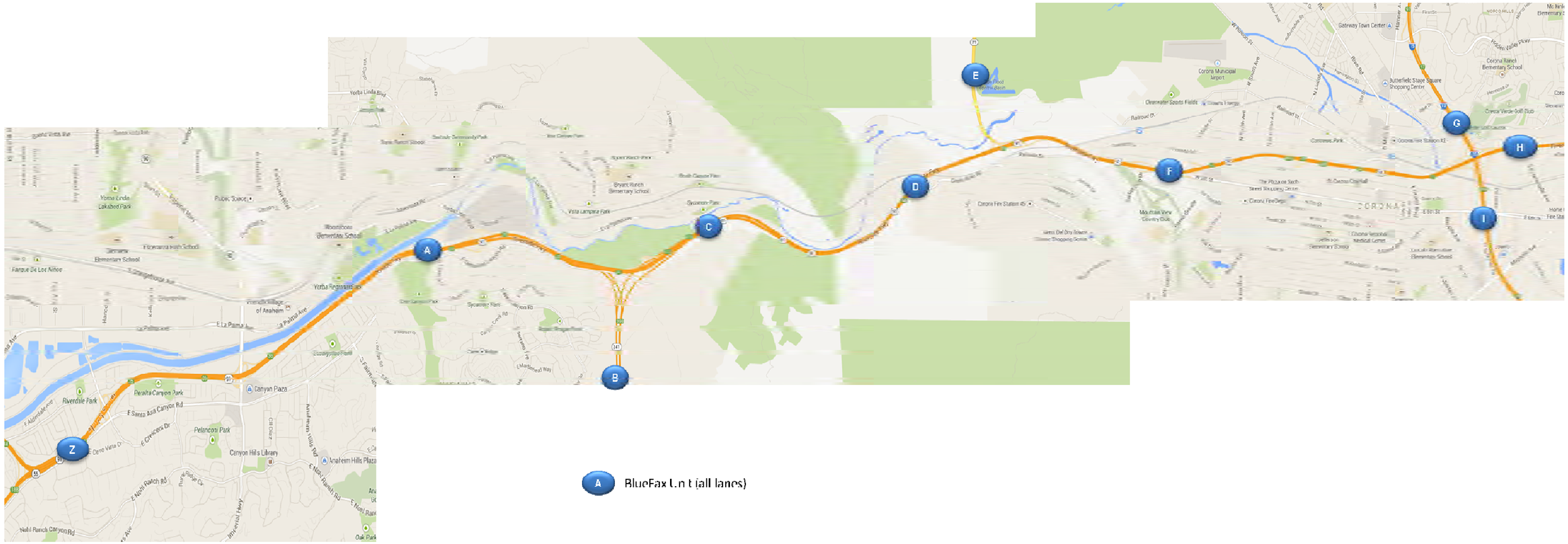
- The operations through the SR-91/SR-241 interchange ingress/egress area require that flows to/from each system are controlled to ensure that the Express Lanes do not break down. This will require coordinating the pricing schemes for three different systems and for different entry points.
- The direct connection proposed by the project will integrate three tolling facilities (SR-91 Express Lanes, SR-241 Toll Roads, RCTC Express Lanes) operated by three different agencies (OCTA, F/ETCA, and RCTC). The operation and setting of toll rates for all three systems will require careful planning and coordination.
- Both of the above items will be addressed in the Concept of Operations Report.

10 Project Reviewers

Agency	Reviewer	Review Date
Foothill/Eastern Transportation Corridor Agency	Juliet Su	7/2/14
	King Thomas	7/2/14
	Doug Feremenga	7/2/14
	Valarie McFall	7/2/14
	David Lowe	7/2/14
	Steven Abendschein	7/2/14
	Jeff Fromhertz	7/2/14
	Mike Kraman	7/2/14
	Lisa Telles	7/2/14
Caltrans District 12	Bassem Barsoum	2/4/15
Orange County Transportation Authority	Anup Kulkarni	2/17/15
Riverside County Transportation Commission	Craig Schneider	12/23/14
Federal Highway Administration	Jesse Glazer	3/25/15

Appendix A
Bluetooth Study Summary Statistics

FIGURE 1
Bluetooth Study Area



Origin-Destination Reporting Parameters

Date/Time Filtering Method:		Origin
Date Range Filter	OFF	
	DATETIME BEGIN	---
	DATETIME END	---
	LENGTH IN HOURS	---
Trip Length Filter	OFF	
	MINIMUM	---
	MAXIMUM	---
Outliers are:	INCLUDED	
Time of Day Filter	OFF	
	BEGIN	---
	END	---
Day of Week Filter	ON	
	Monday	Yes
	Tuesday	Yes
	Wednesday	Yes
	Thursday	Yes
	Friday	Yes
	Saturday	No
	Sunday	No

Segment Status

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I	No Segmer	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site H	OK	No Segmer	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site G	OK	OK	No Segmer	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site D	OK	OK	OK	No Segmer	OK	OK	OK	OK	OK	OK	OK	OK
Site H-1	OK	OK	OK	OK	No Segmer	OK	OK	OK	OK	OK	OK	OK
Site F	OK	OK	OK	OK	OK	No Segmer	OK	OK	OK	OK	OK	OK
Site E	OK	OK	OK	OK	OK	OK	No Segmer	OK	OK	OK	OK	OK
Site C	OK	OK	OK	OK	OK	OK	OK	No Segmer	OK	OK	OK	OK
Site B	OK	OK	OK	OK	OK	OK	OK	OK	No Segmer	OK	OK	OK
Site A	OK	OK	OK	OK	OK	OK	OK	OK	OK	No Segmer	OK	OK
Site Z-1	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	No Segmer	OK
Site Z	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	No Segment

OD Counts

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		5134	11797	6949	6069	8152	719	3088	739	5935	6016	4941
Site H	4815		5026	13827	36700	13694	426	6196	1796	11231	11411	9418
Site G	9456	3652		4917	4076	4740	87	2429	994	3619	3570	3180
Site D	5171	11509	4259		11990	24510	1034	18245	6633	29599	29194	24042
Site H-1	4378	20708	4462	12671		12733	355	5777	1632	10359	10456	8905
Site F	8374	15438	5897	27271	17032		1378	13074	3741	21105	20758	18139
Site E	1262	670	60	3618	681	2740		2035	1101	1925	1810	1632
Site C	4116	9269	3685	21194	9937	20246	892		3486	13036	12396	11354
Site B	562	1810	1143	4576	1932	4053	313	4048		658	326	269
Site A	4322	9150	3136	19590	9427	18623	588	15286	411		32619	26897
Site Z-1	4402	9141	3239	19692	9535	18843	576	15243	246	22049		36211
Site Z	5112	10992	3940	22255	11949	23146	611	18180	253	24604	31060	

Mean Travel Time in Minutes

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		2.055964	1.548925	11.73464	1.903792	8.176877	13.15342	17.63664	24.15607	19.32526	23.45216	24.17709
Site H	2.411566		1.461882	9.920863	0.252427	6.537709	11.78087	15.14342	21.33436	17.0841	20.93165	21.59669
Site G	2.685343	2.756526		9.933937	2.784746	6.836053	15.25038	14.9826	20.60211	18.2936	22.877	23.46729
Site D	11.87459	10.77883	10.76692		10.79129	5.252516	6.688427	3.048814	8.67583	6.488313	10.07878	10.60466
Site H-1	2.314072	0.665971	1.527697	9.914642		6.449683	11.58254	14.96633	21.21544	17.08444	20.98695	21.43719
Site F	6.857449	5.633658	6.013404	3.679573	5.655189		5.602467	6.932444	12.69573	10.18543	13.929	14.37352
Site E	14.92419	13.53241	15.66431	7.054411	13.74939	8.530408		10.42995	16.67408	13.60113	17.79452	18.23465
Site C	14.70665	13.85505	13.90061	3.184293	13.71395	8.097811	9.803578		5.822528	4.041663	7.618093	8.093808
Site B	23.9844	23.81951	22.95427	12.68314	23.7548	17.63313	19.08307	9.817383		8.071771	12.67771	13.48256
Site A	20.76496	20.31101	21.08795	8.358504	20.09296	13.88156	14.40791	6.148444	7.998378		3.554103	4.012316
Site Z-1	24.72219	23.88021	25.38691	12.09314	23.60885	17.29493	19.46207	9.462861	11.61782	3.150622		0.519349
Site Z	25.31089	24.40054	25.63126	12.6045	23.90441	17.76422	20.06232	10.04305	11.62628	3.483005	0.540791	

Minimum Travel Time in Minutes

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		0.625	0.075	2.983333	0.566667	1.25	4.558333	6.833333	11.65833	6.775	1.183333	1.016667
Site H	0.125		0.058333	4.45	0	1.183333	6.6	6.533333	11.43333	9.091667	11.075	4.883333
Site G	0.116667	0.141667		1.816667	0	0.05	7.7	4.766667	11.05	8.083333	0.466667	9.4
Site D	5.158333	4.575	4.883333		4.6	2.116667	3.316667	0.133333	6.016667	3.983333	6.125	2.341667
Site H-1	0.066667	0	0	4.366667		1.1	6.791667	6.516667	11.375	9.166667	7.958333	11
Site F	2.408333	2.266667	2.291667	1.775	2.416667		3.733333	3.533333	8.283333	1.3	2.075	2.833333
Site E	7.416667	6.408333	7.233333	3.066667	6.55	3.725		4.983333	9.55	2.466667	6.941667	7.7
Site C	7	2.866667	6.641667	1.333333	2.766667	3.508333	0.966667		4.066667	2.558333	3.683333	4.791667
Site B	11.66667	11.04167	10.73333	3.666667	9.316667	6.266667	10.70833	1.883333		5.6	8.133333	8.325
Site A	9.425	5.333333	3.133333	4.008333	1.95	2.4	8.991667	2.533333	3.283333		1.891667	2.15
Site Z-1	11.49167	10.58333	10.95	6.008333	10.60833	8.175	11.14167	3.733333	8.183333	1.833333		0
Site Z	11.71667	8.116667	10.50833	6.191667	10.79167	5.716667	11.44167	3.933333	8.5	2.183333	0	

Max Travel Time in Minutes

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		29.78333	29.94167	36.91667	29.95	29.96667	41.325	48.94167	65.20833	70.31667	86.11667	86.95
Site H	29.89167		29.75	38.16667	29.875	29.93333	39.21667	50.39167	68.55833	71.075	87.89167	89.10833
Site G	29.95	29.65		34.18333	29.96667	29.875	34.65833	46.01667	65.35	67.775	84.48333	85.30833
Site D	36.73333	38.15	34.11667		38.39167	29.96667	28.83333	29.8	37.88333	33.78333	50.20833	51.4
Site H-1	29.99167	29.89167	29.99167	38.43333		29.99167	40.51667	50.66667	68.78333	71.98333	87.88333	89.36667
Site F	29.91667	29.85	29.65833	29.85833	29.9		29.89167	29.98333	49.33333	49.83333	66.53333	67.6
Site E	41.80833	40.24167	35.25	29.71667	40.25833	29.925		29.33333	52.125	40.85833	57.29167	57.80833
Site C	48.9	50.4	45.675	28.575	50.53333	29.825	29.73333		30.23333	29.75833	37.9	38.99167
Site B	64.55	68.66667	65.56667	37.90833	68.84167	49.99167	54.625	30.68333		28.61667	33.38333	33.59167
Site A	70.26667	71.56667	67.8	33.78333	72.1	50.175	41.05	29.99167	29.91667		29.95	29.98333
Site Z-1	86.35	88.2	84.18333	50.21667	88.38333	66.56667	57.84167	38.05	33.58333	29.9		29.99167
Site Z	87.10833	89.18333	85.24167	51.46667	89.08333	67.73333	59.21667	39.19167	33.69167	29.925	29.98333	

Median Travel Time in Minutes

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		1.5	1.3	9.35	1.508333	6.325	11.15	13.49167	18.66667	15.525	18.97917	19.54167
Site H	1.375		0.891667	6.466666	0.083333	3.766667	9.2875	10	14.84167	12.575	16.29167	16.84167
Site G	1.516667	1.658333		6.916667	1.691667	4.15	10.9	10.25833	15.1875	13.48333	17.225	17.73333
Site D	8.325	7.383333	7.725		7.408333	3.408333	5.466667	2.666667	8.208333	5.966667	9.108333	9.5
Site H-1	1.325	0.05	0.808333	6.433333		3.708334	8.975	9.858333	14.76667	12.54167	16.24583	16.75
Site F	4.783333	3.9	4.366667	2.816667	3.925		5.208333	5.766667	11.21667	8.841667	12.35	12.79167
Site E	10.89583	9.491667	9.7	5.7	9.541667	5.741667		9.966667	16.475	12.26667	16.2875	16.66667
Site C	10.45	9.55	9.916667	2.341667	9.533333	5.645833	7.783333		5.3	3.65	6.925	7.366667
Site B	17.94583	16.2125	16.14167	8.495833	16.05	12.15	14.01667	6.283333		7.05	10.40833	11
Site A	14.925	13.95	14.575	6.225	13.925	9.866667	11.9375	3.833333	6.825		2.916667	3.275
Site Z-1	18.18333	17.15833	17.88333	9.15	17.06667	12.96667	15.37917	6.666667	9.691667	2.725		0.383333
Site Z	18.49167	17.42083	18.12917	9.45	17.24167	13.23333	15.66667	6.95	9.783333	3.016667	0.283333	

25th Percentile Travel Time in Minutes

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		1.25	1.191667	7.191667	1.283333	4.5375	9.725	10.04167	15.33542	12.99167	15.8	16.17292
Site H	1.25		0.825	5.966667	0.041667	3.441667	8.275	8.533333	13.43333	11.58333	14.325	14.69167
Site G	1.35	1.508333		6.316667	1.541667	3.766667	9.677083	9	13.83333	12.04167	14.90833	15.3
Site D	6.977083	6.116667	6.633333		6.166667	2.833333	4.85	2.341667	7.425	5.6	8.291667	8.583333
Site H-1	1.191667	0.025	0.708333	5.933333		3.408333	8.108333	8.48125	13.39167	11.56667	14.30833	14.64167
Site F	4.1	3.316667	3.766667	2.55	3.358333		4.741667	5.008333	10.03333	8.175	10.91667	11.225
Site E	9.375	8.258333	8.583333	4.183333	8.316667	5.008333		6.916667	12.65	10.05	13.28333	13.7
Site C	8.995833	8.133333	8.622917	2.058333	8.166667	4.875	6.883333		5.058333	3.416667	6.183333	6.491667
Site B	14.625	13.41667	13.86667	7.275	13.46667	10.13333	12.07292	5.2		6.658333	9.608333	9.939583
Site A	12.61667	11.75	12.36667	5.55	11.75833	8.4	10.45417	3.491667	6.510417		2.633333	2.916667
Site Z-1	15.3	14.38333	15.10208	8.183333	14.375	11.03333	13.13333	6.091667	9.141667	2.566667		0.275
Site Z	15.51667	14.64167	15.29167	8.458333	14.63125	11.3	13.50208	6.366667	9.358333	2.841667	0.225	

75th Percentile Travel Time in Minutes

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		1.95	1.466667	12.30208	1.916667	8.783333	13.73125	23.05417	29.84375	20.27292	25.34583	26.42083
Site H	1.608333		0.966667	9.291667	0.141667	5.633333	11.675	18.78333	27.80833	16.875	21.225	22.05
Site G	1.875	2.6375		9.15	2.65	5.9	20.625	18.67917	23.03333	19.65833	24.59167	25.24167
Site D	15.78333	14.80833	14.375		14.8	7.566667	7.541666	3.5	9.408333	6.741667	10.75	11.31667
Site H-1	1.566667	0.1	0.908333	9.033333		5.116667	11.21875	18.40208	26.8125	16.68125	21.19583	21.71667
Site F	7.958333	6.233333	7.110417	3.733333	6.233333		5.783333	8.391667	14.46667	10.61667	14.90833	15.45833
Site E	17.625	15.75833	24.575	9.566667	16.60208	10.54583		13.43333	19.52708	16.3375	20.35833	20.90833
Site C	18.5125	19.025	18.36458	3.741667	18.775	11.48333	12.0125		5.975	4.05	7.891667	8.525
Site B	30.58333	33.54167	30.20833	17.1375	33.475	24.41042	23.98542	13.51667		7.716667	13.31667	14.30417
Site A	24.625	24.15833	24.6875	7.483333	23.95	15.975	15.16667	4.583333	7.404167		3.733333	4.35
Site Z-1	28.63333	28.56875	29.29792	11.10833	28.16667	19.69167	20.27917	8.297917	10.94167	3.033333		0.55
Site Z	29.8	29.275	29.66667	11.775	28.64583	20.33333	20.975	9.083333	10.90417	3.35	0.375	

15th Percentile Travel Time in Minutes

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		1.15	1.15	6.775	1.183333	4.233333	9.069583	9.166667	14.54458	12.38333	15.01667	15.34167
Site H	1.191667		0.783333	5.808333	0.025	3.325	7.983333	8.183333	13.11667	11.31667	13.925	14.24167
Site G	1.291667	1.441667		6.141667	1.466667	3.633333	8.879167	8.591667	13.46667	11.7	14.34167	14.67917
Site D	6.641667	5.866667	6.333333		5.916667	2.7	4.65	2.233333	7.208333	5.45	8.041667	8.316667
Site H-1	1.116667	0.008333	0.633333	5.783333		3.316667	7.891667	8.15	13.0775	11.30833	13.91667	14.225
Site F	3.883333	3.175	3.566667	2.466667	3.225		4.56	4.808333	9.766667	7.975	10.575	10.86667
Site E	8.891667	7.916667	8.266667	3.941667	8.035833	4.808333		6.466667	11.625	9.616667	12.48333	12.78333
Site C	8.616667	7.833333	8.25	1.958333	7.875	4.683333	6.65		4.941667	3.316667	5.933333	6.233333
Site B	13.9	12.875	13.33292	7.025	12.94417	9.766667	11.75	5.016667		6.491667	9.245	9.575
Site A	12.11667	11.275	11.80833	5.35	11.31667	8.1	10.10583	3.383333	6.333333		2.541667	2.816667
Site Z-1	14.7	13.84167	14.43333	7.908333	13.86667	10.65	12.7	5.908333	8.941667	2.5		0.241667
Site Z	14.93333	14.1	14.64167	8.183333	14.11667	10.90833	13.04292	6.175	9.145417	2.766667	0.2	

Mean Speed in MPH - Conversion of Mean Travel Time to Speed

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		29.19995	56.9892	34.08517	30.96912	27.38384	34.57497	30.07353	29.26553	39.42422	39.90817	39.14985
Site H	24.89421		35.22797	41.67706	14.19478	35.87261	37.3776	36.07186	34.97242	45.60504	45.69652	44.81479
Site G	32.87178	18.68261		37.29844	19.77591	28.1923	25.50757	33.61981	34.91257	40.26354	40.01425	39.50853
Site D	33.68346	38.35969	34.41285		38.5839	34.07173	30.30657	43.69292	47.57931	56.41698	54.11668	52.57734
Site H-1	25.47837	5.380325	36.04831	41.99546		36.80969	38.32326	36.68897	35.24908	45.76978	45.70542	45.2734
Site F	32.65271	41.62921	32.04908	48.63671	41.98106		45.84013	44.97322	42.74623	53.47682	51.89369	51.10025
Site E	30.47261	32.5397	24.83354	28.73426	32.28366	30.10616		25.29879	35.58196	32.93048	35.25547	35.23364
Site C	36.06504	39.42615	36.2367	41.83396	40.03949	38.50106	26.91519		57.26293	57.63056	54.13953	52.48408
Site B	29.47499	31.32366	31.33504	32.54635	31.481	30.77698	31.09022	33.9617		38.99282	29.19439	27.40487
Site A	36.69081	38.35954	34.92825	43.79384	38.91667	39.23797	31.08653	37.88329	39.35062		51.42547	49.02732
Site Z-1	37.85801	40.05425	36.05819	45.10241	40.62958	41.79418	32.23471	43.58512	31.85778	58.01122		32.31621
Site Z	37.39613	39.66515	36.17294	44.23537	40.60064	41.34661	32.02387	42.29754	31.78038	56.47797	31.03487	

Mean Speed in MPH - Mean of Individual Speed Observations

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		39.2287	65.81561	42.1438	38.44167	36.03107	39.21707	38.45659	34.99662	46.44992	46.94982	46.11678
Site H	40.73514		59.42411	55.2052	65535	53.29344	43.72535	47.55301	42.762	54.78613	53.85463	52.95354
Site G	51.7164	29.34402		47.26624	65535	41.23727	31.29983	42.73419	41.58162	48.87396	48.91047	47.69586
Site D	42.54564	49.20931	42.31182		49.36981	45.39215	34.29612	47.72636	49.19597	58.86377	57.35688	56.2058
Site H-1	42.30602	65535	65535	55.88666		54.72474	45.34568	48.42654	43.15457	55.13817	54.0648	53.40665
Site F	41.95188	53.81939	39.7835	57.4041	53.94073		48.38027	50.26557	45.62391	57.51787	56.26236	55.44248
Site E	37.36631	41.00225	33.02906	35.08214	40.87185	38.55703		28.66053	38.17517	35.87086	38.58426	38.54123
Site C	44.99773	50.04584	44.73707	51.00483	50.45952	48.08902	30.97162		59.63196	61.55649	57.98033	56.29095
Site B	36.24337	40.33268	39.18175	42.14623	40.49528	39.27703	37.59252	46.19571		42.20514	32.4675	30.7826
Site A	45.76671	49.50765	44.92602	54.14157	49.89491	49.52891	35.17675	53.73917	43.26049		57.99318	55.61669
Site Z-1	46.69789	50.09771	45.77587	54.56517	50.53588	50.80931	38.11288	54.97834	35.35734	64.01158		65535
Site Z	46.25837	49.72073	45.74712	53.69703	50.39379	50.32677	38.02276	53.76873	34.78823	62.19721	65535	

35th Percentile Speed in MPH

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		34.97128	63.42899	36.69515	34.34492	28.37351	36.00191	30.39809	29.77791	43.80738	42.57465	41.43872
Site H	40.93229		55.17762	57.2941	30.71262	55.83922	41.80449	41.59274	37.90749	55.6515	52.7969	51.64168
Site G	53.49818	28.09043		49.12976	29.63456	42.7484	26.66515	37.90397	40.96864	49.68398	46.38881	45.35628
Site D	33.73792	36.21656	34.36046		36.84689	31.07884	32.43253	44.28086	46.25098	57.64583	54.58848	53.39805
Site H-1	41.13404	47.77513	63.54333	58.16576		57.78763	45.13083	43.63703	39.17193	56.18809	53.21841	52.34343
Site F	37.58002	48.35561	35.20074	57.11563	49.37487		46.48287	45.84916	41.21338	55.96071	53.27965	52.40121
Site E	33.85452	38.04239	21.52145	24.24197	37.94932	32.372		21.64307	32.53689	29.82632	33.26667	33.30457
Site C	40.49082	41.22652	39.38456	49.03494	42.98233	39.63233	29.16174		60.25572	60.23878	55.92406	53.9995
Site B	29.92761	29.6175	34.01956	36.10408	30.20193	30.23437	32.46641	37.05641		42.77342	30.37073	29.02211
Site A	39.89266	41.27794	39.14603	53.76514	42.43967	43.74974	33.91621	55.34811	44.43404		56.52725	53.33989
Site Z-1	40.91808	42.38335	39.74482	54.67969	43.40351	45.60424	36.98294	55.92406	36.60306	63.57267		35.96442
Site Z	40.26357	41.92403	39.59394	53.95787	43.57546	44.92295	37.10767	54.8714	36.13866	62.11992	50.3502	

Median Speed in MPH

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		40.02269	67.90154	42.77831	39.0887	35.40147	40.78736	39.31286	37.87179	49.07461	49.31369	48.43648
Site H	43.66111		57.75601	63.93904	42.99765	62.2632	47.41218	54.62514	50.27159	61.95794	58.71123	57.46766
Site G	58.20131	31.05474		53.5692	32.55422	46.43953	35.68809	49.10273	47.35952	54.62782	53.14403	52.28335
Site D	48.0453	56.00078	47.96379		56.20291	52.50728	37.07987	49.95434	50.28914	61.34933	59.88251	58.69101
Site H-1	44.49719	71.6627	68.12893	64.72071		64.0209	49.45744	55.699	50.64277	62.34825	59.04391	57.94236
Site F	46.81135	60.13454	44.13528	63.53691	60.48683		49.30903	54.06491	48.38286	61.60425	58.52852	57.41943
Site E	41.73881	46.39234	40.10311	35.56198	46.52023	44.7288		26.47476	36.01194	36.51292	38.51751	38.54838
Site C	50.7556	57.1991	50.7945	56.8875	57.59783	55.22202	33.9013		62.90849	63.8146	59.55812	57.66463
Site B	39.39299	46.02092	44.56001	48.58735	46.59345	44.66621	42.32794	53.0634		44.64413	35.55977	33.58979
Site A	51.04746	55.85097	50.5362	58.80337	56.15447	55.20448	37.51974	60.7626	46.11591		62.66449	60.06506
Site Z-1	51.47202	55.74573	51.18766	59.60982	56.20415	55.74503	40.79246	61.86599	38.1893	67.07208		43.78277
Site Z	51.18681	55.55711	51.14179	59.00155	56.29006	55.50304	41.00891	61.12174	37.76706	65.20875	59.23551	

15th Percentile Speed in MPH

	END STATION											
BEGIN STATION	**Site I**	**Site H**	**Site G**	**Site D**	**Site H-1**	**Site F**	**Site E**	**Site C**	**Site B**	**Site A**	**Site Z-1**	**Site Z**
Site I		52.2035	76.75826	59.03722	49.82433	52.89314	50.14333	57.86139	48.60504	61.5249	62.32627	61.69665
Site H	50.3782		65.74354	71.18607	143.3254	70.53375	55.15749	66.75169	56.88292	68.84722	68.68968	67.95912
Site G	68.33961	35.72193		60.32895	37.54833	53.04331	43.81044	58.62799	53.41134	62.95428	63.82842	63.16149
Site D	60.22241	70.47826	58.50321		70.37238	66.28234	43.59211	59.64698	57.26567	67.16532	67.82548	67.04184
Site H-1	52.79891	429.9704	86.95402	71.9948		71.58116	56.24674	67.37415	57.18408	69.14821	68.92581	68.22738
Site F	57.66034	73.86605	54.03478	72.55229	73.61576		56.3197	64.84041	55.56598	68.29896	68.35246	67.59113
Site E	51.14667	55.62198	47.05647	51.42578	55.23765	53.41099		40.80389	51.03627	46.57454	50.25533	50.25864
Site C	61.55467	69.73422	61.05601	68.02293	69.7269	66.57103	39.67897		67.47016	70.22813	69.51235	68.14911
Site B	50.859	57.95062	53.94714	58.76015	57.77312	55.56598	50.49333	66.46146		48.48387	40.03439	38.5888
Site A	62.87895	69.10165	62.37672	68.42075	69.09729	67.24497	44.32013	68.84432	49.69596		71.91007	69.83896
Site Z-1	63.6689	69.10323	63.42305	68.96901	69.17434	67.87111	49.39795	69.80648	41.3925	73.10857		69.44852
Site Z	63.38367	68.64192	63.32326	68.13417	68.75097	67.33295	49.25838	68.79289	40.40141	71.10111	83.91693	

Travel Time Report Parameters

METHOD ALL

OUTLIERS EXCLUDED

Status of Station Pairs

	END STATION											
BEGIN STA	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site H	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site G	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK
Site D	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK
Site H-1	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK
Site F	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK
Site E	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
Site C	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK
Site B	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK
Site A	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK
Site Z-1	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK
Site Z	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	

Mean Travel Time in Minutes

	END STATION											
BEGIN STA	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		1.64	1.38	10.44	1.65	7.26	11.76	15.49	21.75	17.12	20.59	21.17
Site H	1.71		0.95	8.75	0.11	5.61	10.28	13.41	19.16	15.07	18.53	18.96
Site G	2.25	2.08		8.76	2.12	5.82	13.91	13.26	18.54	15.44	19.06	19.65
Site D	10.85	9.88	9.92		9.93	4.85	6.17	2.87	8.36	6.24	9.71	10.1
Site H-1	1.63	0.39	0.84	8.73		5.53	9.72	13.2	19.03	15	18.46	18.83
Site F	6.1	5.02	5.3	3.3	5.07		5.18	6.41	11.85	9.48	12.92	13.32
Site E	13.81	12.17	14.57	6.4	12.29	7.84		9.82	15.85	12.59	16.15	16.61
Site C	13.24	12.45	12.53	2.96	12.42	7.51	9.21		5.54	3.75	7.11	7.56
Site B	21.87	21.86	21.36	11.7	21.8	16.34	17.8	9.08		7.28	11.3	12.12
Site A	18.31	17.84	18.09	7.64	17.9	12.66	13.19	5.55	7.49		3.5	3.91
Site Z-1	21.4	20.7	21.35	11	20.64	15.64	16.62	8.64	10.5	2.94		0.43
Site Z	21.93	21.21	21.64	11.46	21.11	16.11	16.87	9.13	10.62	3.24	0.3	

All Measured Parameters

		END STATION										
BEGIN STATION		Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I	count		6410	14876	9408	7758	11113	1022	3824	937	7840	7941	6447
	mean_minutes		1.64	1.38	10.44	1.65	7.26	11.76	15.49	21.75	17.12	20.59	21.17
	min_minutes		0.65	0.73	5.09	0.57	2.92	4.56	6.83	11.66	9.52	11.67	11.97
	max_minutes		10.31	7.44	36.92	11.3	29.97	40.87	48.73	63.7	67.16	81.23	71.75
	median_minutes		1.42	1.28	8.6	1.47	5.59	10.47	11.8	17.64	14.69	17.95	18.42
	PCT25_minutes		1.21	1.18	6.91	1.25	4.32	9.05	9.35	15	12.63	15.39	15.72
	PCT75_minutes		1.82	1.44	11.1	1.85	8.13	12.72	17.74	23.92	17.6	22.14	23
	PCT15_minutes		1.13	1.13	6.59	1.16	4.08	8.66	8.86	14.38	12.14	14.78	15.09
Site H	count	5824		6150	17917	47534	17747	579	7515	2264	14345	14593	11983
	mean_min	1.71		0.95	8.75	0.11	5.61	10.28	13.41	19.16	15.07	18.53	18.96
	min_minut	0.53		0.38	4.41	0	2.47	6.6	6.38	11.11	7.18	11.14	11.18
	max_minu	11.67		8.97	38.17	1.57	29.93	39.22	50.36	65.54	65.62	67.21	68.06
	median_m	1.35		0.88	6.23	0.1	3.62	8.78	9.33	14.26	12.1	15.5	16
	PCT25_mir	1.24		0.82	5.88	0.05	3.38	8.04	8.25	13.29	11.45	14.17	14.48
	PCT75_mir	1.5		0.95	7.33	0.17	4.26	10.46	14.28	20.14	14.13	18.78	19.39
	PCT15_mir	1.19		0.79	5.75	0.03	3.28	7.83	8	12.98	11.22	13.83	14.12
Site G	count	11879	4311		6403	4851	6137	110	2989	1242	4490	4397	3903
	mean_min	2.25	2.08		8.76	2.12	5.82	13.91	13.26	18.54	15.44	19.06	19.65
	min_minut	0.88	0.47		4.48	0	0.05	7.52	6.2	11.01	8.08	11.28	9.4
	max_minu	15.47	7.99		34.18	8.48	29.87	34.66	45.77	65.35	57.62	79.83	82.2
	median_m	1.47	1.63		6.67	1.68	4	10.41	9.77	14.66	12.77	16.4	16.98
	PCT25_mir	1.33	1.51		6.23	1.55	3.69	8.87	8.68	13.63	11.86	14.62	14.98
	PCT75_mir	1.73	1.92		7.65	1.96	4.59	15.67	13.9	18.18	14.77	19.55	20.38
	PCT15_mir	1.28	1.46		6.05	1.48	3.57	8.38	8.39	13.3	11.56	14.18	14.49
Site D	count	6769	14622	5334		15235	31634	1308	22302	7887	38586	37994	31205
	mean_min	10.85	9.88	9.92		9.93	4.85	6.17	2.87	8.36	6.24	9.71	10.1
	min_minut	5.16	4.57	4.33		4.6	2.03	3.81	1.65	6.02	3.98	6.33	6.4
	max_minu	36.73	37.97	32.85		38.35	23.9	21.49	10.39	17.22	15.02	31	31.45
	median_m	7.85	6.95	7.41		6.97	3.22	5.21	2.53	7.92	5.87	8.93	9.28
	PCT25_mir	6.8	6.01	6.52		6.07	2.78	4.78	2.25	7.33	5.56	8.24	8.53
	PCT75_mir	13.52	13.28	12.64		13.32	6.93	6.69	3.22	9.1	6.48	10.59	11.08

	PCT15_mir	6.52	5.81	6.24		5.86	2.67	4.62	2.16	7.15	5.42	8.02	8.28
Site H-1	count	5300	26182	5319	16368		16601	491	7030	2037	13115	13264	11261
	mean_min	1.63	0.39	0.84	8.73		5.53	9.72	13.2	19.03	15	18.46	18.83
	min_minut	0.1	0	0.1	4.34		2.48	6.77	6.42	11.33	7.03	11.08	9.95
	max_minu	12.43	29.98	8.42	38.43		29.96	40.52	50.67	65.63	61.52	67.08	68.35
	median_m	1.3	0.06	0.79	6.21		3.57	8.46	9.22	14.2	12.07	15.47	15.92
	PCT25_mir	1.17	0.03	0.69	5.85		3.35	7.9	8.23	13.25	11.43	14.15	14.46
	PCT75_mir	1.47	0.09	0.88	7.28		4.18	9.62	13.46	19.69	14.07	18.62	19.14
	PCT15_mir	1.1	0.02	0.63	5.72		3.26	7.73	8	12.94	11.2	13.82	14.1
Site F	count	11397	20176	7582	35412	22272		1937	15969	4570	27145	26733	23337
	mean_min	6.1	5.02	5.3	3.3	5.07		5.18	6.41	11.85	9.48	12.92	13.32
	min_minut	2.82	2.09	2.29	1.6	2.42		3.73	3.65	8.28	6.22	8.35	8.37
	max_minu	29.9	28.29	28.02	13.43	27.79		12.72	17.81	26.64	26.58	35.9	36.21
	median_m	4.53	3.71	4.17	2.72	3.73		4.97	5.44	10.68	8.58	11.84	12.25
	PCT25_mir	3.99	3.27	3.68	2.51	3.32		4.6	4.87	9.9	8.09	10.8	11.11
	PCT75_mir	6.86	5.42	6.13	3.22	5.47		5.52	7.29	13.32	9.87	14.08	14.6
	PCT15_mir	3.81	3.14	3.52	2.43	3.2		4.47	4.72	9.66	7.91	10.51	10.8
Site E	count	1714	887	87	4398	898	3712		2329	1213	2392	2231	2014
	mean_min	13.81	12.17	14.57	6.4	12.29	7.84		9.82	15.85	12.59	16.15	16.61
	min_minut	6.65	6.38	7.13	2.98	6.55	3.73		4.98	9.55	7.48	9.58	9.8
	max_minu	41.43	40.56	35.25	17.42	40.69	27.97		22.53	31.42	23.83	29.91	33.84
	median_m	10.2	8.91	9.24	4.76	8.96	5.38		8.69	15.55	11.19	14.98	15.43
	PCT25_mir	9	8.11	8.48	4.01	8.2	4.87		6.57	12.02	9.74	12.8	13.09
	PCT75_mir	14.93	11.96	21.87	8.81	12.2	9.17		12.85	18.88	15.26	19.13	19.66
	PCT15_mir	8.63	7.81	8.05	3.84	7.9	4.69		6.25	11.43	9.41	12.22	12.49
Site C	count	5129	11388	4443	26139	12281	25361	1075		3901	15696	14963	13776
	mean_min	13.24	12.45	12.53	2.96	12.42	7.51	9.21		5.54	3.75	7.11	7.56
	min_minut	7	2.87	6.64	1.3	2.77	3.51	5.83		4.07	2.62	3.68	4.79
	max_minu	48.7	43.44	40.98	10.6	43.47	27.78	29.73		10.94	9.85	17.68	18.08
	median_m	9.86	8.97	9.47	2.25	8.94	5.34	7.43		5.25	3.58	6.68	7.09
	PCT25_mir	8.8	8.01	8.48	2.03	8.04	4.79	6.8		5.02	3.37	6.08	6.39
	PCT75_mir	14.74	15.8	14.4	3.03	15.47	9.81	10.53		5.68	3.93	7.52	8.06
	PCT15_mir	8.49	7.76	8.18	1.93	7.8	4.63	6.61		4.9	3.29	5.89	6.18
Site B	count	707	2210	1388	5416	2376	4968	364	4649		663	330	270
	mean_min	21.87	21.86	21.36	11.7	21.8	16.34	17.8	9.08		7.28	11.3	12.12
	min_minut	11.67	11.04	10.73	3.67	9.32	6.27	10.71	1.88		5.6	8.13	8.33
	max_minu	64.36	68.67	65.57	37.91	68.84	49.99	52.85	30.68		17.9	30.54	30.07
	median_m	16.63	15.2	15.38	7.99	15.13	11.42	12.92	5.68		6.94	10.24	10.68
	PCT25_mir	14.35	13.34	13.72	7.22	13.38	10.05	11.95	5.13		6.59	9.49	9.83
	PCT75_mir	26.36	27.89	25.16	13.23	27.45	20.64	20.32	11.72		7.42	12.48	13.23
	PCT15_mir	13.77	12.83	13.3	6.98	12.89	9.73	11.71	4.98		6.44	9.2	9.55
Site A	count	5548	11369	3758	25015	11777	23922	754	18954	430		43096	35347
	mean_min	18.31	17.84	18.09	7.64	17.9	12.66	13.19	5.55	7.49		3.5	3.91
	min_minut	9.43	8.58	3.13	3.9	8.61	6.05	8.56	2.58	3.28		1.89	2.15
	max_minu	70.27	71.16	67.46	33.76	72.1	50.17	40.99	29.99	29.92		18.38	15.16
	median_m	13.99	13.06	13.78	5.96	13.07	9.27	11.2	3.72	6.75		2.88	3.22
	PCT25_mir	12.3	11.53	12.1	5.47	11.57	8.27	10.23	3.45	6.47		2.63	2.92
	PCT75_mir	20.18	20.48	19.68	7	20.45	14.03	13.25	4.32	7.17		3.79	4.37
	PCT15_mir	11.91	11.14	11.64	5.29	11.2	8	9.98	3.35	6.32		2.54	2.82
Site Z-1	count	5557	11365	3807	24958	11916	24110	718	18918	253	28227		47893
	mean_min	21.4	20.7	21.35	11	20.64	15.64	16.62	8.64	10.5	2.94		0.43
	min_minut	11.49	10.56	9.84	5.63	10.61	8.03	10.65	3.73	8.18	1.83		0
	max_minu	85.63	86.99	81.72	49.93	87.03	66.14	57.84	38.05	30.79	28.18		2.58
	median_m	16.83	15.89	16.86	8.75	15.82	12.08	14.16	6.45	9.62	2.69		0.37
	PCT25_mir	14.94	14.1	14.76	8.05	14.14	10.86	12.86	6.02	9.08	2.55		0.27
	PCT75_mir	23.42	23.58	23.18	10.18	23.42	17.15	16.73	7.57	10.4	2.93		0.52
	PCT15_mir	14.44	13.67	14.19	7.82	13.72	10.53	12.49	5.85	8.91	2.47		0.24
Site Z	count	6583	13930	4807	28437	15342	30266	771	22803	262	31526	39988	
	mean_min	21.93	21.21	21.64	11.46	21.11	16.11	16.87	9.13	10.62	3.24	0.3	
	min_minut	11.72	10.77	10.17	5.83	10.79	5.72	10.9	3.93	8.32	2.14	0	
	max_minu	86.78	88.93	85.08	51.12	88.82	66.4	58.3	39.19	32.77	28.38	6.44	
	median_m	17.05	16.12	16.9	9.04	16.02	12.32	14.42	6.73	9.72	2.97	0.28	
	PCT25_mir	15.17	14.37	14.95	8.33	14.4	11.12	13.19	6.28	9.32	2.82	0.22	
	PCT75_mir	24.2	24.16	23.52	10.55	23.75	17.73	17.04	7.92	10.57	3.23	0.36	
	PCT15_mir	14.69	13.95	14.43	8.09	13.98	10.79	12.83	6.12	9.13	2.74	0.2	

TRAVEL TIME DATA

1 HOUR CORRIDOR STATISTICAL SUMMARIES

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 8-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

			Segment	DED_C45	DED_EE8	DED_2A5	DED_B58	DED_9A2	DED_D69	DED_BB1	DED_D7C	DED_D35	DED_D6D	DED_2BE	C45_DED	C45_EE8	C45_2A5	C45_B58	C45_9A2	C45_D69	C45_BB1	C45_D7C	C45_D35	C45_D6D	C45_2BE	EE8_DED	EE8_C45
			Label	Site I to Site H	Site I to Site G	Site I to Site D	Site I to Site H-1	Site I to Site F	Site I to Site E	Site I to Site C	Site I to Site B	Site I to Site A	Site I to Site Z-1	Site I to Site Z	Site H to Site I	Site H to Site G	Site H to Site D	Site H to Site H-1	Site H to Site F	Site H to Site E	Site H to Site C	Site H to Site B	Site H to Site A	Site H to Site Z-1	Site H to Site Z	Site G to Site I	Site G to Site H
			Length (miles)	1.001	1.471	6.666	0.983	3.732	7.580	8.840	11.782	12.698	15.599	15.775	1.001	0.858	6.891	0.060	3.909	7.339010836	9.104189489	12.4352739	12.98535085	15.94173031	16.1308518	1.471199888	0.858318554
Time		Begin Time	End Time																								
	Midnight	12:00 AM	1:00 AM																								
		1:00 AM	2:00 AM																								
		2:00 AM	3:00 AM																								
		3:00 AM	4:00 AM																								
		4:00 AM	5:00 AM																								
		5:00 AM	6:00 AM																								
		6:00 AM	7:00 AM																								
		7:00 AM	8:00 AM	1.102	1.183	6.343	1.033	3.648	8.243			11.580			1.257	0.823	5.859	0.053	2.981	7.357142874			11.35833329			1.314285734	1.404166678
		8:00 AM	9:00 AM	1.122	1.170	6.469	1.097	3.736	8.277			12.174			1.215	0.828	5.810	0.050	3.177	7.880555531			11.66064356			1.309042554	1.470312477
		9:00 AM	10:00 AM	1.101	1.173	6.505	1.076	3.880	8.359		13.121	11.891	20.916	15.692	1.225	0.820	5.863	0.051	3.233	8.013888923		13.35000001	11.39933036	14.80804597	15.42358491	1.302513251	1.486805594
		10:00 AM	11:00 AM	1.275	1.183	6.842	1.237	3.967	8.715	8.622	13.671	12.404	15.326	15.968	1.262	0.837	5.841	0.054	3.271	8.258333299	8.061666662	13.56875003	11.30553481	14.86774427	15.45925927	1.362777799	1.476851863
		11:00 AM	12:00 PM	1.169	1.143	6.888	1.139	4.214	8.317	9.027	14.156	12.317	15.144	15.484	1.252	0.829	6.141	0.050	3.235	8.136111125	8.004347823	13.21291666	11.76796118	14.02826924	14.37912698	1.32030515	1.489980948
	Noon	12:00 PM	1:00 PM	1.219	1.180	6.751	1.161	4.168	8.598	9.084	14.410	12.225	15.081	15.382	1.324	0.842	5.982	0.043	3.419	7.869444453	8.242516999	13.90396823	11.32404372	14.58030334	14.91010638	1.34622397	1.522126435
		1:00 PM	2:00 PM	1.238	1.203	7.070	1.211	4.075	8.798	8.922	14.350	12.425	14.973	15.260	1.301	0.851	5.951	0.055	3.242	7.643749989	7.990634935	13.15217391	11.34514925	14.01647584	14.26682695	1.333249162	1.51666668
		2:00 PM	3:00 PM	1.204	1.158	8.650	1.150	4.466	10.629	9.021	14.367	13.956	14.949	15.287	1.300	0.843	5.995	0.049	3.295	7.670833301	8.12305296	13.26972221	11.43794327	13.94596154	14.30343642	1.359883717	1.529301092
		3:00 PM	4:00 PM	1.250	1.172	9.143	1.172	5.899	10.600	10.681	16.020	14.745	16.581	16.727	1.277	0.829	6.092	0.061	3.333	8.066666666	8.138608572	13.22596154	11.56409969	14.04854015	14.25654209	1.321940937	1.534496124
		4:00 PM	5:00 PM	1.235	1.193	10.481	1.204	6.419	12.892	11.360	15.882	16.050	17.486	17.749	1.310	0.836	6.212	0.038	3.417	8.390277727	8.240277776	13.7308642	12.04127297	14.2967816	14.54003114	1.357142853	1.558333336
		5:00 PM	6:00 PM	1.922	1.453	9.923	1.908	7.945	11.539	12.693	17.722	15.966	18.687	19.039	1.321	0.882	6.109	0.052	3.466	7.358333319	8.51103989	13.80092592	11.88948599	14.80498636	15.13356919	1.394649111	1.667948698
		6:00 PM	7:00 PM	1.527	1.291	6.894	1.622	6.954	9.082	12.303	18.527	12.651	18.894	19.158	1.365	0.864	6.032	0.057	3.393	8.606249966	8.465126811	14.0119797	11.5405142	14.65177994	14.83695287	1.397284645	1.593055569
		7:00 PM	8:00 PM	1.185	1.206	6.750	1.135	4.185	9.065	9.099	13.600	12.305	15.381	15.655	1.304	0.850	6.007	0.063	3.332	7.9999999	8.305759789	14.18809522	11.53676976	14.21145833	14.50697917	1.369444449	1.593939405
		8:00 PM	9:00 PM	1.190	1.228	6.571	1.116	4.088	8.836	8.897	14.950	12.067	14.861	15.080	1.292	0.839	5.909	0.048	3.335	10.06250007	8.116558434	13.14916669	11.30539217	14.31958762	14.56071429	1.359305548	1.519871778
		9:00 PM	10:00 PM	1.137	1.212	6.612	1.105	3.984	8.746	8.739	15.745	12.079	14.786	14.951	1.288	0.847	5.857	0.054	3.282	7.897222247	8.029861127	13.22045456	11.27935324	13.98594276	14.24155251	1.347321449	1.496428573
		10:00 PM	11:00 PM	1.168	1.177	6.786	1.144	3.906	9.094	8.831		12.288	14.630	14.827	1.295	0.834	5.756	0.058	3.253		8.129484836	14.04333327	11.13373013	14.02759562	14.18433906	1.370277788	1.585897435
	Midnight	11:00 PM	12:00 AM	1.146	1.242	6.650	1.139	3.908	8.545	9.073	26.375	11.949	15.154	15.254	1.405	0.807	6.120	0.057	3.200		7.951754391	12.21666679	11.68194443	13.7840909	14.1742424	1.412698414	1.504545508

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 8-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

			Segment	EE8_2A5	EE8_B58	EE8_9A2	EE8_D69	EE8_BB1	EE8_D7C	EE8_D35	EE8_D6D	EE8_2BE	2A5_DED	2A5_C45	2A5_EE8	2A5_B58	2A5_9A2	2A5_D69	2A5_BB1	2A5_D7C	2A5_D35	2A5_D6D	2A5_2BE	B58_DED	B58_C45	B58_EE8	B58_2A5
			Label	Site G to Site D	Site G to Site H-1	Site G to Site F	Site G to Site E	Site G to Site C	Site G to Site B	Site G to Site A	Site G to Site Z-1	Site G to Site Z	Site D to Site I	Site D to Site H	Site D to Site G	Site D to Site H-1	Site D to Site F	Site D to Site E	Site D to Site C	Site D to Site B	Site D to Site A	Site D to Site Z-1	Site D to Site Z	Site H-1 to Site I	Site H-1 to Site H	Site H-1 to Site G	Site H-1 to Site D
			Length (miles)	6.175338387	0.917848109	3.212067323	6.48333606	8.395202059	11.98787924	12.27608467	15.25676575	15.45263357	6.666285817	6.891207213	6.175338387	6.939498539	2.982705285	3.378388244	2.220192926	6.879833845	6.100850039	9.090498164	9.29274368	0.982646405	0.059718995	0.917848109	6.939498539
Time	Begin Time	End Time																									
Midnight	12:00 AM	1:00 AM																									
	1:00 AM	2:00 AM																									
	2:00 AM	3:00 AM																									
	3:00 AM	4:00 AM																									
	4:00 AM	5:00 AM																									
	5:00 AM	6:00 AM																									
	6:00 AM	7:00 AM																									
	7:00 AM	8:00 AM		6.181818179	1.379166646	3.288888875				12.20185187			6.375757557	5.900000017	6.125362324	5.893010754	2.606431162	4.316666722			5.529878041		1.300000018	0.067757018	0.838333363	5.883333344
	8:00 AM	9:00 AM		6.21328126	1.424999982	3.514516134				11.92948718			6.397348479	5.956402438	6.30759803	5.904761916	2.662239579	4.613636363			5.869691112		1.277430563	0.072520183	0.832083296	5.866823902
	9:00 AM	10:00 AM		6.048387104	1.440740748	3.524137933				11.55492423	15.09876543	15.52115383	6.559802913	5.92064813	6.348170738	5.909057968	2.614067658	4.862500071		7.501282074	5.522426891	8.946836411	9.514876029	1.2654762	0.067857145	0.845833349	5.925735304
	10:00 AM	11:00 AM		6.269833329	1.419444472	3.474324309	7.52499992	8.269907404	14.21666661	11.69411766	14.81439395	15.52083334	6.584591171	5.920061719	6.339375002	5.878978967	2.619058291	4.491666672	2.15684684	7.794583338	5.51903646	8.893236298	9.502101133	1.296250031	0.071134419	0.867647066	5.901851865
	11:00 AM	12:00 PM		6.284188031	1.435784316	3.608687955		8.546396408	14.44666663	11.59930554	14.34348958	14.60864199	6.658712126	5.961441787	6.390416668	5.887748755	2.618374317	4.676666647	2.155011083	7.360925905	5.54692672	8.233306549	8.561378215	1.285952366	0.071317831	0.835465103	6.161390682
Noon	12:00 PM	1:00 PM		6.076000001	1.470325209	3.549999998	7.816666681	8.408035694	14.85833334	11.5	14.47333336	14.86597224	6.69460786	5.994907413	6.405128229	5.957556498	2.646453169	4.507142862	2.188301283	7.661333315	5.483223682	8.294720326	8.618270447	1.351360539	0.069471941	0.863888897	5.93747087
	1:00 PM	2:00 PM		6.176736136	1.445430103	3.513787903	8.616666785	8.23780489	13.20000002	11.49655172	14.11953128	14.40709878	6.75927419	5.874468087	6.395833359	5.86575	2.623030298	4.558333308	2.150355873	7.399382703	5.429476801	8.136896933	8.431680447	1.326700669	0.070347648	0.851587317	6.00288889
	2:00 PM	3:00 PM		6.325537655	1.475505058	3.522962961	25.65000001	8.445698924	13.25681821	11.7914216	14.0522987	14.36630436	6.700490197	5.921491215	6.604427046	5.88444443	2.596340571	4.465277754	2.137858717	7.331691918	5.515186251	8.04885057	8.361475404	1.365476204	0.069095663	0.837634413	6.058128843
	3:00 PM	4:00 PM		6.411442786	1.481249991	3.605508464	8.025000058	8.516666669	13.82380951	11.96967593	14.52187501	14.69351854	6.618006943	6.007456148	6.393518491	5.982616494	2.624597426	4.600000028	2.145370369	7.344576716	5.551493702	8.174614194	8.414910598	1.30694444	0.067681029	0.829999995	6.142777773
	4:00 PM	5:00 PM		6.575555561	1.508876806	3.668827185		8.607843153	13.3797619	12.45141845	14.9446759	15.28854169	7.436764707	6.396891545	7.250245084	6.384679498	2.784407554	4.800000004	2.165005735	7.350320513	5.783333342	8.257288397	8.542717081	1.34047619	0.068329873	0.860476188	6.309684686
	5:00 PM	6:00 PM		6.454296856	1.570959604	3.750595251		8.798809528	14.33464914	12.2739316	15.30995935	15.63210782	6.851257868	6.195170442	6.533012828	6.160175437	2.72686507	4.933333397	2.252999996	7.50778686	5.704109986	8.578734761	8.898636369	1.366463408	0.074054985	0.89320174	6.199173025
	6:00 PM	7:00 PM		6.303333305	1.533352923	3.69412565		8.645325188	14.12611115	11.86565656	14.98706136	15.27177416	6.847695056	6.12446809	6.69958333	6.103741502	2.712799268	4.708333339	2.225461134	7.470673082	5.579891306	8.429089224	8.725843887	1.393421043	0.068201132	0.852678598	6.073784721
	7:00 PM	8:00 PM		6.375520849	1.551282038	3.632291654	32.62500007	8.531904743	14.15104165	12.14791671	14.579798	14.71666669	6.902350432	6.113028176	6.836858952	6.093354424	2.756797015	4.627083298	2.180525363	7.794212988	5.586856059	8.247126443	8.532383431	1.336197904	0.071223195	0.840740719	6.075000004
	8:00 PM	9:00 PM		6.416919174	1.48020832	3.607098771	15.80000013	8.530681846	13.62291662	12.42045457	14.91304349	15.37992427	6.615990976	5.929519782	6.517592613	6.021464642	2.667139482	5.118333299	2.156097559	7.506034512	5.528324921	8.286910033	8.547906202	1.327777773	0.068273429	0.819827573	5.97932488
	9:00 PM	10:00 PM		6.149479161	1.478472236	3.660049013	8.02499989	8.838690461	14.05416667	11.66875002	15.14431817	15.50198413	6.401190505	5.979166668	6.38174603	6.00386474	2.665740747	5.52708332	2.124952656	7.440000013	5.476238743	8.180877617	8.473148148	1.275980413	0.063629621	0.865942026	5.938333339
	10:00 PM	11:00 PM		6.434803907	1.474999982	3.732638889		8.356818139	13.3083334	12.41354168	14.8494442	15.38402779	6.294444404	5.926344101	6.854545449	5.88657408	2.683084566	4.630555641	2.138114757	7.284027804	5.614652983	8.101119399	8.387212638	1.350555584	0.073098724	0.788888913	5.862121221
Midnight	11:00 PM	12:00 AM		6.791666694	1.507638926	3.492187491		8.802083326	16.2749999	12.70694448	15.31666666	15.89583336	6.379999995	6.122580639	6.806944376	6.18583332	2.752124175		2.195312503	8.230555588	5.608506943	8.33797468	8.613809513	1.379861101	0.063888889	0.836666672	6.271180578

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 8-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

		Segment	B58_9A2	B58_D69	B58_BB1	B58_D7C	B58_D35	B58_D6D	B58_2BE	9A2_DED	9A2_C45	9A2_EE8	9A2_2A5	9A2_B58	9A2_D69	9A2_BB1	9A2_D7C	9A2_D35	9A2_D6D	9A2_2BE	D69_DED	D69_C45	D69_EE8	D69_2A5	D69_B58	D69_9A2
		Label	Site H-1 to Site F	Site H-1 to Site E	Site H-1 to Site C	Site H-1 to Site B	Site H-1 to Site A	Site H-1 to Site Z	Site H-1 to Site Z	Site F to Site I	Site F to Site H	Site F to Site G	Site F to Site D	Site F to Site H-1	Site F to Site E	Site F to Site C	Site F to Site B	Site F to Site A	Site F to Site Z-1	Site F to Site Z	Site E to Site I	Site E to Site H	Site E to Site G	Site E to Site D	Site E to Site H-1	Site E to Site F
		Length (miles)	3.956847186	7.398008849	9.151655359	12.46374762	13.03251655	15.98695862	16.17557533	3.731905093	3.908745328	3.212067323	2.982705285	3.956847186	4.280297558	5.19623856	9.044906903	9.078070426	12.04712126	12.24150405	7.579651662	7.339010836	6.48333606	3.378388244	7.398008849	4.280297558
Time	Begin Time	End Time																								
Midnight	12:00 AM	1:00 AM																								
	1:00 AM	2:00 AM																								
	2:00 AM	3:00 AM																								
	3:00 AM	4:00 AM																								
	4:00 AM	5:00 AM																								
	5:00 AM	6:00 AM																								
	6:00 AM	7:00 AM																								
	7:00 AM	8:00 AM	3.058333317	7.48452383			11.3625			3.616666831	3.350595249	3.033333309	2.664035083	3.30135328	4.404629609			8.163793097			8.370833297	7.799999978		3.951282051	7.783333277	4.610555526
	8:00 AM	9:00 AM	3.265979374	7.959722187			11.78200354			3.793493146	3.300284905	3.550333331	2.644025155	3.272115392	4.562280669			8.551357666			8.408333337	7.708333433		3.749166699	7.666666741	4.582352986
	9:00 AM	10:00 AM	3.296471473	8.109722268		13.53333335	11.49754454	15.01006494	15.56266667	3.855789462	3.344784161	3.705681827	2.615539159	3.309829071	4.552678574		10.33703705	8.12151741	11.62096434	12.17509057	8.608333311	8.131250027	8.11666673	3.939523803	8.136458332	4.659374999
	10:00 AM	11:00 AM	3.326531873	8.197222129	8.141087955	13.7038462	11.35659722	14.98340841	15.53678451	3.908762875	3.322094288	3.69684342	2.632787352	3.285949611	4.617361072	4.78227612	10.5022436	8.124963926	11.48744019	12.08439227	8.626470579	7.90833332	7.745833397	3.865123453	7.83194446	4.689646443
	11:00 AM	12:00 PM	3.296705434	8.183333319	8.080793662	13.395	11.7516844	14.13521508	14.49521454	3.981428568	3.372974215	3.788013703	2.695894165	3.319024395	4.578030313	4.807420095	9.979012348	8.206951437	10.86239036	11.21429781	8.818333279	8.491666708		4.038157917	8.123333395	4.744841278
Noon	12:00 PM	1:00 PM	3.465287336	7.922222223	8.267982448	14.01029409	11.34819167	14.58391668	14.85038312	4.077280694	3.417250531	3.76814515	2.654891306	3.38473732	4.61527782	4.875135872	10.64121615	8.098249603	10.97378718	11.29583334	8.87812502	8.063095209	8.302777838	3.998484824	8.049999994	4.749107152
	1:00 PM	2:00 PM	3.312331082	7.718750001	8.064261179	13.3154762	11.39050725	14.04257704	14.2885739	4.07230642	3.374166664	3.75696721	2.666443706	3.357043654	4.552222196	4.794771243	9.774242418	8.101511623	10.75135031	11.03390352	9.145312496	8.253571444		4.032222211	8.201041671	4.828703697
	2:00 PM	3:00 PM	3.34901621	7.733333381	8.160032375	13.25555556	11.48435793	13.96575759	14.33553641	4.16015407	3.394990367	3.884027798	2.691311488	3.352499999	4.540909028	4.804441625	10.00798613	8.173333344	10.67750771	10.99872495	8.807812514	7.930952374	8.816666622	3.928921568	8.044444453	4.756666677
	3:00 PM	4:00 PM	3.38907657	8.049999923	8.196349218	13.29166668	11.60963115	14.12178961	14.31013745	4.11369048	3.414747814	3.88209878	2.704875881	3.401022509	4.797916627	4.845374621	10.1153101	8.266517848	10.79488636	11.06258591	9.004166684	8.368181798		4.112037057	8.353787876	4.828947367
	4:00 PM	5:00 PM	3.479649763	8.463888913	8.319141917	13.8182692	12.09992691	14.30088799	14.61807018	4.044636951	3.73043718	3.840740733	2.807946856	3.689487182	4.888690483	4.888084116	10.05065788	8.603620225	10.98554033	11.29463652	10.09999994	8.832291705	21.39999993	4.303819451	8.851041645	5.22529762
	5:00 PM	6:00 PM	3.537175323	7.583333272	8.584036711	14.03518521	11.94449687	14.88370871	15.2171147	4.922941158	3.520199997	4.505864199	2.722072069	3.466777777	4.967361116	5.063766668	10.29774773	8.428553927	11.39565827	11.73819777	9.637962952	9.002083372	19.38333331	4.157894754	8.985416712	5.113888874
	6:00 PM	7:00 PM	3.452185799	7.895833421	8.509873188	13.43750002	11.56066668	14.69965987	14.94570958	4.22900845	3.471283783	3.905185189	2.709707897	3.446666673	4.881060633	5.00030541	10.31756757	8.255936823	11.189903	11.46407721	9.042857116	8.631060608		4.07727274	8.678333385	4.927343752
	7:00 PM	8:00 PM	3.386080592	8.052083328	8.357309944	14.40277762	11.57765958	14.15770834	14.49942129	4.17973251	3.458261499	3.958578442	2.665676569	3.424999993	4.635060663	4.89410714	10.72738098	8.207436708	10.91912066	11.22750583	9.044791621	8.929166682		4.179166672	8.773333356	4.947222195
	8:00 PM	9:00 PM	3.399353453		8.215833337	13.31250003	11.42320515	14.32640265	14.57870371	4.160483873	3.399312736	3.917658731	2.655180175	3.388511334	4.64166666	4.909404761	10.13095238	8.183769064	10.88409586	11.1266432	8.802777808	8.052380934		4.04509803	8.055952343	4.825980377
	9:00 PM	10:00 PM	3.329761905	7.938888911	8.080952391	13.38796299	11.29644811	14.10846561	14.43111111	3.951293089	3.36163005	3.784935897	2.645646763	3.34192441	4.776190458	4.781617641	10.25745617	8.103874279	10.84082278	11.16213152	9.472222198	8.012500126	8.749999981	4.01111111	8.000000026	4.706666635
	10:00 PM	11:00 PM	3.343038541		8.244166673	14.15999997	11.52756411	14.14568454	14.32514881	3.948076921	3.420555562	3.725574697	2.694256762	3.370454552	4.997222219	4.8085737	9.784722235	8.38619403	10.74645215	11.03999808	8.283333264	8.654166707		4.156250004	8.695833399	4.57886115
Midnight	11:00 PM	12:00 AM	3.249761904		8.104924271	12.21666662	11.95789477	14.06410258	14.33364198	3.857716005	3.395348853	3.800520807	2.805442184	3.401893958	4.905555546	4.89197533	10.98333333	8.418640352	11.08192488	11.39804687	8.691666629	8.27777775	12.32500004	4.337499859	8.258333355	4.883333361

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 8-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

			Segment	D69_BB1	D69_D7C	D69_D35	D69_D6D	D69_2BE	BB1_DED	BB1_C45	BB1_EE8	BB1_2A5	BB1_B58	BB1_9A2	BB1_D69	BB1_D7C	BB1_D35	BB1_D6D	BB1_2BE	D7C_DED	D7C_C45	D7C_EE8	D7C_2A5	D7C_B58	D7C_9A2	D7C_D69	D7C_BB1
			Label	Site E to Site C	Site E to Site B	Site E to Site A	Site E to Site Z-1	Site E to Site Z	Site C to Site I	Site C to Site H	Site C to Site G	Site C to Site D	Site C to Site H-1	Site C to Site F	Site C to Site E	Site C to Site B	Site C to Site A	Site C to Site Z-1	Site C to Site Z	Site B to Site I	Site B to Site H	Site B to Site G	Site B to Site D	Site B to Site H-1	Site B to Site F	Site B to Site E	Site B to Site C
			Length (miles)	4.397752133	9.888277741	7.464864488	10.45589989	10.70788233	8.839934425	9.104189489	8.395202059	2.220192926	9.151655359	5.19623856	4.397752133	5.556916911	3.882054877	6.873999299	7.079935154	11.78233466	12.43523739	11.98787924	6.879833845	12.46374762	9.044906903	9.888277741	5.556916911
Time	Begin Time	End Time																									
Midnight	12:00 AM	1:00 AM																									
	1:00 AM	2:00 AM																									
	2:00 AM	3:00 AM																									
	3:00 AM	4:00 AM																									
	4:00 AM	5:00 AM																									
	5:00 AM	6:00 AM																									
	6:00 AM	7:00 AM																									
	7:00 AM	8:00 AM				9.845238123																					
	8:00 AM	9:00 AM				9.525000019																					
	9:00 AM	10:00 AM				9.382916702	12.41309528	12.54722228															8.144444413		10.11666661		
	10:00 AM	11:00 AM		6.04375	11.13333333	9.281349179	12.7054167	13.36078432	8.581089745	8.054347817	8.452027021	2.118365173	8.023437506	4.707666667	6.466666628	5.290151533	3.357462687	6.399023445	6.90542071	14.3027777	13.22692304	13.99062499	7.469642862	13.28269229	10.10723685	11.30833324	5.058823553
	11:00 AM	12:00 PM		5.987797615	11.30119048	9.531111114	11.9793478	12.28690472	8.787169299	8.121078418	8.545480223	2.202531654	8.080434773	4.819121208	6.636666711	5.29527026	3.365211059	6.08484514	6.43102311	13.8716666	13.31388889	13.81999997	7.551344074	13.39635418	10.09852942	11.88888889	5.305894318
Noon	12:00 PM	1:00 PM		6.151470582	11.59375002	9.476515155	12.27559527	12.57797622	8.700490199	8.088547778	8.568262401	2.106885598	8.05181624	4.743538017	6.625000224	5.436111083	3.394459229	6.162607949	6.51204711	13.73166668	13.7838889	14.17055558	7.440650413	13.52741936	10.2081761	12.12498995	5.448666661
	1:00 PM	2:00 PM		6.18416666	10.85625	9.432812487	12.15138888	12.46874997	8.614007116	8.159709484	8.494379852	2.109062497	8.138976379	4.769676803	6.536904773	5.266111095	3.369514236	6.035677086	6.341761375	13.6013889	13.34222225	14.42777781	7.048333336	13.19010416	10.011875	11.84999997	5.064375007
	2:00 PM	3:00 PM		6.225666627	11.89166665	9.512777768	12.03289473	12.29555556	8.8494152	7.982612179	8.514722239	2.099441962	7.985177591	4.718333328	6.737499959	5.140303035	3.356902357	6.000863557	6.304646467	14.52222227	12.96041665	13.5333333	7.353666618	13.26574069	9.982666627	11.16666662	5.184848472
	3:00 PM	4:00 PM		6.064102568	10.9972222	9.72000001	12.29090908	12.45833335	8.751602568	8.014717737	8.592083308	2.104418108	7.979726363	4.709975213	6.63999996	5.268790859	3.414970506	6.069223666	6.357027024	14.29015151	13.86302087	13.9499997	7.535683761	13.63480394	10.20227273		5.344629638
	4:00 PM	5:00 PM		6.188235326	11.07222224	10.11666666	12.43869048	12.83636366	8.649999998	8.087329945	8.556321819	2.105462527	8.032750004	4.730066085	6.744444463	5.19485818	3.43910255	6.142041661	6.454545446	13.9416666	13.62277777	13.8263889	7.555448718	13.73101852	10.20234375	11.51666673	5.441369044
	5:00 PM	6:00 PM		6.629166659	11.81190468	9.61944446	12.7621795	13.0465278	9.818478245	8.685052919	9.552439008	2.213823523	8.63974359	5.036340848	6.957407426	5.360763883	3.581746032	6.401106195	6.726851849		14.20625003	15.28703703	7.366666708	13.82604167	11.33172046	12.60833334	5.387333362
	6:00 PM	7:00 PM		6.380357153	11.63750008	9.800000014	12.44861112	12.74305562	9.117499996	8.450171806	8.722656249	2.172613063	8.424793384	4.932572453	7.220833311	5.330620142	3.530414311	6.283363841	6.578525639	14.74583336	13.29880957	15.67361115	7.560416684	13.36818187	10.26000001	13.32499998	5.341666695
	7:00 PM	8:00 PM		6.250000019	12.0166667	9.952083332	12.61428574	12.75357151	9.031666652	8.242783502	9.003846145	2.154454017	8.198571423	4.859536079	6.829125012	5.599722252	3.468172424	6.154166672	6.473854968	14.30833334	13.90231478	16.0687497	7.449561389	13.90964908	10.53368051	11.93333331	5.445614002
	8:00 PM	9:00 PM		6.3537037		9.592948705	12.51111109	12.847619	9.104734853	8.308235297	8.978571433	2.168476196	8.266131491	4.910134003	6.706249961	5.237000019	3.447691443	6.145774647	6.426441107	15.48750007	14.73194449	15.89999995	7.742129667	14.58988099	11.01354166		5.814236132
	9:00 PM	10:00 PM		6.132499963	10.92499992	9.869444389	12.2689394	12.56136359	8.760515869	8.305372809	8.8745836	2.129075424	8.263065838	4.815090096	7.605555542	5.338333373	3.443357493	6.080395681	6.375976564		15.1261905	13.97500006	8.088888898	14.92083334	11.23703701		6.161458357
	10:00 PM	11:00 PM		6.040277816	11.23888901		12.3541667	12.775	8.34166666	7.990591402	8.612499998	2.118960238	7.986666654	4.749242421	7.175000031	5.229999998	3.380128211	6.030526313	6.341071426	14.78333322	15.41388885	14.98333345	8.46833335	15.04895833	11.42083336		6.518333349
Midnight	11:00 PM	12:00 AM		6.263888888	10.94166666	9.666666538			8.353787845	7.989285739	9.084722176	2.093502841	8.085185187	4.781392695	6.687500104	5.797222238	3.490123445	6.265895053	6.584666651	15.21666661		9.250000119	14.84999992				6.429166747

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 8-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

			Segment	D7C_D35	D7C_D6D	D7C_2BE	D35_DED	D35_C45	D35_EE8	D35_2A5	D35_B58	D35_9A2	D35_D69	D35_BB1	D35_D7C	D35_D6D	D35_2BE	D6D_DED	D6D_C45	D6D_EE8	D6D_2A5	D6D_B58	D6D_9A2	D6D_D69	D6D_BB1	D6D_D7C	D6D_D35
			Label	Site B to Site A	Site B to Site Z-1	Site B to Site Z	Site A to Site I	Site A to Site H	Site A to Site G	Site A to Site D	Site A to Site H-1	Site A to Site F	Site A to Site E	Site A to Site C	Site A to Site B	Site A to Site Z-1	Site A to Site Z	Site Z-1 to Site I	Site Z-1 to Site H	Site Z-1 to Site G	Site Z-1 to Site D	Site Z-1 to Site H-	Site Z-1 to Site F	Site Z-1 to Site E	Site Z-1 to Site C	Site Z-1 to Site B	Site Z-1 to Site A
			Length (miles)	5.245685037	6.168632565	6.158128703	12.69805498	12.98535085	12.27608467	6.100850039	13.03251655	9.078070426	7.464864488	3.882054877	5.245685037	3.046190422	3.27855103	15.59888021	15.94173031	15.25676575	9.090498164	15.98695862	12.04712126	10.45589988	6.873999298	6.168632565	3.046190422
Time		Begin Time	End Time																								
	Midnight	12:00 AM	1:00 AM																								
		1:00 AM	2:00 AM																								
		2:00 AM	3:00 AM																								
		3:00 AM	4:00 AM																								
		4:00 AM	5:00 AM																								
		5:00 AM	6:00 AM																								
		6:00 AM	7:00 AM																								
		7:00 AM	8:00 AM				10.92500009	10.53333328	12.09166663	5.420833343	10.54166665	8.204861116																
		8:00 AM	9:00 AM				12.01395834	11.41796878	12.15771607	5.546882963	11.34044119	8.266721494																
		9:00 AM	10:00 AM				11.87234848	11.54599567	11.79615382	5.505613426	11.45308643	8.070622362	10.09027778		6.466666795	3.064388492	3.48166667	14.66488096	14.03299999	14.90476191	8.076808179	13.89346407	10.86413043	13.03750003		9.508333392	2.576504623
		10:00 AM	11:00 AM	6.700000037	10.45833327	11.02500005	12.41968084	11.77705627	12.25393521	5.792897734	11.71080246	8.432692306	10.12777777	3.385498695	6.511110999	3.349208567	3.924080461	14.575	14.07246836	14.57007575	8.054000007	14.04246034	10.68348304	13.69166672	5.949724529	9.083333351	2.559291197
		11:00 AM	12:00 PM				11.92521368	11.51155913	12.1785714	5.528086422	11.51195286	8.135067439	10.22638894	3.592602992	5.858333241	2.728153168	3.05735295	14.9184026	14.16527778	14.80698925	8.359738388	14.13492063	10.97361112	12.65555562	6.141429927	11.51250008	2.559190484
	Noon	12:00 PM	1:00 PM				12.0654762	11.59831349	11.87672418	5.546764174	11.5731685	8.190720716	10.22489994	3.423808078	7.175000142	2.776836158	3.109878563	14.43553923	14.08545918	15.41553028	8.088835473	14.00318629	10.77582847	12.75000008	5.969230775		2.554211472
		1:00 PM	2:00 PM	6.075000074			12.19182692	11.3013158	12.02234853	5.48072917	11.36754902	8.109824555	9.900000047	3.433467743	6.383333243	2.664173788	2.950225996	14.79912282	14.04905302	14.45388888	8.064897567	14.07356902	10.71951871	12.31944446	5.95636446		2.538163706
		2:00 PM	3:00 PM	6.341666635	11.13750002	11.37500008	12.06421568	11.24120879	12.24555552	5.463567076	11.22227891	8.043930036	10.31666662	3.414560931	6.466666628	2.639187911	2.92093939	14.56911765	13.75927082	17.80438599	7.954238913	13.79316477	10.6048835	12.75833337	5.909061923	8.95000007	2.537457902
		3:00 PM	4:00 PM	6.525000064			11.90047619	11.76666667	12.23333332	5.520156255	11.74760417	8.097119344	9.388888869	3.394875779		2.686089401	2.963333325	14.49706332	13.77795138	15.46190475	7.936359127	13.80031445	10.53366104	11.76111108	5.888115532		2.521305843
		4:00 PM	5:00 PM	6.716666613	9.466666784	9.88333337	13.20133333	12.25573477	13.01574074	5.74170918	12.20945018	8.562478192	10.95833324	3.407852564	6.899999958	2.704672063	3.00066186	14.50427348	14.09851191	14.76521736	8.099610132	14.2958712	10.68146551	12.76250009	5.941047608	9.499999937	2.557766976
		5:00 PM	6:00 PM	6.591666732	10.96666669	11.28333349	12.44357143	12.05353881	12.14659092	5.678571437	11.99122807	8.42467533	10.57738098	3.561830745		2.793812783	3.094938481	15.69683333	14.86435184	16.11166666	8.375345413	14.83377192	11.25666666	13.21904764	6.22270408		2.649069763
		6:00 PM	7:00 PM	6.605555546	9.3833334	9.691666737	12.41714286	11.70343915	12.14404763	5.668764973	11.7084596	8.314444441	11.2000001	3.530650705		2.743643156	3.021945426	15.07072071	14.81632882	14.76599999	8.338444433	14.76709401	11.09224683	14.08333339	6.160067117		2.646898139
		7:00 PM	8:00 PM	7.200000007	9.233333375	8.900000006	12.63119047	11.83142858	12.88041667	5.731494268	11.82283549	8.490053769	10.27916669	3.488150245		2.670944238	2.954203882	15.08089429	14.3501029	14.88277777	8.284222213	14.27813727	10.92521786	13.01875006	6.120675106		2.6265469
		8:00 PM	9:00 PM				12.17553761	11.42401962	13.31736117	5.571056547	11.56633335	8.215748593	10.41666666	3.543368543		2.679033486	2.955000007	15.36373875	14.41760563	16.89374998	8.354891313	14.41493901	11.08208875	12.41666654	6.150326798	11.20833331	2.642250535
		9:00 PM	10:00 PM	6.583333332			12.00128204	11.54089506	12.31730769	5.600862067	11.53549383	8.280681815	11.04166668	3.46779935		2.668952803	2.945726497	14.92230391	14.01303766	15.65388891	8.170486108	14.14270834	10.87855192	13.83333329	6.066304348		2.626908399
		10:00 PM	11:00 PM		9.491666649	9.649999961	11.65320508	11.52623456	12.87196971	5.576149424	11.67446236	8.25228494	10.67500002	3.48621794		2.635385558	2.927136742	14.33782052	14.03479534	14.58425924	8.119836952	14.04870692	10.66649122	13.33333335	6.043248943		2.612547881
	Midnight	11:00 PM	12:00 AM				11.78055547	11.7794872	12.74666663	5.611363653	11.83200003	8.417291672	9.537500069	3.491176451		2.649905301	2.911036045	14.35666661	14.18091399	15.99583336	8.168951604	14.18773148	10.89067163	11.82500007	6.060818696		2.584871794

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 8-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

			Segment	2BD_2BE	2BE_DED	2BE_C45	2BE_EE8	2BE_2A5	2BE_B58	2BE_9A2	2BE_D69	2BE_BB1	2BE_D7C	2BE_D35	2BE_D6D
			Label	Site Z-1 to Site Z	Site Z to Site I	Site Z to Site H	Site Z to Site G	Site Z to Site D	Site Z to Site H-1	Site Z to Site F	Site Z to Site E	Site Z to Site C	Site Z to Site B	Site Z to Site A	Site Z to Site Z-1
			Length (miles)	0.279723233	15.77549156	16.1308518	15.45263357	9.29274368	16.17557533	12.24150405	10.70788233	7.079935154	6.158128703	3.27855103	0.279723233
Time		Begin Time	End Time												
	Midnight	12:00 AM	1:00 AM												
		1:00 AM	2:00 AM												
		2:00 AM	3:00 AM												
		3:00 AM	4:00 AM												
		4:00 AM	5:00 AM												
		5:00 AM	6:00 AM												
		6:00 AM	7:00 AM												
		7:00 AM	8:00 AM												
		8:00 AM	9:00 AM												
		9:00 AM	10:00 AM	0.282624995	14.76625	14.33434343	14.91764705	8.415686282	14.20166668	11.14338488	13.60833328		9.641666673	2.884057966	0.287525876
		10:00 AM	11:00 AM	0.490685097	14.88560608	14.36084143	14.69333331	8.355409365	14.41465281	10.97526277	14.01944451	6.213131319		2.839321611	0.300514403
		11:00 AM	12:00 PM	0.335846867	15.09583334	14.5669003	15.12385621	8.628421908	14.40874999	11.238313	13.00277785	6.425836679	11.83749991	2.857202682	0.289801857
	Noon	12:00 PM	1:00 PM	0.339983971	14.6898148	14.24539298	15.32809521	8.336403518	14.18504729	11.00122037	13.05416677	6.229744495	11.56666679	2.823239435	0.280905778
		1:00 PM	2:00 PM	0.289583339	15.1022109	14.46816039	14.74250001	8.344227641	14.44583335	11.00411565	12.60972222	6.248319038		2.819941641	0.285480582
		2:00 PM	3:00 PM	0.287444147	14.96888889	14.18641666	16.45277781	8.275253806	14.17926666	10.88170731	13.22916666	6.191334804	9.78749997	2.827348479	0.282259886
		3:00 PM	4:00 PM	0.286384681	14.80436508	14.17391599	16.29194443	8.229641456	14.21103448	10.88706418	12.06944447	6.204613106		2.795281587	0.268837088
		4:00 PM	5:00 PM	0.30988092	14.78441359	14.37415903	15.04967946	8.379708337	14.3805303	10.95462963	13.07083326	6.242561621	9.825000018	2.848032904	0.284745301
		5:00 PM	6:00 PM	0.302083329	16.04799383	15.29481793	15.88680553	8.674367554	15.18883102	11.55267053	13.53809526	6.50345608		2.949329098	0.289164007
		6:00 PM	7:00 PM	0.290857844	15.44166666	15.12233009	15.22838541	8.630480078	15.05086956	11.42045106	14.54166675	6.469336575		2.953416668	0.310303619
		7:00 PM	8:00 PM	0.288055558	15.34655796	14.73391088	15.33985508	8.623050673	14.73985506	11.25109074	13.30625004	6.414698493		2.921535575	0.285408688
		8:00 PM	9:00 PM	0.280868051	15.59539008	14.73505748	15.43437501	8.661605328	14.75416666	11.37793882	12.74166662	6.472495896	11.54583341	2.952638897	0.297989767
		9:00 PM	10:00 PM	0.287013893	15.0596591	14.50162602	15.25611114	8.445104901	14.64728465	11.17722223	14.22499996	6.345430113		2.909317126	0.28226495
		10:00 PM	11:00 PM	0.287411344	14.75392158	14.3221847	14.72826084	8.402850874	14.30703464	10.96761517	12.93333326	6.32579023		2.925898691	0.312500004
	Midnight	11:00 PM	12:00 AM	0.282885299	14.62142856	14.33928571	15.38154758	8.490357136	14.35380435	11.14737318	12.2166667	6.380399051		2.883937194	0.293402777

TRAVEL TIME DATA

1 HOUR CORRIDOR STATISTICAL SUMMARIES

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 9-Dec-13
Day of Week: Monday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	DED_C45 Site I to Site H 1.001	DED_EE8 Site I to Site G 1.473	DED_2A5 Site I to Site D 5.666	DED_B58 Site I to Site H-1 0.883	DED_9A2 Site I to Site F 3.722	DED_D69 Site I to Site E 7.499	DED_BB1 Site I to Site C 8.800	DED_D7C Site I to Site B 11.702	DED_D35 Site I to Site A 13.698	DED_D6D Site I to Site Z-1 15.569	DED_2BE Site I to Site Z 16.775	C45_DED Site H to Site I 1.000	C45_EE8 Site H to Site G 0.858	C45_2A5 Site H to Site D 6.001	C45_B58 Site H to Site H-1 0.000	C45_9A2 Site H to Site F 3.909	C45_D69 Site H to Site E 7.326910824	C45_BB1 Site H to Site C 9.104184849	C45_D7C Site H to Site B 11.438427736	C45_D35 Site H to Site A 12.985250601	C45_D6D Site H to Site Z-1 15.041729157	C45_2BE Site H to Site Z 16.3386218	EEB_DED Site G to Site I 1.474189866
	Midnight	12:00 AM	1:00 AM	1.022	1.159	6.443	1.078	3.984		8.730	15.150	11.699	14.522	14.883	1.322	0.844	6.195	0.066	3.389	9.387499918	8.366166548	13.86666656	12.08944444	14.16729258	14.59285714	1.440035415
		1:00 AM	2:00 AM	1.060	1.247	6.649	0.987	3.655	8.403	8.568	15.992	12.664	14.508	14.874	1.406	0.827	6.239	0.055	3.469	10.27499992	8.526312498	13.29444448	12.46425186	14.62760416	15.0139394	1.396874969
		2:00 AM	3:00 AM	1.200	1.187	6.327	1.102	3.969	8.110	9.197	12.057	11.771	14.407	15.065		0.756	5.905	0.096	3.415	7.063856795	8.908333343	17.633333281	13.3310185	14.93641667	15.38287037	1.353378845
		3:00 AM	4:00 AM	1.108	1.125	6.862	1.147	3.775	9.234	8.599	13.750	14.783	14.175	14.883	1.297	0.815	6.691	0.064	3.237	8.355833385	6.151262619	14.46666657	12.43823188	14.04116158	14.1158333	1.520634869
		4:00 AM	5:00 AM	2.952	1.200	23.912	2.139	6.661	23.417	11.661	16.475	27.468	17.271	17.708	1.185	0.829	16.230	0.047	4.021	29.77666678	8.937499997	14.25833343	23.65376488	15.3357572	15.3304722	1.459316458
		5:00 AM	6:00 AM	2.757	1.309	29.323	2.889	7.446	35.942	13.757	16.671	43.469	20.478	20.799	1.367	0.909	30.009	0.139	13.993	28.07499998	22.95233913	34.99375002	25.4589394	25.92388768	25.9388768	1.458998859
		6:00 AM	7:00 AM	2.533	1.339	28.666	2.363	23.081	38.260	38.993	53.501	44.853	46.329	46.402	1.500	0.998	29.553	0.183	23.295	38.25833339	36.53402777	44.02500022	40.13674603	44.30816832	45.37188754	1.518678552
		7:00 AM	8:00 AM	4.063	4.190	26.958	3.668	22.385	32.260	39.679	51.014	35.659	49.417	50.635	1.572	5.151	17.878	0.197	22.621	23.33750001	36.3729584	43.77250389	29.48087798	43.4839998	43.0877787	1.4597222
		8:00 AM	9:00 AM	2.041	3.038	15.464	1.913	19.815	16.689	31.075	38.306	24.519	38.543	39.526	1.350	3.405	10.740	0.053	12.121	11.70833328	23.36554985	31.00460577	19.07924074	29.6102981	30.32958334	1.446005511
		9:00 AM	10:00 AM	1.851	1.208	21.498	1.808	5.348	24.445	20.779	28.883	26.852	27.676	28.056	1.304	0.868	15.838	0.058	5.234	19.80999997	15.48318868	26.74870207	22.0600624	21.98258622	22.53161412	1.492278634
		10:00 AM	11:00 AM	3.275	1.525	11.387	3.224	16.113	15.339	23.676	26.207	19.353	29.526	29.718	1.344	0.909	7.099	0.054	10.590	9.997222144	18.346789	25.33958328	13.49916227	24.78564425	25.21811235	1.493200645
		11:00 AM	12:00 PM	1.812	1.645	7.530	1.733	7.945	10.061	14.414	20.239	13.627	23.146	23.442	1.380	0.876	6.108	0.052	3.953	12.92333334	9.701923089	14.82944442	12.14318182	17.51841887	17.82850001	1.455050483
	Noon	12:00 PM	1:00 PM	1.616	1.499	7.030	1.549	4.731	10.224	10.677	15.692	13.606	16.166	16.505	1.336	0.887	6.044	0.048	3.429	9.9347223	8.522365834	13.35451388	11.72565091	14.56998391	15.10268518	1.46281248
		1:00 PM	2:00 PM	1.677	1.356	7.213	1.427	4.712	10.162	9.756	14.618	12.925	16.027	16.584	1.345	0.850	6.084	0.054	3.450	8.503916692	8.404732569	13.99333335	11.62255747	14.2682973	14.79178583	1.464609715
		2:00 PM	3:00 PM	1.498	1.321	7.116	1.421	4.461	9.531	9.881	14.060	12.783	15.444	15.877	1.319	0.864	5.993	0.048	3.396	8.577777743	8.500333328	13.32651515	11.56719698	14.33215278	14.70454547	1.428253981
		3:00 PM	4:00 PM	1.587	1.299	7.226	1.501	4.422	10.119	9.534	14.715	12.916	15.381	15.926	1.352	0.851	6.090	0.066	3.355	8.749999991	8.466212963	14.12919697	11.70048508	14.14583335	14.53999999	1.449409448
		4:00 PM	5:00 PM	1.586	1.293	7.490	1.501	4.506	9.897	9.625	14.328	13.181	15.961	16.957	1.373	0.882	6.305	0.062	3.440	9.061111103	8.322474787	13.39388889	12.07491666	14.47874802	14.9078642	1.598318714
		5:00 PM	6:00 PM	1.788	1.313	8.901	1.704	4.581	9.225	10.087	15.975	12.485	16.189	16.723	1.445	0.898	6.167	0.069	3.596	9.591666693	8.629062449	13.48596493	11.82499999	15.35582354	15.7783592	1.672271395
		6:00 PM	7:00 PM	1.332	1.252	6.887	1.248	4.211	9.661	9.516	14.486	12.045	15.502	15.922	7.350	0.887	6.128	0.074	3.464		8.587479661	13.32129201	11.89701979	14.52546308	14.98509614	7.642119569
		7:00 PM	8:00 PM	1.239	1.228	6.683	1.176	4.132	9.033	9.300	13.584	12.382	14.580	14.970	2.785	0.868	6.073	0.068	3.459	9.033333287	8.733333343	13.21666669	11.78935471	14.57953518	14.80388906	2.038606735
		8:00 PM	9:00 PM	1.153	1.264	6.743	1.095	4.071	9.831	9.148	15.108	12.550	15.153	15.992	1.338	0.899	6.226	0.065	3.391	8.605555482	8.772499999	12.64722224	12.15130719	14.65015722	15.14735732	1.430905583
		9:00 PM	10:00 PM	1.107	1.245	6.630	1.064	4.072	9.375	8.833	14.262	12.690	15.390	15.435	1.309	0.876	6.269	0.069	3.454	8.633333346	8.631666233	12.77222218	12.20525786	14.57509433	14.9725748	1.394053449
		10:00 PM	11:00 PM	1.137	1.253	6.873	1.081	4.040	10.137	9.381		12.633	15.530	15.656	1.311	0.819	6.369	0.066	3.495		8.086383844		12.51304352	15.02939938	15.64185697	1.377000014
	Midnight	11:00 PM	12:00 AM	1.082	1.327	6.472	1.089	4.056		8.765	14.400	11.748	15.015	15.608	1.223	0.780	6.180	0.064	3.586		8.911979229	14.37500015	12.19642857	15.20162299	15.69656097	1.411666654

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 9-Dec-13
Day of Week: Monday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Length (miles)	EE8_C45 Site G to Site H 9.958138554	EE8_2A5 Site G to Site D 6.115328697	EE8_DS8 Site G to Site H-1 5.617948109	EE8_SA2 Site G to Site F 3.132662737	EE8_D69 Site G to Site E 6.45323066	EE8_BB1 Site G to Site C 9.229382098	EE8_D7C Site G to Site B 11.95787804	EE8_D35 Site G to Site A 12.27808483	EE8_D4D Site G to Site Z-1 15.29019172	EE8_2BE Site G to Site Z 15.45263257	2AS_DED Site D to Site I 6.665246917	2AS_C45 Site D to Site H 6.691202711	2AS_EE8 Site D to Site G 6.179138304	2AS_DS8 Site D to Site H-1 6.529188539	2AS_9A2 Site D to Site F 2.982726284	2AS_D69 Site D to Site E 3.179198254	2AS_BB1 Site D to Site C 2.291912291	2AS_D7C Site D to Site B 5.873813849	2AS_D35 Site D to Site A 6.109590039	2AS_D6D Site D to Site Z-1 8.096489164	2AS_2BE Site D to Site Z 8.239714989	BS8_DED Site H-1 to Site I 9.98254649	BS8_C45 Site H-1 to Site H 8.958218896
Midnight	12:00 AM	1:00 AM	1.396666668	6.880000049	5.311111096	3.906166715		9.277083348	13.37500021	13.37638895	16.30015758	17.11388885		6.436666645	6.469444439	6.538333375	2.956578933		2.197712423	7.462708348	5.742166668	8.220202998	8.533712139	1.972500005	0.972337973
1:00 AM	2:00 AM	1.39999995	6.80350878	1.366666643	3.771999751		9.365000085	12.78076221	16.73750002	17.11166669	6.354999778	6.773484439	6.970228955	6.775757537	2.895277742		2.252113897	7.933333398	5.874853799	8.522101463	8.930158724	1.41000003	0.695659769
2:00 AM	3:00 AM	1.435110153	6.369452284	1.45833328	3.946531276		9.333333255	12.15944447	16.0540909	16.50000005	7.203333222	6.809059095	6.255952383	6.77895455	2.88705148	4.356333331	2.30111111	8.181250007	5.50599751	8.605890799	8.976166662		0.289948117
3:00 AM	4:00 AM	1.533333343	7.354246019	1.483333446	3.730128218	29.11666655	8.795833387	12.97557473	14.77142858	15.30111111	7.268055557	6.309848489	6.696111124	6.257261906	2.856452594	4.241666626	2.147967484	7.948911081	5.982799151	8.069229163	8.437049552	1.255555581	0.207067609
4:00 AM	5:00 AM	1.609375059	15.51354417	1.656000019	4.676666647		9.423541229	17.42916653	22.5344898	25.69004762	25.97353985	8.763833274	8.244499988	8.613095227	6.225452944	6.382884488	5.293333267	2.339070165	7.753666141	8.579854553	8.827202013	8.838691557	1.260000035	0.07538622
5:00 AM	6:00 AM	1.520857489	29.59836392	1.552272997	11.35433548	9.733333346	24.97245644	28.91979169	37.69354762	41.25952135	41.85740139	20.90766132	6.910494575	6.910494575	6.63412998	6.63412998	5.268433971	4.456909983	10.74826578	11.52439643	11.43882663	1.539357312	0.131924353
6:00 AM	7:00 AM	1.590952387	29.73018013	1.551282079	23.76492751	34.65833346	38.24999998	44.38712123	41.69375003	40.50588236	41.47741189	7.227976209	6.159053418	5.979564509	6.036073754	7.813909835	4.782692399	3.675215088	9.567614993	6.422280765	10.87219999	11.21135348	1.518137354	0.094529772
7:00 AM	8:00 AM	1.64346848	18.01131788	1.596629985	23.68914727		35.58028454	45.4291667	47.37361112	46.19916536	45.88766667	7.16787633	6.196541456	6.72941179	6.146764714	2.831499408	5.119607833	3.154729883	8.152600641	7.0208585	9.398158727	8.835640613	1.653472318	0.088544669
8:00 AM	9:00 AM	1.628240713	11.36260141	1.565170936	12.59955356	20.64999999	22.6622807	31.07361112	29.22900002	32.3888785	34.0611111	7.366472857	6.398421043	7.052282699	6.368333335	2.945753199	5.16296301	3.831151727	9.575139461	8.444333355	9.906376391	10.36379002	1.401126134	0.074307272
9:00 AM	10:00 AM	1.605148714	10.80549999	1.532980687	4.845117155	15.58166675	17.0296353	27.85037501	22.88357142	23.18333334	23.85361945	7.797659999	6.794570711	7.344666673	6.777087646	3.148527778	5.353333281	5.008996482	10.7453453	8.33511763	11.15088219	11.46700538	1.549285714	0.070967736
10:00 AM	11:00 AM	1.610416667	7.142176697	1.574039077	10.05		18.58011906	25.36388889	14.97966455	25.62083332	25.67095556	7.747337956	6.568209881	7.30347224	6.542307684	3.070242781	5.284523812	2.532119741	8.492534698	5.811745794	9.360009948	9.66838329	1.389316272	0.070757931
11:00 AM	12:00 PM	1.638173202	6.379165644	1.634791663	4.130034735	10.90000005	10.5450174	16.37619067	11.91336577	13.07053996	19.32905329	7.810342409	6.648613871	7.853953539	6.826118543	3.197892788	5.276041673	2.28757811	7.592835632	5.654115852	8.853985978	9.318825617	1.392493987	0.070549148
Noon	12:00 PM	1:00 PM	1.627255252	6.569295468	1.602439201	3.841423458	21.79166682	8.84775639	16.18240741	12.26305224	16.12583718	19.88187934	7.90337907	6.724200048	7.598931092	6.670924573	2.985454488	5.136538455	2.238919082	7.658333218	5.670173744	8.347039878	8.713314292	1.393623182	0.068287036
1:00 PM	2:00 PM	1.643217057	6.466927787	1.587589843	3.782767369	25.04166679	8.84677923	13.4547619	12.3449653	15.14541666	18.86969697	11.71542269	10.07180556	11.1583068	10.0485963	5.444829678	5.592848669	2.240909532	7.6006507	5.644166666	8.340866973	8.884824562	1.36510417	0.071111115
2:00 PM	3:00 PM	1.636458355	6.509503154	1.739922478	3.722830416		9.008771937	14.53365148	12.41350576	14.97733335	15.31085274	18.52616958	17.67719298	17.57499998	17.63274572	9.708550237	8.609166674	2.277145222	7.673749994	5.585824111	8.289574189	8.549461212	1.36402778	0.071036653
3:00 PM	4:00 PM	1.37916665	6.638580249	1.149545455	3.924842774	10.19166671	8.882407404	13.74166664	12.44843753	15.13910755	15.38923188	19.64454762	19.9920738	18.30741148	20.2648599	9.327180238	8.261979165	2.265612153	7.481497198	5.646752452	8.244942744	8.563405798	1.33497923	0.068080113
4:00 PM	5:00 PM	1.702389373	6.612326391	1.604859998	3.876111118		9.078851858	13.76481483	12.41602553	15.27580645	15.73275862	20.39104939	21.58095992	20.40106958	21.62037791	9.53800217	9.648809492	2.23402082	7.370386894	5.788320206	8.468745587	8.887696715	1.452251718	0.067898685
5:00 PM	6:00 PM	1.451754419	6.528828899	4.308888905	3.853378361		8.940151503	13.79953775	12.65317994	15.95930001	16.5367983	23.64268534	24.023359	16.99729727	13.58777324	6.704506837	9.765585578	2.284929979	7.460530197	5.685990989	8.830309159	9.347999118	1.452393162	0.069240369
6:00 PM	7:00 PM	2.368939411	6.38983333	2.429814827	3.786324864		9.120312537	14.33717951	12.40169393	15.27558733	15.72107846	18.52599507	16.2087413	17.75872087	16.4725877	10.11757955	7.329901992	2.248674288	7.352213537	5.619387755	8.378342351	8.709532376	1.149561363	0.070569967
7:00 PM	8:00 PM	1.598111203	8.352777782	1.532083142	3.663451905	9.341666782	8.930555579	13.35333327	12.71281903	15.0179167	15.29210529	7.929359449	7.313668852	7.717892433	7.112938514	3.343959234	5.006666634	2.268852462	7.137777785	5.585483503	8.329249498	8.666388898	2.707539699	0.971859209
8:00 PM	9:00 PM	1.546825421	6.516666645	1.48733338	3.774224427	8.833333369	8.359791678	13.1458339	12.56372552	15.5496444	15.9433335	6.947979805	6.407213938	7.298666658	6.946381568	2.885651226	4.835416675	2.245024874	6.989339948	5.734359354	8.361637803	8.673146151	1.381609193	0.969937437
9:00 PM	10:00 PM	1.508547614	6.621428578	1.47239582	3.756749223		8.824999977	13.56666667	12.55303333	15.24928784	15.55131577	6.913346154	6.448304308	6.9944446	6.391198535	2.940434273	4.648333307	2.280451974	7.240151517	5.780902275	8.371183214	8.652278878	1.338541678	0.075172899
10:00 PM	11:00 PM	1.538538445	6.442292828	1.481111079	3.810997475		9.08583332		12.07023608	15.82416668	16.04305557	6.866518518	6.470476198	6.882851357	6.424780755	2.878566209	5.554168716	2.330218575	7.360333255	5.7497175	8.501041898	8.83166667	1.337254918	0.071316759
Midnight	11:00 PM	12:00 AM	1.541666687	7.129166639	1.464814829	3.742857107		8.94500009	15.71249984	12.88333338	14.275	14.61979164	6.679487147	6.652083339	7.067282954	6.597747718	3.081525809		2.313571424	7.814999989	5.645261427	8.438836355	8.975347218	1.258333339	0.985825648

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 9-Dec-13
Day of Week: Monday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	BS8_EE8	BS8_2A5	BS8_9A2	BS8_D69	BS8_BB1	BS8_D7C	BS8_D35	BS8_D6D	BS8_28E	9A2_DED	8A2_C45	9A2_EE8	9A2_2A5	9A2_BS8	9A2_D49	9A2_BB1	9A2_D7C	9A2_D35	9A2_D6D	9A2_2BE	D69_DED	D69_C45	D69_EE8
			Length (miles)	9.917481019	6.009486204	3.656647186	7.398098849	9.191659300	14.49374762	15.60514454	15.88859953	16.17561232	3.724509261	3.908743328	3.824967327	2.992726284	3.495847166	4.298227504	5.195218854	9.944990951	8.829018408	15.64742126	12.14156404	5.479634650	7.328018252	6.45333365
Midnight	12:00 AM	1:00 AM		0.870833333	6.232529871	3.480681856		8.596499125	13.97916662	12.15833333	14.58134924	14.97783159	3.827083334	3.926416643	3.824999935	2.733143939	3.414982954		5.064166676	10.2354387	8.626601858	10.9881783	11.31666668	6.549999997	7.716666953	
1:00 AM	2:00 AM			0.800001923	6.322619573	3.477192988	8.858333314	8.627777796	12.38333338	12.49912283	14.79166668	15.12243587	3.934722254	3.653888907	3.587499945	2.798333336	3.475000027	4.950833275	5.640666682	10.16944449	8.824113468	11.37595238	11.75241934	9.100000096	9.750000089	
2:00 AM	3:00 AM			0.825000012	5.999047594	3.499111131	7.197222215	9.051470596	17.69166691	11.35530361	15.12482457	15.41853855	4.025000024	3.568141016	3.970833337	2.661730629	3.566666635	4.297619991	5.179432623	10.94999999	8.150681119	11.42580753	11.72999233	8.699999955		
3:00 AM	4:00 AM			0.839000773	6.734051723	3.297674438	8.452500038	8.135784308	14.48333332	12.57122749	13.75139445	13.96172839	3.968969926	3.424305541	3.547277222	2.847559919	3.413993478	4.669761921	4.625114158	10.41333324	8.757350952	10.67089743	11.05507811	8.99583335	7.947916854	
4:00 AM	5:00 AM			0.825000355	18.23030656	4.035497234	21.48611115	9.030636863	14.06041672	23.0928951	15.14369598	15.46706636	4.136231883	3.422177403	3.725327444	5.047623412	3.388095812	6.32139633	5.191433927	12.42777791	13.47139299	11.4052381	11.73346283	9.863636288	9.977777859	
5:00 AM	6:00 AM			0.913999265	7.012540388	3.936912736	37.13749998	9.031336509	29.48307436	41.37003953	25.05453002	25.05036803	4.057139966	3.422478133	3.675437666	5.043481832	3.337075299	8.126100484	5.935532665	13.38137998	15.34250766	16.09243438	15.80934486	12.04571429		
6:00 AM	7:00 AM			1.028785725	29.47415987	23.05603172	37.95555554	38.57478632	42.99579488	38.48533952	43.85159933	45.13458333	4.077272713	3.41546613	3.930253026	5.656218144	3.375213533	7.449826264	11.08346828	17.76461588	22.20137998	18.78399755	19.17925297	15.3333333	12.27083333	
7:00 AM	8:00 AM			4.699116167	17.89172008	22.61564467	23.33666662	35.41319448	42.67546018	26.10393333	43.01464965	42.38516739	4.33410873	3.42043011	4.38125002	5.095259688	3.389523821	8.357692276	8.827516457	14.7796353	11.9074564	15.19664902	15.59458868	14.19516667	13.21904757	15.45333351
8:00 AM	9:00 AM			3.280227302	10.8245478	12.16060146	11.44166662	23.39441581	31.20882252	19.12578947	29.10715277	30.27679538	4.360543476	3.515468039	3.964714306	5.309071421	3.483892263	5.763003307	6.785000007	14.68172349	13.24567183	14.79480027	15.30035544	10.59000001	9.005303014	14.62499997
9:00 AM	10:00 AM			2.859429659	15.75021356	5.173991048	16.8125	15.61352132	20.44924241	22.02599502	21.85460186	22.42184751	4.450410983	3.723985991	4.004818839	6.238800473	3.680153332	8.230303028	8.841600258	15.22436865	13.03840938	15.65868585	15.96350872	10.13791668	9.576166478	8.916666579
10:00 AM	11:00 AM			0.9229335	7.108395956	10.20920005	9.994444437	18.03788662	25.68111108	13.57967389	24.58900333	25.08899048	4.572718282	3.589478745	4.132575765	2.863217449	3.555015309	5.074479188	8.703396369	15.95670851	8.755845775	16.47533738	16.89065524	10.43492063	8.549999888	
11:00 AM	12:00 PM			0.833375435	6.193333325	3.905075183	8.391666765	9.765877013	14.49409758	12.12903663	17.64805322	17.9358227	4.589788844	3.690709453	4.233953311	2.710361727	3.539123388	5.2553523	5.173335576	10.51774392	8.567531187	11.89773059	12.38549192	8.915000033	9.699714389	
Noon	12:00 PM	1:00 PM		0.88500789	6.086680529	3.439634314	9.997222262	8.570108892	13.3297618	11.79012819	14.66964832	15.07097782	4.548300756	3.801738229	4.256813074	2.749319729	3.768443817	5.264722758	5.010040651	10.14649124	8.413924196	11.17753267	11.54802983	12.15009295	11.75666232	
1:00 PM	2:00 PM			0.827485363	6.146399998	3.518721448	8.58650478	8.452950853	13.75075764	11.71549999	14.43559569	15.00398546	4.910714283	5.445129967	4.443713637	2.718484854	5.446056518	5.32361159	5.007589286	10.22716949	8.421697736	11.11755121	11.50711804	19.53749998	13.34999993	15.49166679
2:00 PM	3:00 PM			0.833510644	6.02788713	3.449483192	8.099999987	8.46782928	13.28770839	11.63930918	14.44988784	14.9585296	6.934086846	8.384796102	6.556147502	2.677160493	8.574430898	4.982738096	5.097784807	10.1809281	8.297424242	11.03202765	11.33240741	24.02361113	23.88166658	
3:00 PM	4:00 PM			0.856372547	6.16503.3219	3.411879761	8.538333898	8.354166655	13.50468747	11.78599765	14.2917475	14.82631834	8.523947369	10.6638211	7.927419342	2.718205958	10.94162801	5.102499994	5.042532469	10.1706.1464	8.387592603	10.9817676	11.25850938	24.47375004	25.85357144	26.09166663
4:00 PM	5:00 PM			0.881770825	6.360911273	3.507782365	9.083333351	8.440151531	13.3291667	12.20577568	14.45018514	14.98162649	9.725661795	12.20239275	9.14194933	2.805568022	12.01677352	5.360416635	4.997555561	10.03310182	8.638888897	11.1489758	11.61729952	27.54889851	28.87023832	
5:00 PM	6:00 PM			0.904989322	6.27975323	3.6599829	9.708333151	8.730230122	13.55868736	11.9568376	15.23178935	15.81988597	10.72011805	7.185113173	10.53222231	2.717252768	7.244836923	5.392749853	5.14975548	10.3035358	8.438825683	11.67631626	12.19051933	29.09000005	21.99444439	
6:00 PM	7:00 PM			0.853545824	6.108064569	3.547735504	8.958333363	8.633943075	13.27502595	11.8566992	14.63220168	14.9413783	16.3093365	6.235486899	9.271401468	2.702727732	8.191186742	5.169445453	5.110024156	10.11885965	8.353166685	11.07217948	11.4125	22.52797618	13.62500003	27.14999992
7:00 PM	8:00 PM			0.88974358	6.176765572	3.501666657	9.025000002	8.74275.3515	13.3552592E	11.83387431	14.57622953	14.87588539	9.835166875	5.682350278	7.373994248	2.681144078	3.639172755	4.989666688	5.138120558	9.94351852	8.349297485	11.08878205	11.48487361	9.473333318	9.251190403	
8:00 PM	9:00 PM			0.881884078	6.290386237	3.475128203	8.299999972	8.91263637	12.8729167E	12.198	14.75673758	15.20491455	4.298415634	3.503937713	4.051333343	2.739737658	3.486309421	4.813898895	5.064583332	9.795277788	8.490942502	11.18283132	11.56644144	8.828787898	8.698333322	
9:00 PM	10:00 PM			0.817435978	6.35124115	3.532391181	8.108333272	8.364906448	12.84166672	12.30049016	14.6336207	15.03456294	4.075451686	3.472198274	3.97950198	2.785235004	3.464011407	4.97777788	5.1175	9.764285678	8.673161287	11.12582944	11.40372341	9.059259286	8.478703955	8.333333395
10:00 PM	11:00 PM			0.771527786	6.423456818	3.512234628		8.113888878	12.56643843	15.23723973	15.7734127	4.057361255	3.515243918	3.875476186	2.814015178	3.467483874	5.954166633	5.253888043	10.3749988	8.540625023	11.45587606	11.78042909	8.20277766	9.050000031	7.233333327
Midnight	11:00 PM	12:00 AM		0.745833328	6.362986367	3.632291652		8.907777833	14.42500009	12.38249986	15.19154719	15.66021746	3.936333324	3.588952483	3.884208519	2.731910588	3.578124975		5.199333276	11.3270338	8.461574083	11.35691492	11.68706147	9.364583328	7.5041667	

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 9-Dec-13
Day of Week: Monday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D69_2A5 Site E to Site D 3.72128214	D69_BS8 Site E to Site H1 7.3980089	D69_9A2 Site E to Site F 4.2802719	D69_BB1 Site E to Site C 4.1827741	D69_D7C Site E to Site B 3.8352773	D69_D35 Site E to Site A 7.4648644	D69_D6D Site E to Site Z-1 10.4609898	D69_28E Site E to Site Z 10.7078912	BB1_DED Site C to Site I 8.2093442	BB1_C45 Site C to Site H 3.1941804	BB1_EE8 Site C to Site G 3.9503209	BB1_2A5 Site C to Site D 2.2101928	BB1_BS8 Site C to Site H1 3.1914553	BB1_9A2 Site C to Site F 5.1952356	BB1_D69 Site C to Site E 4.307724	BB1_D7C Site C to Site B 5.5569419	BB1_D35 Site C to Site A 3.8826427	BB1_D6D Site C to Site Z-1 6.8736929	BB1_28E Site C to Site Z 7.2278214	D7C_DED Site B to Site I 11.7823464	D7C_C45 Site B to Site H 10.4352128	D7C_EE8 Site B to Site G 11.9078704	D7C_2A5 Site B to Site D 6.8788184
Midnight	12:00 AM	1:00 AM			4.304166522	7.633333169	4.872222114	6.708333325		10.73333329	12.38166501	12.64166649	8.39041782E	8.277678582	8.764285697	2.13097828	8.281547625	4.869270843		5.395238096	3.474095588	6.079583332	6.413571433	12.87500007	16.39166641		6.816666741
	1:00 AM	2:00 AM			4.488904732	10.10833348	5.454166756	6.950000002		10.23666995				8.505282028	8.666666653	2.182125212	8.647023856	5.272058845		4.916666653	3.580238979	6.321666654	6.790222554		13.20416854		7.058333166
	2:00 AM	3:00 AM			3.894047621		4.891666573	6.832142855		9.731944438	13.48750006	13.7858333	8.9835536	9.247916671	9.367708336	2.0894448	9.262500039	5.074722117		6.418749969	3.696059937	6.458333328	6.814208731			15.43124999	8.544444479
	3:00 AM	4:00 AM			4.023344828	7.452777753	4.674242445	6.285416888	12.64999995	9.784047637	12.64166666	13.07916672	9.318333283	9.244841273	8.466666657	2.224523894	9.127536221	5.170121982	6.449999998	6.020833282	3.502023196	6.060208529	6.403042336			12.38333398	6.729166629
	4:00 AM	5:00 AM			5.965134734	8.908333333	5.499097655	6.338157935	11.75833326	14.34210193	12.22333227	12.42149659	10.0075579	9.584619377	8.964982527	2.349126788	9.616666668	5.182914331	6.585555552	5.56573684	3.860204955	6.488178402	6.785885403			13.47291655	6.989999952
	5:00 AM	6:00 AM			11.39479527	12.41666666	9.540896156	10.34999731	16.07943555	17.72428888	16.42733422	17.18499975	9.539846163	8.4871435	8.966666679	2.248074689	8.35327998	5.088429759	7.359999987	6.106332689	4.631277831	7.499924113	7.722395233		15.50999996	13.4958333	8.988888977
	6:00 AM	7:00 AM			11.37758818	12.2458333	10.59708334	14.26166663	19.9857143	17.98933333	20.49953354	21.10833333	9.939166334	8.258145362	9.162666701	2.242176869	8.281992338	5.08242424	7.385857463	5.755928568	3.663627448	7.453217958	8.052874994	16.95666864	13.43958336	14.7618183	7.748333347
	7:00 AM	8:00 AM			9.71230887	13.17857138	8.948904243	14.51304825	20.86933336	17.51317835	20.36833334	21.5095.1854	9.429864485	8.28367989	9.272866208	2.218172794	8.295983903	5.068153729	7.071804613	5.74037941	3.541960068	6.513612121	7.680816515	15.32616667	13.5857778	14.9051587	7.569977354
	8:00 AM	9:00 AM			5.472988498	9.138836371	5.583870357	13.82166668	19.57837301	14.43828829	20.23454763	20.8791666B	9.393662783	8.384833317	8.935828206	2.277269774	8.328058107	5.048858211	7.438541637	5.393580722	3.595476189	6.453366648	7.021520608	14.68166668	13.64080461	14.3268639A	7.804835288
	9:00 AM	10:00 AM			4.378134987	8.866674668	5.544367536	10.71457301	17.03159725	12.07878783	17.12803652	17.42301449	9.815068271	8.759163386	8.324494844	2.367854568	8.724927621	5.307956889	7.681593636	5.617802039	3.706138883	6.558055588	6.961823368	15.49478165	14.4350878	14.8713982	7.892892119
	10:00 AM	11:00 AM			4.605555527	8.491750009	5.434677435	7.396287852	14.29881106	10.13252891	15.49901956	16.10128204	10.43449616	9.233834585	10.04247314	2.50803078	9.23922618	5.622715417	7.913541658	5.181666649	3.73840579	6.665130558	7.007281143	16.7619048	16.34593696	15.9149999	9.047348495
	11:00 AM	12:00 PM			4.061393606	9.616666655	5.405095125	7.583235131	13.55444447	9.6138892	13.18499988	13.9489.9133	10.15251904	8.853316379	9.874285703	2.368203783	8.808139413	5.417545572	7.717351884	5.352327923	3.813765385	6.688448538	7.139547433	16.61145833	14.67115378	16.78333356	8.7215583
Noon	12:00 PM	1:00 PM			4.292777765	11.74285713	5.274193556	6.248484834	11.70666664	10.21929028	12.50584864	12.82199974	9.781286543	9.093.210936	9.92073642	2.360923776	9.056330768	5.431549851	7.850000025	5.449999964	3.956753283	6.263602146	6.95617284	16.7454762	14.05488112	15.8833332	8.309722222
	1:00 PM	2:00 PM			4.495398466	13.66833333	10.59799999	6.509317726	11.96041663	10.27321428	12.83953846	13.1738766	10.24519504	8.957506353	9.605253627	2.293837891	8.897268518	5.236014262	7.462272765	5.098702363	3.508907451	6.284615507	6.646495366	16.81392046	15.10458332	15.2097222	8.357539677
	2:00 PM	3:00 PM			4.366409251	23.41499997	15.22750001	6.818518527	12.03611109	10.04210527	12.91666668	13.28899399	14.66885985	12.68761315	13.51631845	2.371659448	12.51121032	7.907472817	8.145454514	5.573333345	3.545682727	6.262650549	6.588999836	21.31136365	17.502193	20.77647059	8.237442933
	3:00 PM	4:00 PM			5.125694452	25.79285722	14.94692983	6.669323316	11.70555549	10.41885965	12.7764.7058	13.1197985	22.4046515	21.1451853	22.4175925B	4.549186312	21.54539998	13.9188899	13.14947938	5.544686964	3.527426568	6.3928527.48	6.8019969.4	29.73115385	27.17534728	27.08703699	11.47043684
	4:00 PM	5:00 PM			8.209277757	28.6940478	18.06632292	7.447727282	12.0472222	13.43833335	13.1387355	13.52083333	25.54583334	24.9527127	24.3802383	5.469063897	25.28210383	14.70857872	14.16333331	5.568157907	3.553216383	6.352575749	6.831635799	33.71249998	34.34077381	33.3137254	18.50238094
	5:00 PM	6:00 PM			5.86438571	22.04722222	14.47791481	10.80833331	15.37439549	12.9537777	15.77187503	16.11454333	25.98416667	26.92449975	25.55129636	5.680999773	26.81398027	14.9846016	15.51666664	5.792347229	3.649685514	6.630600772	7.190548927	38.11250009	41.69229199	39.29702778	21.33803065
	6:00 PM	7:00 PM			4.194230728	13.56666676	9.814705887	8.155769237	13.55937503	9.328124988	15.5491967	16.6238.9952	29.81850972	28.4673.286	29.17289512	4.249258872	28.44826667	11.04953569	15.03424545	5.25681816	3.851005738	6.513358011	6.828656859	54.85999998	35.70992062	40.80833334	19.03145539
	7:00 PM	8:00 PM			4.054186537	9.133333331	5.22276543	6.127083292	11.85833339	10.33166652	11.85595241	12.1722222	24.09972978	20.88154783	23.07814813	4.682438564	20.44666468	14.82773767	12.25416667	5.078328283	3.570502228	6.353333343	6.756782853	29.17777773	29.1093.75	34.5809524	10.27985108
	8:00 PM	9:00 PM			3.978569655	8.611904774	4.992666997	6.387500027	10.2583352	9.974999998	13.3585935	14.24444441	10.54139048	9.96291079	10.10931074	2.333447488	9.956275717	5.780812749	7.483333319	4.972916662	3.53306121	6.413475159	6.779651149	15.27738893	18.79529631	18.0333331	8.353841659
	9:00 PM	10:00 PM			4.222106644	8.53452381	4.986403255	5.702777767	11.47500004	10.11666662	12.7041666	13.0333332B	9.252053298	8.74021214	9.661987156	2.271923878	8.723502153	5.280067113	7.082499998	5.149666648	3.627941188	6.281263687	6.705490393	14.54583333	14.2214286	17.53681477	8.319057539
	10:00 PM	11:00 PM			4.470833391	8.98333338	4.66979163	6.983333343		11.15000005	11.71666673	11.99583331	9.155392158	8.751969783	9.29750003	2.276179945	8.664397645	5.250188007	6.703333359	6.199999999	3.721833323	6.557993318	6.949259255		14.66333329	17.19166663	8.360333289
Midnight	11:00 PM	12:00 AM				7.358333409	4.786805563	6.919444454			14.29500025	14.6700009B	9.301923082	8.68010757	9.564285733	2.302866488	8.598099097	5.074102555	6.850000017	5.27083344	3.602525445	6.446551731	6.809821428	14.04166667		15.27499998	7.944444281

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 9-Dec-13
Day of Week: Monday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	D7C_BS8	D7C_9A2	D7C_D69	D7C_BB1	D7C_D35	D7C_D6D	D7C_2BE	D3S_DED	D3S_C45	D3S_EE8	D3S_2A5	D3S_BS8	D3S_9A2	D3S_D69	D3S_BB1	D3S_D7C	D3S_D6D	D3S_2BE	D6D_DED	D6D_C45	D6D_EE8	D6D_2A5	D6D_BS8
			Site B to Site H-1	Site B to Site F	Site B to Site E	Site B to Site C	Site B to Site A	Site B to Site Z-1	Site B to Site Z	Site A to Site I	Site A to Site H	Site A to Site G	Site A to Site D	Site A to Site H-1	Site A to Site F	Site A to Site E	Site A to Site C	Site A to Site B	Site A to Site Z-1	Site A to Site Z	Site Z-1 to Site I	Site Z-1 to Site H	Site Z-1 to Site G	Site Z-1 to Site D	Site Z-1 to Site H-1
			12.4624762	8.564999604	9.689377749	5.106918011	3.245899707	8.168825499	6.198128707	12.69862498	19.8853496	12.27409457	6.109810938	13.9329456	9.078125498	7.456961488	8.38265467	5.245685827	3.065169242	3.278531109	15.58888211	15.84172691	15.29675819	9.996189164	15.39916582
Midnight	12:00 AM	1:00 AM	14.85416665	10.66944452		5.391666675				18.27499995	12.72178483	12.31666664	5.757371795	12.53333337	9.377941174		9.512499998	6.545833284	2.616815884	2.918377594	14.43749998	14.52901294	15.35694438	8.323148815	14.53065476
	1:00 AM	2:00 AM	13.2374995	10.03749987		5.104166658				12.17361113	12.96875002	13.88333327	6.185119081	12.83928233	8.863888886		3.691220678		2.718578392	3.086938743	23.40624999	15.1916668	14.68958333	8.30451387	14.67272727
	2:00 AM	3:00 AM		11.47708333		6.127083376				13.34166665	13.24921448	12.43333329	5.971666658	13.13645831	9.156300831		3.782716258		2.795520467	3.095833342	14.94500001	16.32361111	16.7888889	8.8352778	16.39454285
	3:00 AM	4:00 AM		8.566666651		4.804166676				14.22333333	13.31309522	13.34537037	6.293850799	13.18722222	9.301458328	9.716666685	3.717207685		2.62125468	2.992564108	15.63833299	16.11805558	14.80418662	8.762008814	16.07532051
	4:00 AM	5:00 AM		9.361388913	12.08333334	5.395416705				13.38958243	12.18921394	13.8647493	5.983769513	12.16783566	9.816354169	10.04166668	3.941441456		2.793697875	2.979699477	16.96296296	15.36833333	14.78833333	9.229785716	15.84912707
	5:00 AM	6:00 AM	15.19166665	11.37291434	11.93000003	5.519116697	6.333333347			12.76874416	11.96634252	13.12000004	5.810733333	11.90533329	8.69981572	13.7983333	3.857999547	7.046666726	2.825963963	3.135969733	15.42592593	15.22183131	15.56833335	8.99985988	14.98950759
	6:00 AM	7:00 AM	13.30833337	10.21233633	11.98833336	5.335516693	6.859999993	9.993166619	10.47500031	13.19420839	11.94888257	13.12222224	5.875709259	11.99291661	8.685561637	11.20434783	3.633993969	6.449999968	3.556964982	4.149939776	15.21559138	14.62434944	15.54758948	8.77775982	14.81284212
	7:00 AM	8:00 AM	13.57357147	10.3833333	13.14500003	5.301666905	6.737500003	9.99500003	10.375	13.801634	12.1263616	13.7500001	6.024392718	12.0861537	8.69953209	10.7019231	3.64258545	6.830634625	2.99861694	3.438523616	15.88300001	14.61339394	15.69479188	8.606855778	14.66892856
	8:00 AM	9:00 AM	13.58134408	10.27512626	13.37083334	5.307539674	7.300000079	9.537499985	9.956166454	14.1647436	12.77276423	13.382	6.309804283	12.49088226	9.274766588	11.53981479	3.885115618	6.975789036	2.95955417	3.447332227	16.68440252	14.84674479	17.4628923	8.830166993	14.75721384
	9:00 AM	10:00 AM	14.84722222	10.99278834	15.12444443	5.609230782	7.283333382	10.35000035	11.86166671	14.86351353	13.79516706	14.74305556	6.763382979	13.72295238	9.922723133	13.2875001	3.886243386	7.085606106	2.884309854	3.213021861	17.08761905	15.52466216	16.44637936	9.101255445	15.31824329
	10:00 AM	11:00 AM	16.17673809	12.02970987	13.8374999	6.856957249	9.37777795	10.28333355	10.68333309	14.92738096	13.11951477	13.91614584	6.366825405	13.2122549	9.472001761	12.34333304	4.153299499	6.39166652	2.878282703	3.188693132	17.8356481	16.73240742	17.3297619	9.701433701	16.65578079
	11:00 AM	12:00 PM	18.05555555	11.50804589	11.92500019	6.176353308	8.349999983	9.858333338	10.28750003	14.23351443	13.94166592	14.42769886	6.045733115	14.3345119	9.342702949	12.94547921	3.888563379	6.775833237	3.023747845	3.457292598	18.23356037	17.76366668	9.303955555	15.97385411
Noon	12:00 PM	1:00 PM	14.40833336	11.62155173	14.65694444	5.81287872	8.439583283	8.929000038	9.999999927	14.02139394	12.45859692	13.7353174	6.029333027	12.4680272	8.9448948	11.6625001	3.702479525	6.708333225	2.792104102	3.003668258	16.78291665	16.77660984	18.84166666	9.332946092	17.20163046
	1:00 PM	2:00 PM	15.14642856	10.92903207	12.73888892	5.81667816	7.204166653	10.3166667		18.03574074	16.19620686	17.72301353	6.215856573	16.11453499	11.95961575	10.80383334	3.671416665	7.108333334	2.701648992	3.009781075	16.96916464	15.54930553	16.83953647	8.624917072	16.49955184
	2:00 PM	3:00 PM	17.68690476	13.94497354	20.39861111	5.934523854	6.775757598	10.14833331	10.3526038	25.46145833	25.72461439	26.45208332	9.363482798	25.54769318	18.21814574	12.28249741	4.049710985	7.091666758	2.681714284	2.968945348	20.6344552	19.2082351	19.69347619	8.941000804	19.19200422
	3:00 PM	4:00 PM	27.57884416	20.68177967	25.66333333	6.767123656	7.090854131	9.71354166	9.922222316	32.53666605	32.3052174	32.16123188	14.23174322	32.70686408	23.21367523	17.1098187	5.917913304	7.106333251	2.717327232	3.004456125	28.44035866	29.04649533	29.16344498	12.11186369	28.7375354
	4:00 PM	5:00 PM	34.79615385	25.74428852	23.56249994	12.47490941	7.007246387	9.845238123	10.25833355	37.92812499	39.57763192	43.31644144	16.3501707	39.69513978	27.7936745	20.26349995	12.05690475	10.62777772	2.781472983	3.221184372	34.81483741	35.40090366	35.48115842	16.9464873	35.77677469
	5:00 PM	6:00 PM	41.87473121	29.50147959	28.30208138	14.81140952	6.973333328	9.989444433	10.36999984	40.74166668	41.13209221	34.87955557	16.54147958	32.37925171	24.9873234	33.3788328	14.5963857	13.72488998	2.998524594	3.539815958	41.4967351	42.96338895	45.49666668	20.87339018	42.92185742
	6:00 PM	7:00 PM	35.69021738	28.0669753	19.85666668	13.432947	6.879191729	9.210000068	9.452083362	32.45818968	33.38528788	34.42363181	12.35222458	33.63683936	24.57713984	27.5138891	14.71172586	10.9708342	2.7209824	3.05436962	46.53716217	35.36307191	36.7097222	20.8950732	36.60141514
	7:00 PM	8:00 PM	29.86535089	21.40940851		5.638021401	8.924999995	9.355555548	9.541666713	13.92756938	13.83649531	13.75582186	6.335763588	13.83683432	9.610982553	19.63712195	6.327517064		2.655203305	2.953852539	36.3318255	37.77979168	15.46598946	36.72418878
	8:00 PM	9:00 PM	17.34935899	11.84753886	11.79166675	6.241025852	6.908333413	9.45000004	9.541666673	13.08117285	12.65094339	13.5916887	6.009494543	12.60154319	8.973485813	11.69583335	4.038362088	6.666666637	2.665767382	2.985725314	16.7574754	16.52588234	17.52810079	9.197972985	16.49003932
	9:00 PM	10:00 PM	14.20128098	11.18017408		6.162629526		9.591666628	9.95000001	12.92366422	12.3599708	13.05592258	6.000420183	12.2945536	8.827482773	11.20277781	3.784728331		2.692766218	2.984673872	15.62307691	15.56766248	16.24228058	8.78994449	15.53115369
	10:00 PM	11:00 PM	14.62999997	11.24062501	12.25833323	7.243333306				13.07111111	12.9197225	13.33429268	6.133685452	12.78888892	9.059677424	10.22708335	3.750366306	14.1666666	2.734393923	3.096302678	15.6158731	15.37093486	15.81918667	8.799414083	15.22245959
Midnight	11:00 PM	12:00 AM		10.73041407		6.274999911				12.82954544	12.9510752	13.21041659	6.25428244	12.94298875	9.208602164		3.801436657		2.749223664	3.053594782	15.44270832	15.56408047	16.12121213	8.779929564	15.43671875

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 9-Dec-13
Day of Week: Monday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	D6D_9A2	D6D_D69	D6D_BB1	D6D_D7C	D6D_D35	D6D_28E	28E_DED	28E_C45	28E_EE8	28E_2A5	28E_B58	28E_9A2	28E_D69	28E_BB1	28E_D7C	28E_D35	28E_D6D
				Site Z-1 to Site F	Site Z-1 to Site E	Site Z-1 to Site C	Site Z-1 to Site B	Site Z-1 to Site A	Site Z-1 to Site Z	Site Z to Site I	Site Z to Site H	Site Z to Site G	Site Z to Site D	Site Z to Site H-1	Site Z to Site F	Site Z to Site E	Site Z to Site C	Site Z to Site B	Site Z to Site A	Site Z to Site Z-1
			Length (miles)	10.4472128	10.4536959	6.4739529	6.1696329	3.5491956	9.2797223	15.775491	16.126853	15.4583257	9.2842483	16.1728753	12.5410495	10.7078723	7.4299154	6.1912705	3.2788183	9.2797223
Midnight	12:00 AM	1:00 AM		11.13559368		6.111742417		2.644791856	0.317213129	14.39583204	14.53811111	15.72777778	8.648113479	14.75055556	11.37823127		6.466197268		3.05434824	0.355852376
	1:00 AM	2:00 AM		12.15539214		6.368229148		2.723188402	0.314716288	23.74166666	15.45064066	14.59999999	8.663257963	15.3555556	12.67579364		6.70745611		3.126041684	0.342013889
	2:00 AM	3:00 AM		11.47666999		6.516208503		2.851569112	0.309854533	15.06166667	16.57722235	17.14166667	9.25472235	16.58277783	11.85106669		6.872765445		3.225955561	0.382095255
	3:00 AM	4:00 AM		11.83231711	12.28333334	6.505238106		2.752578313	0.272807013	15.99999984	16.24933335	15.21308522	9.08785714	16.244	12.14037041	12.62016665	6.849375002		3.141304301	0.380092588
	4:00 AM	5:00 AM		12.41346153	12.45833348	6.753717085		2.858472303	0.28035333	17.29316184	15.2453125	16.13541666	9.453614134	15.5148553	12.35995385	12.75416748	6.9611441B		3.178788043	0.392465448
	5:00 AM	6:00 AM		11.59942533	13.57666652	6.293756282	9.858333398	2.727600333	0.326824488	15.92743425	15.1435849	15.68036896	8.996119371	15.05337338	11.7853456	13.89666613	6.632407404		3.042583203	0.337435443
	6:00 AM	7:00 AM		11.33168103	14.13416667	6.315364586	9.954166675	2.667981149	0.355747308	15.31261325	14.99402344	16.24833334	8.996429574	14.96236033	11.85028735	14.3856555	6.595433307	9.552777783	3.06613497	0.331873984
	7:00 AM	8:00 AM		11.29266666	14.78402778	6.364306308	9.794166621	2.752422	0.535752534	16.15880302	14.9536613	15.80701753	8.88810105	14.89815479	11.6157466	14.47500001	6.639880163	9.883055588	3.046318773	0.367753869
	8:00 AM	9:00 AM		11.72398649	14.46481472	6.437500008	10.21197918	2.791275638	0.510789655	16.9826388	15.15087717	15.85468746	9.16049197	15.10442386	12.0612984	14.84351847	6.721254214	10.06119047	3.090377158	0.318548523
	9:00 AM	10:00 AM		12.08599526	16.65833342	6.697558817	9.866666735	2.834883726	0.353164453	17.5738878	15.9538889	15.57485279	9.417258378	15.712605	12.31137892	17.15833336	6.902539102	10.02500048	3.148455451	0.324502762
	10:00 AM	11:00 AM		12.96443535	15.57916665	7.108510974	9.333333368	2.894970635	0.328223984	17.9291666	16.90453332	17.71634616	10.0365199	16.7765574	13.17976743	16.99166654	7.338071266	8.499999937	3.209404269	0.317249399
	11:00 AM	12:00 PM		12.47783333	14.87619047	6.863547488		2.946734235	0.435418623	18.1673785	15.94484533	17.02060196	9.547859323	15.91124214	12.5735248	15.77023803	7.123554327		3.173837203	0.333556397
Noon	12:00 PM	1:00 PM		12.47891892	14.125	6.5573B224		2.836454517	0.284302864	17.71122467	16.31751542	18.6934998	9.277136636	16.1136998	12.54662442	14.95000004	6.728172928		3.13396852	0.314199382
	1:00 PM	2:00 PM		11.87458079	13.58	6.510438598	10.57500014	2.770735676	0.298465393	17.2501644	16.03071863	16.96	9.047291884	16.0038461B	12.02197558	13.87166663	6.727569747		3.056217589	0.298696792
	2:00 PM	3:00 PM		14.20295529	14.99855837	6.829807704		2.769358547	0.295244333	20.78969422	19.39950494	20.16111111	9.294384704	19.3668154B	14.59039926	15.39687501	7.142508865		3.055199177	0.298710068
	3:00 PM	4:00 PM		21.06081872	19.90984848	9.565500001		2.756769151	0.303047617	28.76464152	28.7784463	29.80187499	12.4377421	28.61311189	21.31693453	20.28712125	8.999048502		3.050435527	0.309356084
	4:00 PM	5:00 PM		25.93107089	23.0041667	14.77810458	10.58333343	2.838487908	0.427950449	35.29313725	35.51707459	35.47473138	17.3780365	35.85035714	28.57995978	23.34583338	15.10534404	14.09666666	3.126028815	0.299067782
	5:00 PM	6:00 PM		39.70522173	36.68749999	17.9839159		2.860915232	0.508639253	42.3626815	43.53967154	45.45479199	21.90429962	44.02032259	31.74008516	36.55166663	19.66529412	17.99999999	3.15503388	0.295148593
	6:00 PM	7:00 PM		27.9718116	36.7097222	18.7840884		3.344079692	0.298834744	49.09665969	37.82350713	39.46354185	22.0355425	38.3795333	29.75610466	35.752381	20.04394737		3.665321732	0.30345118
	7:00 PM	8:00 PM		27.4297222	22.67121215	11.0964515		2.858575282	0.273333336	36.9712699	36.61127653	39.00998375	15.92433466	38.72449278	27.79201471	23.02727283	11.64054622		3.16417749	0.298044314
	8:00 PM	9:00 PM		12.4230178	14.71875	6.890012249	10.075	2.793669698	0.282369618	17.07188954	17.64831649	18.93194645	9.499846291	16.8995179	12.7727932	15.18125005	7.254500003		3.108333341	0.312600238
	9:00 PM	10:00 PM		11.7265562	14.02466662	6.564438648		2.825965175	0.295238092	16.0317242	15.74836364	16.4447917	9.112387385	15.7274999B	12.09251384	14.40277785	6.876427421		3.122295832	0.3015652
	10:00 PM	11:00 PM		11.77199999	12.78333331	6.517401952		2.769527544	0.296394232	15.86458333	15.44157596	15.94339081	8.952757353	15.33691756	11.9636111	15.08166664	6.778813548		3.084448804	0.303852976
Midnight	11:00 PM	12:00 AM		11.63596485		6.511111108		2.775535077	0.311742407	15.88388887	15.69924244	16.3680556	9.189369257	15.52333334	11.92753158		6.771464638		3.129895828	0.323207893

TRAVEL TIME DATA

1 HOUR CORRIDOR STATISTICAL SUMMARIES

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 10-Dec-13
Day of Week: Tuesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	DED_C45 Site I to Site H 1.001	DED_EE8 Site I to Site G 1.473	DED_2A5 Site I to Site D 5.666	DED_B58 Site I to Site H-1 0.883	DED_9A2 Site I to Site F 3.722	DED_D69 Site I to Site E 7.486	DED_BB1 Site I to Site C 8.900	DED_D7C Site I to Site B 11.792	DED_D35 Site I to Site A 13.698	DED_D6D Site I to Site Z-1 15.969	DED_2BE Site I to Site Z 16.779	C45_DED Site H to Site I 1.001	C45_EE8 Site H to Site G 0.858	C45_2A5 Site H to Site D 6.801	C45_B58 Site H to Site H-1 0.000	C45_9A2 Site H to Site F 3.909	C45_D69 Site H to Site E 7.709999939	C45_BB1 Site H to Site C 9.104418469	C45_D7C Site H to Site B 15.43842739	C45_D35 Site H to Site A 12.98329651	C45_D6D Site H to Site Z-1 15.98172919	C45_2BE Site H to Site Z 16.13986249	EEB_DED Site G to Site I 1.474189854
Midnight	12:00 AM	1:00 AM			0.992	1.256	7.056	0.981	3.987	22.450	8.641		12.860	14.989	14.612	1.321	0.898	6.791	0.060	3.242		8.594999970	14.4833334	13.61904758	15.07699405	15.56888889	1.536904748
	1:00 AM	2:00 AM	0.980	1.408	7.296	1.029	4.051		9.330		13.258	16.363	16.460	1.296	0.875	6.214	0.064	3.802		9.401111137	12.74444444	12.1337963	16.49145494	16.87444447	1.485937497
	2:00 AM	3:00 AM	1.043	1.244	8.549	1.098	4.042	8.083	9.888		12.618	16.188	16.326	1.056	0.872	5.971	0.075	3.469	10.78166664	9.392599939		11.62947153	15.3982281	15.53333333	1.556660577
	3:00 AM	4:00 AM	1.094	1.319	9.906	1.146	3.975	10.058	9.276		14.438	15.079	15.686	1.267	0.763	6.742	0.064	3.462	8.102777748	8.505027469	13.90000044	12.22721775	14.33581092	14.92161458	1.523275859
	4:00 AM	5:00 AM	2.379	1.210	22.155	2.243	7.033	26.775	12.296	20.308	26.909	17.614	17.426	1.311	0.791	17.833	0.092	4.173	29.64444451	9.233375021	16.49047617	22.67482879	14.68664737	15.2385119	1.473018429
	5:00 AM	6:00 AM	1.353	1.235	30.488	2.568	16.593	37.293	34.737	32.889	58.999	29.216	29.595	1.407	0.966	32.429	0.243	14.718	38.62500012	29.31129421	29.49232142	39.99457857	24.00619718	24.3364351	1.507293569
	6:00 AM	7:00 AM	1.387	1.273	31.833	1.354	23.789	32.846	38.993	45.564	38.665	47.577	48.042	1.447	1.008	28.479	0.135	25.593	34.58333334	36.85374388	42.40465868	37.65569161	44.27896536	44.85949999	1.497668449
	7:00 AM	8:00 AM	1.321	1.254	18.804	1.275	25.815	26.609	35.356	47.488	27.727	42.499	43.450	1.330	0.989	14.070	0.098	21.557	17.06166668	33.65498102	40.07868219	21.51462144	42.4722926	42.66343863	1.459357503
	8:00 AM	9:00 AM	1.272	1.289	10.241	1.256	14.079	13.213	24.607	32.279	17.791	32.239	34.710	1.336	0.874	7.699	0.054	8.743	12.35833334	18.16632418	24.19765626	14.9415459	26.06299719	26.7472701	1.473033344
	9:00 AM	10:00 AM	1.388	1.274	10.335	1.267	8.849	12.563	16.617	15.545	16.424	22.126	22.081	1.387	0.886	6.222	0.055	4.130	8.483333334	11.11884852	16.01574673	12.02122454	19.5773224	19.78481816	1.521177386
	10:00 AM	11:00 AM	2.050	1.440	9.351	2.099	7.637	11.950	13.289	18.175	15.008	21.226	21.772	1.342	0.841	6.023	0.053	3.568	9.799999988	9.920305186	13.64676928	11.70354533	16.70313335	17.26401516	1.485662649
	11:00 AM	12:00 PM	1.383	1.281	9.333	1.369	6.198	11.800	12.004	15.546	15.124	18.706	19.421	1.312	0.873	6.042	0.051	3.420	9.524999989	8.838889863	13.62763154	11.70796705	15.09319174	15.67714776	1.464658529
Noon	12:00 PM	1:00 PM	1.726	1.398	10.660	1.696	6.722	13.535	12.616	15.799	16.808	17.775	18.248	1.304	0.876	6.097	0.062	3.468	10.32142858	9.088954758	13.35000005	12.19859272	14.39967806	14.5941672	1.422736814
	1:00 PM	2:00 PM	2.406	1.566	10.698	2.175	8.139	13.863	13.950	19.176	16.524	19.428	19.741	1.353	0.888	6.052	0.055	3.536	10.03750002	9.583552436	13.81875004	11.81111111	14.91565363	15.27352643	1.451250005
	2:00 PM	3:00 PM	2.411	1.559	11.097	2.348	8.183	13.043	13.783	19.169	16.863	19.333	19.883	1.327	0.874	6.083	0.059	3.527	9.453333355	9.35918803	13.27395831	11.69714286	14.4778012	14.80468253	1.438589973
	3:00 PM	4:00 PM	2.550	1.593	11.041	2.417	8.466	13.826	14.133	19.395	16.838	19.444	20.241	1.349	0.896	6.287	0.048	3.506		8.000451739	13.63930991	12.18948637	14.48916668	14.76227599	1.463902546
	4:00 PM	5:00 PM	2.250	1.449	9.253	2.218	8.280	12.812	13.038	18.807	14.685	22.095	22.514	2.929	0.894	6.384	0.055	3.571	11.02708334	8.882183901	13.74708333	12.24317456	17.16201922	18.08591953	1.45953333
	5:00 PM	6:00 PM	1.798	1.341	7.127	1.792	5.588	10.752	12.033	15.778	13.093	20.630	21.850	7.131	0.913	6.076	0.066	3.634	8.680555579	9.954040409	13.88249016	11.98623915	17.65682204	18.35434678	7.075402466
	6:00 PM	7:00 PM	1.383	1.261	6.866	1.383	4.399	9.350	9.899	15.140	12.475	15.904	16.081	3.819	0.898	6.195	0.055	3.474	8.320833379	8.581110392	13.69517541	11.93992536	14.57573368	15.3695818	3.994807668
	7:00 PM	8:00 PM	1.244	1.251	6.565	1.235	4.298	9.642	9.423	14.475	11.997	15.295	15.701	1.365	0.834	6.079	0.050	3.489	9.069583317	8.783892249	13.33954185	12.24193987	14.46349885	14.74614427	1.448214288
	8:00 PM	9:00 PM	1.118	1.264	6.673	1.141	4.305	10.286	8.792	21.538	12.768	14.538	14.811	1.302	0.854	6.208	0.060	3.507	9.195000002	8.711231888	13.55555559	12.26985466	14.84338236	15.43160931	1.420293001
	9:00 PM	10:00 PM	1.190	1.278	6.632	1.171	4.110	8.492	9.034	13.333	13.451	15.716	16.546	1.264	0.856	6.332	0.055	3.493	7.408333384	8.987931009	13.3288333	12.39321764	15.01413733	15.3929478	1.423379509
	10:00 PM	11:00 PM	1.189	1.241	6.318	1.143	4.115	9.650	10.062	17.725	12.228	15.768	16.396	1.319	0.875	6.317	0.095	3.549	7.924999969	8.914583327	14.60833322	12.65989584	14.99449405	15.37481098	1.485937529
Midnight	11:00 PM	12:00 AM	1.182	1.290	6.799	1.180	3.906	9.708	9.020	11.858	12.511	14.674	14.454	1.367	0.857	6.483	0.063	3.610	9.149999991	9.558333378	13.31388887	12.69722225	15.24687499	16.1027775	1.427469117

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 10-Dec-13
Day of Week: Tuesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	EES_C45 Site G to Site H 9.95818854	EES_2A5 Site G to Site D 6.11532609	EES_B58 Site G to Site H-1 5.61784109	EES_9A2 Site G to Site F 3.13266747	EES_D69 Site G to Site E 6.45033906	EES_BB1 Site G to Site C 3.92932039	EES_D7C Site G to Site B 11.9579764	EES_D35 Site G to Site A 12.2780845	EES_D6D Site G to Site Z-1 15.2561675	EES_2BE Site G to Site Z 15.4526357	2A5_DED Site D to Site I 6.66634917	2A5_C45 Site D to Site H 6.85102715	2A5_EE8 Site D to Site G 5.17538104	2A5_B58 Site D to Site H-1 6.52918533	2A5_9A2 Site D to Site F 2.38272585	2A5_D69 Site D to Site E 5.17838284	2A5_BB1 Site D to Site C 2.92019291	2A5_D7C Site D to Site B 6.87383845	2A5_D35 Site D to Site A 6.50859039	2A5_D6D Site D to Site Z-1 8.09548164	2A5_2BE Site D to Site Z 8.29214488	BS8_DED Site H-1 to Site I 9.98254492	BS8_C45 Site H-1 to Site H 8.85818855
Midnight	12:00 AM	1:00 AM			1.585277781	6.946874997	1.446428655	4.068750001		9.824999985		13.8222222	15.72291671	16.00208333	6.577380911	8.833013825	7.598271424	6.970534824	3.128455288	4.933333309	2.2345997	8.650000021	6.261041653	8.498765139	8.73865854	1.381250031	0.079645469
1:00 AM	2:00 AM				1.538888869	6.852380911	1.458533243	4.137500002		9.620833285		13.36458328	16.55634999	16.9152777	7.683333329	6.763194455	6.835371399	6.921874996	3.111851544	5.687499912	2.450694442	7.1805555	5.877645505	8.256462963	9.747916666	1.358333342	0.052777779
2:00 AM	3:00 AM				1.720533387	6.880047611	1.416666594	4.021666625		9.419859645		12.93379181	16.3555553	16.9725	6.797222253	6.867259465	7.436111104	6.952884621	3.178125008		2.346814822	8.175000049	5.784133783	8.686980474	8.997564321		0.056018513
3:00 AM	4:00 AM				1.033333316	7.173379648	1.246833266	3.935000014		9.8166573		12.89655174	15.60049022	16.09166666	7.479861178	6.712666674	6.904411767	6.855128188	3.0802941.36	5.046999934	2.298871749	8.14833338	5.773639412	8.509331808	8.822083348	1.211499756	0.057380599
4:00 AM	5:00 AM				1.533333365	15.73199947	1.475000022	4.655864367	9.583333321	8.544427599	14.13911359	21.28029849	15.51442398	16.3497366	8.83289471	6.406833338	6.898499932	6.39695713	2.940312727	4.59999968	2.978304747	8.010937717	7.209285023	8.401356479	9.743981858	1.298111108	0.05133704
5:00 AM	6:00 AM				1.548199976	24.60228494	1.629654479	12.18628799		18.32633998	24.91458833	31.38937975	23.91393881	24.3946987	20.03135343	6.270433782	6.600250273	6.396899239	2.857986178	5.038333307	3.735727833	10.07966088	6.693731393	10.27769849	10.69592936	1.425000018	0.068999959
6:00 AM	7:00 AM				1.611607121	25.69368038	1.609865469	21.82105285		34.2432098	40.73363819	34.01909723	40.59973234	40.24865986	7.141239319	6.075185189	6.592291698	6.095259881	2.82749979	5.138461534	3.696411609	9.857765183	6.612391309	12.13311387	12.47355529	1.431818199	0.079177779
7:00 AM	8:00 AM				1.641483421	16.26125733	1.554421774	20.09655172	31.45416871	31.24995278	37.87824074	26.90259412	37.89893336	38.10899262	7.1693906473	6.1827844	6.7505681.98	6.187124521	2.880479254	4.839629641	3.29279475?	9.304074891	6.924957411	10.13308838	10.7680847	1.2937037	0.065530725
8:00 AM	9:00 AM				1.639995981	7.940384614	1.613566667	10.96185897	23.20833336	20.87275642	23.08858097	15.68231293	31.89453381	32.16338362	7.109314012	6.1614376	6.715499998	6.19014421	2.893613376	5.181450251	3.71851246	9.210706411	6.579563972	10.55464913	11.04704383	1.34194443	0.062387077
9:00 AM	10:00 AM				1.58229166	6.643983148	1.595416655	4.350252518	13.36666656	12.67716548	18.7851515	12.65442178	20.85333334	21.23729989	7.205483594	6.310659684	6.911533197	6.31454273	2.857936142	5.034995838	3.102589388	8.632500753	5.739364977	10	11.31452598	1.296607955	0.047387599
10:00 AM	11:00 AM				1.591452995	6.471629966	1.595625004	3.899314829	10.76333335	8.259615387	15.05714283	12.19454023	17.44542486	18.1537037	7.278055568	6.295833308	6.927614393	6.329421757	2.92521097	5.387499975	2.349267389	7.928333316	5.702270216	10.59269744	11.00547703	1.335595479	0.051619722
11:00 AM	12:00 PM				1.515441101	6.530975287	1.592543868	3.773931587	10.42499985	8.945296756	13.97142851	11.5287037	15.5978205	16.4826388	7.627827387	6.494834861	7.452878783	6.518242349	2.93617645	4.854761939	2.364705381	7.605260268	5.675353922	9.251972197	9.917533062	1.335535945	0.045597253
Noon	12:00 PM	1:00 PM			1.591452991	6.466277283	1.573604148	3.857407426	8.483333341	9.005009214	13.87250004	12.32229687	18.30811998	16.0967.2946	7.676736588	6.738102188	7.598809547	6.815277777	3.061271054	4.917777792	2.3743.0062	7.625771692	5.765844302	8.391284742	8.648578256	1.392919382	0.049658874
1:00 PM	2:00 PM				1.657777786	6.538518544	1.615034609	3.845512813	8.349999977	9.73681481	13.66666668	12.13095955	21.56256000	24.41346156	12.35312503	10.64764857	11.6280157	10.42248595	5.746339694	5.818897423	2.388161287	7.513053589	5.699635937	8.464466696	8.82233187	1.316435307	0.043556005
2:00 PM	3:00 PM				1.622448968	6.526000001	1.618553456	3.992592614		9.304166668	13.75416666	12.51689816	14.99202834	15.3361.1111	16.57666491	15.02742537	17.45416666	15.01548453	9.478031486	8.314285664	2.34806202	7.399833309	5.730537437	8.49943709	8.669703184	1.298469389	0.049909173
3:00 PM	4:00 PM				1.947979788	6.695833333	1.795634912	3.774459523	8.300000075	9.26666665	13.68333334	12.81337723	15.2596599	15.7275.453	19.25677966	16.78036363	16.29807938	16.83943154	7.707979735	9.243427447	2.329222225	7.481317199	5.758754518	8.454875668	8.800072151	1.34469463	0.049832914
4:00 PM	5:00 PM				1.39737854	6.798936184	1.648317907	3.899374987		9.161904772	13.91416667	12.66031749	18.44805282	18.9983871	25.90646767	20.76340592	20.80544218	21.20151517	9.200916388	13.70347222	2.290482972	7.43148147	5.809879084	10.86317922	11.56251994	2.926833183	0.062529686
5:00 PM	6:00 PM				5.310752897	6.550499999	5.250497522	4.095367403	12.39166676	9.302083253	14.7907.4076	12.73795439	18.79846497	19.49729.009	17.35857843	13.88854321	13.53085107	14.06050724	5.995367987	11.51777778	2.389239142	7.411855451	5.755394344	11.22726717	12.03762605	6.959791702	0.068979656
6:00 PM	7:00 PM				3.600581401	6.508125	3.428921558	3.85402966	17.58333336	9.093859636	14.65735295	12.65969089	15.58402778	15.91805593	9.860835682	8.796189898	9.953921548	8.896106864	4.879864424	6.627380919	2.337580132	7.637499981	5.728846144	8.454939966	8.780954299	3.80975608	0.351025636
7:00 PM	8:00 PM				1.466333333	6.524462369	1.585493516	3.783133691		9.084523793	14.16905554	12.25342593	15.3980392	15.72916667	7.206255003	6.553421857	7.200000007	6.535166857	2.931373448	4.663333353	2.349978302	7.539351887	5.716520858	8.469380998	8.722284179	1.395714304	0.045967269
8:00 PM	9:00 PM				1.558333316	6.270534847	1.538146998	3.789898987		9.10075758	15.76041964	12.25119047	15.11898958	15.34304544	6.668095246	6.40352113	6.817380937	6.414636735	2.90769231	5.050000018	2.346453883	7.216111153	5.818322307	8.379379567	8.688541664	1.295833329	0.050347223
9:00 PM	10:00 PM				1.576888918	6.587685227	1.547826035	3.697154981		8.5416667	13.74166665	13.2666667	14.78731864	15.11541668	12.41897413	6.631.72348	10.86987143	6.599422435	2.838645151	4.708333318	2.33930.4659	7.243452276	5.905525271	8.443545392	8.804545319	1.276250002	0.051029833
10:00 PM	11:00 PM				1.529444464	6.983888872	1.547222277	3.81796297		9.709166676	15.53333332	13.16250001	16.1427778	16.50500004	11.69923078	8.537676995	12.0820556	6.578169013	2.821996135	4.163312081	2.305606548	9.939953702	8.524603147	8.958699625	1.291098481	0.050493833
Midnight	11:00 PM	12:00 AM			1.540476189	6.833333324	1.514285716	3.916923539		9.833291649	14.19166727	12.68148148	15.875	16.4833335	11.32430559	8.596969856	11.90648134	6.662933333	2.958531579	5.449999964	2.484722226	7.354166645	5.988999997	8.539877457	8.931639811	1.315833329	0.052994137

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 10-Dec-13
Day of Week: Tuesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	BS8_EE8 Site H-1 to Site G	BS8_2A5 Site H-1 to Site D	BS8_9A2 Site H-1 to Site F	BS8_D69 Site H-1 to Site E	BS8_BB1 Site H-1 to Site C	BS8_D7C Site H-1 to Site B	BS8_D35 Site H-1 to Site A	BS8_D6D Site H-1 to Site Z-1	BS8_28E Site H-1 to Site Z	9A2_DED Site F to Site I	8A2_C45 Site F to Site H	8A2_EE8 Site F to Site G	9A2_2A5 Site F to Site D	8A2_BS8 Site F to Site H-1	9A2_D69 Site F to Site E	9A2_BB1 Site F to Site C	9A2_D7C Site F to Site B	9A2_D35 Site F to Site A	9A2_D6D Site F to Site Z-1	9A2_28E Site F to Site Z	D69_DED Site E to Site I	D69_C45 Site E to Site H	D69_EE8 Site E to Site G	
					9.9178 mins	6.9394 mins	3.9566 mins	7.3869 mins	8.3316 mins	11.4613 mins	15.8251 mins	15.8895 mins	16.1754 mins	3.7245 mins	3.8067 mins	3.2186 mins	2.9917 mins	3.9568 mins	4.2852 mins	3.1952 mins	9.9416 mins	5.8787 mins	15.5472 mins	12.1419 mins	5.2786 mins	7.2891 mins	6.4933 mins	
Midnight	12:00 AM	1:00 AM		0.858333305	6.839215078	3.607738112		8.663541856	14.56666678	13.38461537	15.35072218	15.68277778	3.949999971	3.870045253	3.944696988	2.609999993	3.684833938	4.391666651	5.059166678		9.314999938	11.27571431	11.63881113	9.091666639	8.726333305		
	1:00 AM	2:00 AM		0.733714283	6.179999963	3.843333308		9.626388894	13.52916663	12.36155249	16.32135417	16.6888889	3.816666618	3.636922829	4.312499966	2.781481467	3.721064823	5.666666776	5.533771786	10.32499986	8.624545388	12.44652777	12.80312468	8.258333393		
	2:00 AM	3:00 AM		0.839444431	6.63109573	3.569999955	10.94999955	9.485416668		11.74081395	15.07966749	15.61166643	4.07152778	3.649864738	3.750757592	2.678761148	3.685539194	4.966666554	5.289208344		8.450102854	11.46340581	11.92887498	9.355555548	7.758333329		
	3:00 AM	4:00 AM		0.723148137	6.713333888	3.452777817	8.130555544	8.948254418	13.92777773	12.17447817	14.32500004	15.03091398	3.987500009	3.615674817	4.176666677	2.771128339	3.555232557	4.784090889	5.077202105	10.8033333	8.463115953	11.20833333	11.52252342	10.02833338	8.899875003		
	4:00 AM	5:00 AM		0.753421368	17.44318753	4.096511624	19.24166674	9.158854775	12.86416666	11.52937403	14.61785714	15.09666747	4.215562503	3.441885974	3.792954423	3.201666903	3.449231723	4.966666645	5.218458823	11.25562774	11.99444633	11.12265588	11.49589933	9.263213347	8.874999974		
	5:00 AM	6:00 AM		0.882407422	12.14579713	7.427666666		19.85312539	28.13896693	39.57884615	43.23953365	43.05133766	4.998512947	3.963389566	3.710145588	3.031379368	3.539772969	5.966111101	8.807386216	15.45406612	13.99145999	14.68617382	15.07406149	14.24847222	14.22666967		
	6:00 AM	7:00 AM		0.849444477	28.03621104	25.79999451		36.45327869	42.61499998	37.21424462	43.80833333	43.91843659	4.098592262	3.943945833	3.763936782	3.385767637	3.339027652	6.694999997	10.7842758	17.49210785	12.16695635	18.14301436	18.56393362	14.38240742	13.32333333		
	7:00 AM	8:00 AM		0.83314814B	13.39668338	21.42137436	15.59166668	33.61411569	46.36747998	21.80866986	42.2772887	42.7857309	4.18856758	3.958858529	3.760277736	4.32720332	3.370833297	5.967424422	8.870643552	14.96059325	11.21962997	15.81872146	16.45886757	12.58583334	11.19642867	30.35	
	8:00 AM	9:00 AM		0.781702126	7.707207842	8.408417933	12.13611114	17.9963037	24.88514566	14.72940001	25.29378119	25.86997245	4.320742133	3.342634414	3.973461537	3.375969526	3.353721163	5.495680247	8.104195008	13.573091	10.01023392	14.82089794	15.35375537	9.46338891	8.518518469		
	9:00 AM	10:00 AM		0.840503882	6.358485249	4.608807298	9.475026925	11.03529923	18.15049516	11.93113084	18.33857727	19.5268138	4.147689773	3.45298554	3.871953639	2.719953869	3.454485618	4.818871748	6.545315929	12.05038974	8.587933328	14.27179725	14.69038512	9.878333308	8.416666666		
	10:00 AM	11:00 AM		0.798569414	6.056988899	3.926804199	8.233333439	8.860858596	13.6021875	11.86286956	16.78121469	17.2889439	4.272604172	3.463013879	3.864015145	2.681099039	3.455132852	5.209844393	5.194097222	10.03505749	8.388962932	13.42776641	13.88716786	9.891025612	9.095433283		
	11:00 AM	12:00 PM		0.838148151	6.098378335	3.43177583	9.495833376	8.725035205	13.597545	11.73795966	15.23809559	15.8423871	4.351375389	3.825496669	3.941007807	2.70722533	3.554479164	5.224404733	5.241995853	10.1585397	8.384405548	13.89182317	12.53838516	9.840104134	8.995666989		
Noon	12:00 PM	1:00 PM		0.826457842	6.12085958	3.459821432	9.289583322	8.970166666	13.67316672	11.94925706	14.31566266	14.71888735	4.625985672	3.780952988	4.334009926	2.683066439	3.822569797	5.088111135	5.206418803	10.0272358	8.439659097	11.08228155	11.3913063	10.3954286	10.08833338	32.50000002	
	1:00 PM	2:00 PM		0.834119458	6.004055618	3.521386939	9.624999983	8.754599903	13.9660938	11.66752356	14.64351165	14.93502169	4.79290123	5.2408389	4.533138038	2.666104499	5.195922927	5.177150287	5.258105454	10.18541864	8.360906588	11.58709814	11.5059739	15.98611112	12.81666663	17.30833325	
	2:00 PM	3:00 PM		0.858833325	6.127148439	3.496881425	9.764583344	8.891111137	13.00990988	11.63899223	14.30514708	14.5791236	6.812878784	6.240204672	6.294627532	2.655288052	6.340954771	5.049537076	5.183446606	10.00925926	8.320512948	11.06813973	11.35423488	23.61888886	23.11666667		
	3:00 PM	4:00 PM		0.799074095	6.337241477	3.527052756		9.074074073	13.60499998	12.1847 4685	14.36169478	14.7071 4481	7.448694764	9.12856607	7.271568527	2.795960447	9.150109855	5.161904765	5.136290313	10.12926829	8.605802808	11.30062366	11.45822344	29.33472224	29.06666667	20.79166673	
	4:00 PM	5:00 PM		0.889570717	6.393924254	3.587582961	9.500000001	8.907758631	13.67807017	12.26100852	17.18122711	18.21030705	11.1701389	11.84722222	8.154519777	2.784762933	12.49720746	5.569169675	5.138095246	10.29534314	8.621844182	13.69881377	14.45634458	35.58750004	30.99888563	23.60833336	
	5:00 PM	6:00 PM		0.84500001	6.079376039	3.61474998	9.016666671	9.027083336	13.93555557	11.98583334	17.69803934	18.47997073	17.58783125	7.873481875	11.84044127	2.657411807	8.098148149	5.079641091	5.181428568	10.2497479	8.429491971	13.97983981	14.79391909	22.01509095	21.75559551		
	6:00 PM	7:00 PM		0.868540377	6.151626012	3.4998074	8.337499968	8.540773198	13.65833333	11.91379369	14.60919049	14.9451623	11.52821129	6.223727432	7.515983893	2.697301134	4.061304013	4.888888894	5.123888896	10.2675984	8.496799988	11.15497837	11.46779765	13.54999998	12.27083335		
	7:00 PM	8:00 PM		0.833568282	6.16018518	3.5162038	8.577499955	8.892939428	13.32222233	12.37816661	14.39790765	14.9875953	5.138333342	3.546983849	4.68701491	2.624118189	3.59958403	5.173916697	5.152821597	10.2368212	8.464389431	11.15948583	11.49286129	10.0470238	8.703125033		
	8:00 PM	9:00 PM		0.795428602	6.229497343	3.565459993	9.002777783	8.758720149	13.24809953	12.44112319	15.03801188	15.53699972	4.19483986	3.438386524	4.09444448	2.637080827	3.452901785	5.351388866	5.117073145	10.28833334	8.543333324	11.11689814	11.50066667	9.421429823	7.990416698		
	9:00 PM	10:00 PM		0.742777722	6.288926234	3.511202188	7.491666765	8.152499981	13.40791672	12.44473161	15.13731243	15.56746533	3.996417814	3.705954753	3.883159418	2.75210424	3.675285762	4.599999988	5.116495469	9.921666663	8.78544477	11.3138575	11.70073757	14.66547918	8.62013889	7.883333322	
	10:00 PM	11:00 PM		0.849490759	6.533109476	3.555141846	7.674999945	8.888888899	13.82500003	12.66230788	14.93262425	15.26128638	9.009770869	3.542750002	8.105701727	2.70049948	3.559719474	5.609166719	5.328750002	11.3281481	8.680028735	11.46309525	11.77294379	15.98333331	8.848333351		
Midnight	11:00 PM	12:00 AM		0.826587266	6.424821633	3.653735519	9.083333351	9.013095249	13.29166668	12.65909531	15.64333334	15.9754166	8.518111143	3.630898868	8.69999998	2.825429728	3.600271752	5.295555549	5.435555555	9.808331298	8.904255334	11.4095288	11.83674477	12.37083327	8.648333299		

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 10-Dec-13
Day of Week: Tuesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D69_2A5 Site E to Site D 3.7378E-04	D69_BS6 Site E to Site H1 7.3980E-04	D69_9A2 Site E to Site F 5.2800E-04	D69_BB1 Site E to Site C 4.1977E-04	D69_D7C Site E to Site B 3.8927E-04	D69_D35 Site E to Site A 7.4648E-04	D69_D6D Site E to Site Z-1 10.4629E-04	D69_2BE Site E to Site Z 10.7278E-04	BB1_DED Site C to Site I 8.8293E-04	BB1_C45 Site C to Site H 9.1941E-04	BB1_EE8 Site C to Site G 9.3952E-04	BB1_2A5 Site C to Site D 2.2401E-04	BB1_BS8 Site C to Site H1 9.1914E-04	BB1_9A2 Site C to Site F 5.1952E-04	BB1_D69 Site C to Site E 4.3977E-04	BB1_D7C Site C to Site B 5.1456E-04	BB1_D35 Site C to Site A 3.8926E-04	BB1_D6D Site C to Site Z-1 6.8736E-04	BB1_2BE Site C to Site Z 7.2278E-04	D7C_DED Site B to Site I 11.7321E-04	D7C_C45 Site B to Site H 16.4352E-04	D7C_EE8 Site B to Site G 11.8673E-04	D7C_2A5 Site B to Site D 6.8758E-04
	Midnight	12:00 AM	1:00 AM	4.1733333281	8.7416666772	5.1555555531			11.0722222281				8.8703703699	9.0083333351	9.2145833086	2.3505787724	8.9927777648	5.3819788158			5.5291666851	8.2725000003	6.5874999993			15.8875000031	19.1166666775	8.6402777823
		1:00 AM	2:00 AM	4.2283333365			4.9805555597	7.09999998		10.0145833381	14.1999999962	14.5125000077	9.1166666299	9.0078947479	9.9083333267	2.3861979924	9.0524509998	5.5874999977	7.1583333998	5.0611109985	3.9327788904	6.9849000011	7.3853333344			16.0416666771	9.2333333291	
		2:00 AM	3:00 AM	4.3322916959	7.858333328	4.8291666789	6.5111666853	13.0966667	10.3250333382	13.2055555962	13.7749999977	10.5083333536	9.2156695554	9.2500000145	2.3729166852	9.3613629031	5.5331140137	8.2083333198	6.3000000931	3.8466666447	6.4988063662	6.7807142951			11.8916666731	13.4333333351	8.8972222213	
		3:00 AM	4:00 AM	4.1299424237	8.6400000008	5.0812499988	6.4930555868	21.4166666918	10.0977777838	13.2738138977	13.5882986469	8.8107143288	9.4372121333	10.172958332	2.3587500414	9.5722222216	5.5714583471		5.8715667703	3.610525293	6.3600925398	6.7433962141			21.9000000007	6.6666666549	
		4:00 AM	5:00 AM	5.1666514658	8.8458333268	5.2541666578	7.2048999953	11.6541666817	12.0364259281	12.5018518543	12.5838888913	9.9233333358	9.1226851385	9.3516416304	2.2754999307	9.0574074067	5.3485972575		6.0459699644	3.5954861762	6.3272392777	6.6232244454	15.5583333377	15.5972222237	14.3164149955	8.3457407144	
		5:00 AM	6:00 AM	11.1666666304	14.2583333369	8.6250000253	10.8991666899	17.9691666912	19.2930555555	19.7219536111	19.8564814	13.6857175926	9.8670512986	2.2216666793	9.4043722238	5.1956875099	6.9333333288	6.8460474925	3.9954861762	7.139351492	7.43250463	16.2006000149	14.3006000031	12.8333333132	8.6849166359	
		6:00 AM	7:00 AM	10.7107638252	12.9416666981	9.9803240556	14.3442666978	20.7180555564	17.6708333328	22.2367592597	21.8433333369	9.3333333327	8.2733333321	8.8678537143	2.1893774086	8.5369953762	4.9854791386	7.3033333368	5.8613827223	3.6889901762	9.3157471255	9.9868053868	15.4375000037	12.9980740741	13.1843055778	7.4961018057	
		7:00 AM	8:00 AM	7.8038759661	11.1861111081	7.643518924	14.3178125	20.1367592712	15.2419791667	21.1897569335	21.1857638931	8.3402777763	8.1553588812	8.7545454443	2.1516313305	8.1097972388	4.9857875941	7.241666658	5.6241452854	3.5879473972	7.1836999772	7.92850989	14.2874999997	12.9980769946	13.537269163	7.3556451574	
		8:00 AM	9:00 AM	4.3181250027	8.6937499972	5.1715625031	11.6483333341	17.3954953511	11.5607638981	19.1111111141	20.0337962131	8.4569904038	8.4056921035	8.2819444318	2.1844999914	8.3859307339	5.0750000002	7.0999999676	5.4815789644	3.6778761202	7.5834607753	8.3268081851	14.0319444448	13.0659867	14.5352394151	7.3907010394	
		9:00 AM	10:00 AM	4.1253623232	8.2708333999	5.1538895128	7.8908730016	13.6571759529	9.7508564448	18.1652968981	18.1740856132	9.5787581176	8.2868955385	8.9039649181	2.1881148338	8.2147619357	5.0852435318	7.5625000032	5.2504629648	3.6722884822	8.1992424638	8.8355057277	14.7719999977	13.4610185	13.7677883215	7.3918079797	
		10:00 AM	11:00 AM	4.1246794951	8.8083333338	5.2426666682	6.4493055853	12.5998791021	9.5458333346	14.7254166653	15.0522721569	9.2990798439	8.5981321853	8.9069869242	2.1674812203	8.5849462237	5.1442029031	7.1321428549	5.3601990938	3.6843711881	8.2288384998	8.5914021224	13.8781666674	14.3107638432	14.5784722223	7.7587837723	
		11:00 AM	12:00 PM	4.1232633997	8.8819444439	5.1781655953	6.4285714615	12.5734999984	10.1315476178	13.4535230853	13.9026041133	9.4798126644	8.4943909233	9.1983333205	2.1380958555	8.4821693137	5.1477213927	8.2305555556	5.5625000043	3.6335205564	7.3228923207	8.1462988653	16.3833333255	14.6643287571	14.0695011143	7.8731666855	
	Noon	12:00 PM	1:00 PM	3.9264407568	9.2037878924	5.2813131331	7.1416666654	12.7625000095	10.4427083319	12.8693055662	13.3295454566	10.0883680635	8.7545833361	9.8988999917	2.1998750091	8.804710114	5.1456149923	6.9542500062	5.5338888914	3.6782951132	6.6384148938	6.9375904833	18.3666666725	14.2166666696	16.4375000037	7.8709401646	
		1:00 PM	2:00 PM	4.0972916852	12.8583333204	9.0666676207	6.3770833116	12.8527778	9.5838888893	13.173954533	13.4927989305	10.1571428395	8.9258172851	9.9220543	2.2024456094	9.0290548853	5.3250417961	6.9333333256	5.1944444893	3.6855514438	6.5694444638	6.9201138445	15.7396527804	15.6875000037	14.6138888883	8.0098406449	
		2:00 PM	3:00 PM	4.6894444408	23.6739583836	15.7546643429	6.1511309472	11.7416666671	10.5333333	12.252381	12.5041666693	14.1237847222	13.1255128	13.4942708464	2.3719791332	13.0150568148	8.0050868224	7.8472222211	5.4169696556	3.7904628973	6.5098039327	6.6963767988	23.2900000003	17.6817460317	28.9736111093	8.4916666645	
		3:00 PM	4:00 PM	7.3926569574	29.0791666959	18.7741666659	6.7749999994	12.4375001	13.0986111	13.8374078	14.1981481481	21.1458125	19.4600000001	21.1364197917	4.9954321	19.4610069777	13.9277151818	12.9357142857	5.2869792164	3.6425724851	6.5088888889	6.9175308043	30.0875121139	25.8429629	29.5018518519	12.7099895	
		4:00 PM	5:00 PM	8.4186111124	31.1440473	18.1213541667	9.6066666562	14.9152777772	14.4234884881	18.0648148	18.4687789203	24.9739351852	22.0369907407	21.5216435248	22.0191203	12.8782688631	14.9595238095	5.1385483312	5.5823809581	3.6457253696	6.5454535866	26.2527777778	34.5088888952	32.2026620833	19.8320833292	
		5:00 PM	6:00 PM	5.6715505364	22.0666666659	11.7340509191	10.5303030303	15.2993055555	11.5159722135	19.6583333359	20.5066481822	31.0971428571	26.7260729167	27.1508802355	5.8784432031	27.0477113877	15.0079591918	18.6284772222	5.2999999985	3.6053636364	8.9648511268	9.8476431515	47.4020833194	42.7989444455	41.5505434109	24.6449275362	
		6:00 PM	7:00 PM	3.970833295	12.4904178324	7.045987658	8.0444444439	14.5027777776	9.9574907349	14.5818518519	15.0129629167	22.3702314852	18.3758993976	17.8564410255	4.5229513977	18.5432098848	10.2538426116	16.1941964952	5.6121352782	3.625	6.4359932238	6.7771135163	42.9666666663	42.1718438907	40.4022727272	27.1183333319	
		7:00 PM	8:00 PM	3.9435185475	8.7625000038	5.0625	6.1616666539	11.5375000005	9.1276166971	12.1703703703	12.4511111142	12.9791666502	11.8755555511	12.7489318	2.7939222308	11.9629966772	7.7143880211	13.0361111125	5.4416967718	3.5956666922	6.4139393494	6.7973230353	30.9599444468	25.2361666858	23.4625289542	11.7539393933	
		8:00 PM	9:00 PM	3.977777772	8.3533333369	4.92787619	6.3750000011	10.8833333331	9.308333334	11.8208333333	11.8416666644	9.3777127394	8.7864 1027	9.3808641931	2.1879393423	8.8410628	5.1810064855	7.0500000038	5.0125000053	3.5935714431	6.3771135838	6.7139953979	15.4619047619	15.3285714431	15.3277777782	7.7150540488	
		9:00 PM	10:00 PM	4.0738095442	8.5208333204	4.6574073364	5.8750000053	10.8083333328	10.33125	11.6500000001	11.9466666644	8.9523809524	8.5840517156	9.0670298932	2.1807859414	8.5801282051	5.1433333342	6.8833333265	5.182142854	3.7035984502	6.4638550808	6.8807272377	13.2444444467	15.6133333336	17.2333333315	8.1746457143	
		10:00 PM	11:00 PM	4.2645833796	8.8543999948	4.8635416666	6.6166666894	11.0805555532	10.5166666454	13.1458333333	13.4354166633	13.6333333331	8.8925925984	13.4266666633	2.1651400981	8.7604430048	5.0325318121	6.9500000229	6.26166666	3.7445739882	6.5257936658	6.9953571739		15.3202380		7.3208333319	
	Midnight	11:00 PM	12:00 AM		8.4750000007	4.8880555572	6.5208333393	11.3458333		13.2333333227	13.6583333218	12.9345238021	8.8251462585	14.5283333439	2.1625000003	8.7348039216	5.0942328036		4.9638888643	3.8153225851	6.6427777729	6.9494041757		14.8333333328		7.6880583267	

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 10-Dec-13
Day of Week: Tuesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label																										
			Length (miles)																										
			12.46174762	8.564899902	9.689277749	5.566184021	3.245666504	8.168182945	6.198182678	12.69862366	19.80534058	12.27409497	4.108816528	13.93214905	9.078125488	7.456954956	8.383254077	5.245849037	3.965149879	15.56188202	15.58188171	15.84172821	15.29675293	9.090188599	15.89916992
Midnight	12:00 AM	1:00 AM	15.15555555	12.02666666		6.181904777				12.60499998	13.20185185	14.3857145	6.541381605	13.67277778	9.649999999		3.695185186	16.98333333	2.699851268	2.966472867	15.57384479	15.79973958	16.27222218	9.074712647	15.75329213
	1:00 AM	2:00 AM	17.36666678	12.17500003		6.699999953				14.92222222	13.33472499	13.34444446	6.504074071	13.55819537	9.501666636	12.36666664	4.04756945		2.989666474	3.398853223	15.03798324	16.24356063	17.38154756	9.313999987	16.3240741
	2:00 AM	3:00 AM	11.80833332	9.064444449		4.841666937				14.13888857	13.19138718	13.3500333	6.340728126	13.45285549	9.531150703	12.51250003	3.9857265		2.785416676	2.091339862	17.17500003	16.47191398	16.18888885	9.462722687	16.5198719
	3:00 AM	4:00 AM		17.19166663						13.77113385	13.52045456	13.61212123	6.104877191	12.85541668	9.260596163		4.031481498		2.681510434	2.989080469	16.6166667	16.26203888	16.99052466	9.391956733	16.42019229
	4:00 AM	5:00 AM	16.03055553	11.13333213		5.630555543				12.46111112	12.34814815	12.3552631	5.916473676	12.31764706	8.856451613		3.883333346	8.666666809	2.670921358	2.982058238	16.71987177	15.76930233	16.58263887	9.113788916	15.56999999
	5:00 AM	6:00 AM	15.17552936	10.93000003	11.3458334	5.808333303	8.12499997			12.68254366	11.24999987	12.8761111	5.777738173	11.89264706	8.65	9.991666519	3.875000149		3.074461149	3.463126083	15.44835444	15.02493303	16.14013334	8.679999918	14.93000003
	6:00 AM	7:00 AM	13.57083335	10.28487503	13.16666668	5.057017572	6.702777799	11.4416668	12.05000002	13.03333333	11.89209546	12.29444125	5.778038868	11.89742546	8.563446333	11.81111109	3.563613249	9.066666719	5.134560669	5.668676472	15.70249997	14.9009772	15.4612256	8.479222927	14.9898
	7:00 AM	8:00 AM	13.03666647	9.859975708	12.89833337	5.06666765	6.321428626			13.2254714?	11.9457175	13.0675516	5.76885744	11.8375	8.603411307	11.12666643	3.952309996	6.972867035	3.427993366	4.966747958	15.6897117	14.3537366	14.9853666	8.380498161	14.3796202
	8:00 AM	9:00 AM	13.10606453	10.20354841	12.03958333	5.133514469	6.727777719	10.74500002	11.94791669	13.42829861	11.93422621	12.51666668	5.803056853	11.85317857	8.680307132	10.81458331	3.640248227	6.782539647	3.637806838	4.215246743	16.40651064	14.56556604	23.91478496	8.570833339	14.50699744
	9:00 AM	10:00 AM	13.58302472	10.33833338	12.83750002	5.215873604	6.599999992	10.14999993	10.46666658	13.03979165	12.12797255	12.8852733	5.855823729	12.21166338	8.751733784	11.8145831	3.86524436	6.506833336	4.184556497	4.700287354	16.9459583	14.53937601	17.79416668	8.603956261	14.48323045
	10:00 AM	11:00 AM	14.18070174	10.66182794		5.85833329	6.545833368	11.43000007	11.62708334	13.16564625	12.01374458	12.9685744	5.890113602	12.036214	8.761081697	11.16666665	3.891666677	6.935555537	4.993267822	5.308473916	16.2009343	14.85115386	15.67237662	8.617592983	14.94846667
	11:00 AM	12:00 PM	14.79225191	10.84583335	12.19583332	5.779259265	6.351111085	10.12500007	10.80000001	13.83304873	12.4798595	13.5310775	5.954549109	12.8125448	8.801833993	11.83958326	3.983150385	7.137550178	3.533043686	5.413622338	15.88231708	14.68552287	15.83074718	8.68657658	14.74874631
Noon	12:00 PM	1:00 PM	14.40999963	10.77457912	12.42500001	5.363425948		8.999833322	9.183333311	13.39183622	12.74699998	12.85075252	5.956854224	12.72829391	8.899958277	11.54791669	3.760081586		2.676175872	2.871415441	16.4893185	15.61315788	16.2859242?	8.662143888	15.54789472
	1:00 PM	2:00 PM	15.70535146	11.20817398	13.64249999	5.509750007	6.660966707	8.725000117		18.01073867	16.85983056	17.32904187	6.065429094	16.65398538	11.76991777	10.5861111	3.712698136	6.295833303	2.724827642	3.023906604	16.2112745	15.64934854	16.77959477	8.594699972	15.42961234
	2:00 PM	3:00 PM	17.48624998	14.35637254	22.04583328	5.973541678	6.528030268			24.6350856	22.98775	25.48666666	9.961297538	22.73088888	17.67956041	11.79537037	3.739573257	6.87777778	2.698021452	3.015460146	20.88074074	19.23948318	19.91448413	8.788313947	19.22377678
	3:00 PM	4:00 PM	25.7397976	21.01349056	28.21399538	7.697421886	6.7912878	9.780952398	10.2819445	30.63292353	28.3761197	30.62805556	13.12793816	28.75996078	20.1476523	16.3183333	5.569497178	6.454166779	2.7639769	3.111933809	26.8443856	25.64423679	28.09583334	11.7985	25.59734511
	4:00 PM	5:00 PM	34.41127451	25.65761905	36.85333343	14.05725491	7.32149122	12.08571428	12.13250001	39.33460388	37.81389547	40.64987499	14.7273148	38.46182796	25.60397038	24.45424999	10.33557832	7.533333208	5.183799193	5.774935153	34.38695851	31.06964285	32.89596774	15.87543183	31.24926538
	5:00 PM	6:00 PM	43.58079735	33.20212419	35.01666667	18.45769999	7.482499992	11.94666668	11.8416667	34.07333334	29.47633647	26.98666029	14.50094903	29.80035355	20.99025978	24.85666621	12.83879629		5.292975794	6.049854111	41.52572464	40.12613369	46.11342357	17.9636559	40.83448455
	6:00 PM	7:00 PM	42.70208333	35.08909091	29.08750003	21.27509957	6.549999844	10.57222218	10.94270858	23.827451	20.5049728	24.57462526	10.05996455	20.87240897	15.63298756	26.58958328	11.79900618		2.717735647	3.018918988	35.05196969	32.5731132	30.90746742	17.2873666	33.22912502
	7:00 PM	8:00 PM	24.30138892	18.43202256	12.31250002	8.059122401	6.825000029	9.183333311		12.93492509	12.62488426	13.68659423	5.882107844	12.56289538	8.881375488	15.25000003	7.385242087		2.699273521	3.063725488	24.58502978	23.45139512	25.7395163	12.9953695?	24.20833339
	8:00 PM	9:00 PM	14.24027776	10.86041665	31.66333339	6.205000008		11.85000003	12.16666672	12.2270115	12.724283	12.65254498	5.850299513	12.75282484	8.741977659	10.43888893	3.711776855		2.668222225	2.979413438	15.58457446	15.30170455	16.37931008	8.575533802	15.2030466
	9:00 PM	10:00 PM	13.60666672	10.81071433		5.775208338	6.458333291			18.04502444	12.66049755	17.14	5.820416658	12.55401666	8.688140446	10.23	3.708929233	6.783333337	2.709405893	3.021271038	14.97500002	15.3623077	15.39263218	8.567776092	15.34821468
	10:00 PM	11:00 PM	14.96481482	10.275		5.481249983		9.29166656	9.529999969	17.56212173	12.68763257	18.99166669	5.917243382	12.72910995	8.946458343	10.86944444	3.712716317		2.744444431	3.067721033	21.52083329	15.46529413	19.96257576	8.426333548	15.32910369
Midnight	11:00 PM	12:00 AM	14.89999998	10.98333327		5.387500031				17.17564128	12.85402298	16.8714286?	6.053142878	12.76739403	8.958677419		3.790965174		2.70865789	3.029234883	20.23525638	15.19275279	22.45625007	8.630208138	15.23935145

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 10-Dec-13
Day of Week: Tuesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D6D_9A2 Site Z-1 to Site F	D6D_D69 Site Z-1 to Site E	D6D_BB1 Site Z-1 to Site C	D6D_D7C Site Z-1 to Site B	D6D_D35 Site Z-1 to Site A	D6D_28E Site Z-1 to Site Z	28E_DED Site Z to Site I	28E_C45 Site Z to Site H	28E_EE8 Site Z to Site G	28E_2A5 Site Z to Site D	28E_B58 Site Z to Site H-1	28E_9A2 Site Z to Site F	28E_D69 Site Z to Site E	28E_BB1 Site Z to Site C	28E_D7C Site Z to Site B	28E_D35 Site Z to Site A	28E_D6D Site Z to Site Z-1
					10.64742185	10.45999999	6.672969196	6.169832962	3.246019649	9.272720232	15.72491047	15.12685137	15.45831257	9.2842438	10.17267512	10.64192495	10.70778722	7.429926154	6.159128707	3.270501837	9.272720232
	Midnight	12:00 AM	1:00 AM		12.08638356		6.727380964		2.873953857	8.299822683	15.56130952	16.12297979	16.64331815	9.271986984	10.67476187	12.13655556		6.954003567			3.171120683	8.314431835
		1:00 AM	2:00 AM		12.47870369	15.14999997	6.942562586		2.9712963	8.306358653	15.3364583	16.47938995	17.91730785	9.616041644	17.0484375	12.8335648	15.5833333	7.312037013			3.333571425	8.346238967
		2:00 AM	3:00 AM		12.55182927	15.62499991	6.999764715		2.949431828	8.327832653	17.21458288	16.69842751	16.55833333	9.733972217	16.76979167	12.7258697	16.0749998	7.251351348			3.303983047	8.36916209
		3:00 AM	4:00 AM		12.53600777		7.041666667		2.972037058	8.313564481	16.60999986	16.5013945	16.6316667	9.681539855	16.64351851	12.73966667		7.397038543			3.297435807	8.348153861
		4:00 AM	5:00 AM		12.2752955		6.784629999		2.889329386	8.229539993	17.12564103	16.2467922	16.4338889	9.322669343	15.92777778	12.47566389		6.977864577	9.78333341		3.192108253	8.329980765
		5:00 AM	6:00 AM		13.49234533	12.39583333	6.496864987		2.980979787	8.39952533	15.52728569	14.1781413	15.4763889	8.955840324	13.32455678	11.48207986	12.67916655	6.67954269			3.024249494	8.326809938
		6:00 AM	7:00 AM		11.42598537	14.65555547	6.274544288	9.887503593	2.643894218	8.607048593	15.87215869	14.89812205	15.61153847	8.711844862	14.85416666	11.53543987	15.0638888	6.460975422	10.6811113	2.926172344	8.291747464
		7:00 AM	8:00 AM		11.22108985	13.88500002	6.217447922	9.935416668	2.67196224	8.610731796	15.96361804	14.52435065	15.2204861	8.6473356	14.53641975	11.4707639	14.3133338	6.445416665	9.9999721	2.941881364	8.306991822
		8:00 AM	9:00 AM		11.44451111	13.37083327	6.483400006	10.12962963	2.715381622	8.574846312	16.32469695	14.91133612	15.9676678	8.756936425	14.7941358	11.57064296	13.74791661	6.63612976	10.31730771	2.970799723	8.303418861
		9:00 AM	10:00 AM		11.45432086	15.3166666	6.381562418	9.479166621	2.735008592	8.521488916	16.4726138	14.8637133	15.3840278	8.84132397	14.81524999	11.52056972	15.0166666	6.648703899	9.9916666	2.951483902	8.312884431
		10:00 AM	11:00 AM		11.5845224	13.87499999	6.455583338	8.704166649	2.729510307	8.514177297	15.96545301	15.29025417	16.1677639	8.856882784	15.21800787	11.68915289	14.2216666	6.743319553	9.9999721	3.026259933	8.295785809
		11:00 AM	12:00 PM		11.50440613	14.79166675	6.51090033	9.681111293	2.810641626	8.549856923	16.1738581	14.9734955	16.5826736	8.979509864	14.91880953	11.80551751	15.1833333	6.796721315	9.9472222306	3.116952338	8.328011803
	Noon	12:00 PM	1:00 PM		11.61195853	14.34999998	6.58899792		2.785522682	8.308275248	17.2783886	15.8932727	16.5230092	8.977561166	15.7276666	11.91292373	14.6312509	6.924067973		3.075813698	8.301004082
		1:00 PM	2:00 PM		11.54235337	13.15937504	6.463693043		2.760233624	8.301176347	16.54855769	15.8247986	16.8797916	8.9255	15.8326563	11.98663199	13.5052	6.787578916	9.7509000	3.065028389	8.291489564
		2:00 PM	3:00 PM		14.49135866	14.70185185	6.534111121	9.3833334	2.761451782	8.319044804	21.20977012	19.31944443	20.3782231	9.049774015	19.30613699	14.75842137	15.0296296	6.833382226	9.7624999836	3.042892897	8.284709188
		3:00 PM	4:00 PM		20.54272106	17.69999997	8.421896251		2.769765618	8.361489276	28.10871212	25.87533903	28.0909722	12.11195801	25.77114898	20.8943142	18.2538194	8.881468456		3.007958288	8.289763488
		4:00 PM	5:00 PM		23.00548339	26.00119048	13.13161667		2.789500585	8.774899733	34.93402778	32.04538369	32.6930703	16.22036455	32.2093029	23.54316592	26.3857143	13.73715447		3.088482672	8.292167573
		5:00 PM	6:00 PM		28.4057075	30.47166669	15.59927535	11.92500003	2.759950277	8.647778283	42.64779972	40.97385839	45.3919899	18.57488171	41.7023123	29.1887499	30.9066669	16.42762763	14.9125	3.039485535	8.298422095
		6:00 PM	7:00 PM		23.22187431	29.33229169	14.53529925	12.24166665	2.801021017	8.308256683	38.16286764	33.72703561	32.4510948	17.88838028	34.19312823	24.76254468	29.7489583	15.8830357	12.64166648	3.116577059	8.308756682
		7:00 PM	8:00 PM		18.86315428	20.84722215	10.74885359		2.749381156	8.300245776	25.77131435	23.85165582	27.2269412	13.22592887	24.21733953	18.64055173	19.7874999	10.75844299	14.4333333	3.064759368	8.301352728
		8:00 PM	9:00 PM		15.59771573	12.99565958	8.447169498		2.730039774	8.292870387	15.97092147	15.69861482	16.5299587	8.88748349	15.77887687	11.88123218	13.7833325	6.722168806		3.044197198	8.298165454
		9:00 PM	10:00 PM		11.40231788	12.71666659	6.409159431	9.513888962	2.714087236	8.315896458	15.31683331	15.54789117	15.6713541	6.892558824	15.46755208	11.6667948	13.1499999	6.714028768	9.6833333365	3.020736256	8.303966559
		10:00 PM	11:00 PM		11.35683762	13.30208331	6.386078429		2.69729344	8.31871795	21.6473958	15.69539682	19.6999998	8.73813681	15.38213333	11.58155231	13.6104166	6.656872841		3.024521851	8.308750064
	Midnight	11:00 PM	12:00 AM		11.48278369		6.516269229		2.792304281	8.299666664	20.56259524	15.51946513	21.8466872	8.910294127	15.53078424	11.80064103		6.772883331		3.112027483	8.296784784

TRAVEL TIME DATA

1 HOUR CORRIDOR STATISTICAL SUMMARIES

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 11-Dec-13
Day of Week: Wednesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	DED_C45 Site I to Site H 1.201	DED_EE8 Site I to Site G 1.471	DED_2A5 Site I to Site D 5.666	DED_B58 Site I to Site H-1 0.883	DED_9A2 Site I to Site F 3.722	DED_D69 Site I to Site E 7.490	DED_BB1 Site I to Site C 8.900	DED_D7C Site I to Site B 11.792	DED_D35 Site I to Site A 13.698	DED_D6D Site I to Site Z-1 15.569	DED_2BE Site I to Site Z 15.775	C45_DED Site H to Site I 1.000	C45_EE8 Site H to Site G 0.859	C45_2A5 Site H to Site D 6.801	C45_B58 Site H to Site H-1 0.000	C45_9A2 Site H to Site F 3.909	C45_D69 Site H to Site E 7.359169824	C45_BB1 Site H to Site C 9.104187499	C45_D7C Site H to Site B 15.439427736	C45_D35 Site H to Site A 12.985259054	C45_D4D Site H to Site Z-1 15.941729317	C45_2BE Site H to Site Z 16.139826147	EEE_DED Site C to Site I 1.471189966
	Midnight	12:00 AM	1:00 AM	1.327	1.427	7.272	1.078	4.042	8.008	9.653		13.510	15.123	15.356	1.316	0.856	6.769	0.085	3.641		9.161250022	12.74999999	13.38519687	15.78603922	16.027873505	1.429687457
		1:00 AM	2:00 AM	1.085	1.228	7.101	1.103	4.272		10.345		12.658	16.646	15.369	1.413	0.883	6.154	0.070	3.831		10.43333334	9.534258252	15.63083335	12.19374998	16.68666667	16.875595857	1.582954569
		2:00 AM	3:00 AM	1.092	1.363	8.286	1.085	4.180	8.647	9.145		11.365	15.379	15.850	1.231	0.885	6.192	0.072	3.468		34.72499991	8.578645833	13.76666659	12.37187499	14.85208334	15.450503837	1.484909821
		3:00 AM	4:00 AM	1.092	1.268	6.556	1.172	4.091	9.158	8.574	13.600	13.795	14.662	16.033	1.289	0.877	6.638	0.073	3.516		8.908333329	6.786874981	15.78333359	12.13884803	14.89500001	15.29464283	1.469666669
		4:00 AM	5:00 AM	1.469	1.233	20.080	1.379	6.156	21.985	11.030	18.033	18.310	16.474	16.400	1.292	0.882	16.752	0.098	4.100		24.2694445	9.040717716	25.66429364	22.41173035	14.89167	15.1201855	1.462393179
		5:00 AM	6:00 AM	1.412	1.251	29.799	1.433	14.849		23.720	33.478	45.193	28.672	28.187	1.394	0.953	30.054	0.139	19.183			30.66582019	25.96585563	41.39914079	23.80883994	24.04825989	1.479439259
		6:00 AM	7:00 AM	1.322	1.293	32.137	1.328	24.761	36.450	38.379	44.584	45.389	45.869	45.923	1.360	0.896	29.666	0.085	25.639			37.92484999	41.90315901	39.77614059	45.13884789	45.52259653	1.446767867
		7:00 AM	8:00 AM	1.276	1.233	23.357	1.321	25.859	23.819	40.235	45.514	32.159	47.662	47.157	1.366	0.864	18.142	0.074	22.015		20.08583393	35.09545358	41.17364944	24.59776788	43.61630288	44.09272399	1.46294081
		8:00 AM	9:00 AM	2.308	1.300	12.771	1.966	17.832	18.439	27.974	34.274	20.874	37.282	39.098	1.388	0.889	8.637	0.066	11.429		10.71944439	20.43828361	28.25159729	15.84812096	29.44133663	30.82993827	1.439583237
		9:00 AM	10:00 AM	1.537	1.316	10.814	1.568	9.041	13.958	17.392	21.931	16.424	29.822	27.142	1.374	0.862	6.154	0.071	5.111		10.92033531	12.61459125	18.37202225	12.63038214	20.87154598	21.85732686	1.774626824
		10:00 AM	11:00 AM	2.249	1.391	11.288	2.229	8.222	13.760	13.254	18.521	17.613	20.274	20.866	1.341	0.863	6.100	0.069	3.669		10.99259254	9.150974718	13.82137883	12.39210914	15.64976537	16.40498089	1.360513075
		11:00 AM	12:00 PM	2.306	1.430	8.301	2.272	8.531	11.419	14.839	18.996	14.553	20.389	20.987	1.340	0.899	6.050	0.069	3.566		9.978571441	9.538189338	13.69047617	13.74339699	15.59539474	15.78118279	1.458437508
	Noon	12:00 PM	1:00 PM	1.361	1.310	7.191	1.405	5.557	9.815	11.913	17.767	12.992	18.124	18.013	1.339	0.876	6.116	0.066	3.483		9.116666671	9.442065486	13.46666671	12.02846528	14.56093226	15.17898826	1.41676864
		1:00 PM	2:00 PM	1.364	1.308	7.195	1.382	4.610	10.491	11.822	15.232	12.946	14.506	15.982	1.323	0.876	5.959	0.068	3.511		8.9722222	8.791000014	13.43787879	11.61870917	14.87937285	15.4352814	1.406914539
		2:00 PM	3:00 PM	1.577	1.328	7.528	1.591	4.788	10.040	9.810	14.458	13.339	15.498	15.967	1.337	0.909	6.114	0.073	3.478		8.720833388	8.206249989	13.62109696	11.97704678	14.48780303	15.65916667	1.411399372
		3:00 PM	4:00 PM	1.665	1.286	8.797	1.669	4.843	11.691	10.521	15.840	14.427	16.238	16.581	1.573	0.882	6.176	0.074	3.536		10.17916678	8.924775368	13.66388886	11.65416667	14.68701261	15.2168244	2.197016449
		4:00 PM	5:00 PM	1.543	1.268	9.852	1.593	6.340	11.947	11.083	16.025	15.171	18.458	19.263	2.416	0.890	6.482	0.071	3.597		10.38750093	9.925877191	13.81083331	12.385435	15.88745319	16.77450782	4.433359735
		5:00 PM	6:00 PM	1.749	1.369	7.156	1.781	6.164	9.644	11.607	17.200	12.888	20.717	21.101	2.802	0.904	6.302	0.069	3.734		8.508333452	8.949999989	14.19659539	12.35159575	17.69772012	18.57669959	4.513104315
		6:00 PM	7:00 PM	1.370	1.233	6.851	1.402	4.499	8.733	9.851	15.517	12.513	15.548	16.386	1.448	0.868	6.235	0.069	3.672		8.096666666	8.958333348	13.69777765	12.13828899	15.14231481	15.81431687	1.633633363
		7:00 PM	8:00 PM	1.448	1.263	8.735	1.509	4.273	9.514	9.302		12.327	15.306	15.515	1.374	0.867	6.038	0.074	3.590		7.587499917	9.145322278	13.10000001	12.05820927	14.80765185	15.33804599	1.396300535
		8:00 PM	9:00 PM	1.164	1.277	6.726	1.201	4.389	10.775	9.731	14.442	12.374	14.933	15.213	1.297	0.867	6.241	0.064	3.492		7.541666698	9.909185348	13.32957139	12.28265397	14.8003003	15.27157842	1.465016293
		9:00 PM	10:00 PM	1.214	1.275	6.546	1.224	4.096	8.925	8.825	14.462	12.325	15.093	15.330	1.295	0.862	6.318	0.067	3.587			9.320814054	14.15566663	12.49666665	14.65302053	15.29189191	1.239011127
		10:00 PM	11:00 PM	1.149	1.265	6.927	1.164	4.085		9.467	14.125	12.852	15.607	15.532	1.273	0.832	6.365	0.064	3.645			8.652604177	13.7466997	12.53130082	15.11029642	15.73055585	1.411729469
	Midnight	11:00 PM	12:00 AM	1.111	1.248	6.458	1.124	4.139	8.975	9.515	13.725	12.328	15.552	15.886	1.256	0.856	6.445	0.076	3.580		9.304385998	14.88133335	12.65166665	15.47301587	15.72093097	1.316666667	

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 11-Dec-13
Day of Week: Wednesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Length (miles)	EE8_C45 Site G to Site H 9.958138554	EE8_2A5 Site G to Site D 6.131328597	EE8_B58 Site G to Site H-1 5.617948109	EE8_9A2 Site G to Site F 3.132662747	EE8_D69 Site G to Site E 6.45633066	EE8_BB1 Site G to Site C 9.329326098	EE8_D7C Site G to Site B 11.95787904	EE8_D35 Site G to Site A 12.27886452	EE8_D4D Site G to Site Z-1 15.25619172	EE8_2BE Site G to Site Z 15.45263257	2A5_DED Site D to Site I 6.665246812	2A5_C45 Site D to Site H 6.881202712	2A5_EE8 Site D to Site G 6.131328304	2A5_B58 Site D to Site H-1 6.329186533	2A5_9A2 Site D to Site F 2.982729284	2A5_D69 Site D to Site E 3.129198524	2A5_BB1 Site D to Site C 7.201932291	2A5_D7C Site D to Site B 6.873838248	2A5_D35 Site D to Site A 6.109590039	2A5_D4D Site D to Site Z-1 8.996489364	2A5_2BE Site D to Site Z 9.292714385	B58_DED Site H-1 to Site I 9.982546402	B58_C45 Site H-1 to Site H 8.958218882
Midnight	12:00 AM	1:00 AM		1.820000031	7.171969718	1.405208381	3.829761883		9.174970648		13.61779837	15.53333131	16.54699985	12.34781903	8.697142871	11.95833329	6.713095247	9.030857888		2.44142165	7.166666697	6.349774758	8.812212834	9.125340128	1.241666672	0.850978752
	1:00 AM	2:00 AM		1.543756099	7.191145838	1.393749984	4.222484861		9.962037057		13.65046297	16.55520833	16.83055552	10.23666652	6.701881693	11.46666666	6.633902495	2.973857121	6.06833335	2.566833322	6.063888848	6.014150952	8.440476187	9.454947900	1.338333318	0.924964573
	2:00 AM	3:00 AM		1.475030045	6.442948578	1.529266571	4.136111103		9.882777784	17.70833317	12.47666653	17.25781253	17.65104169	6.504166676	7.032539489	7.012878758	7.606782627	3.116812708		2.38285.7141	9.006666607	5.873771921	8.788666478	9.256889161	1.184374949	0.534567907
	3:00 AM	4:00 AM			6.941964201	0.772222168	3.719942834		8.866666552	16.28333388	12.46950743	14.60486188	15.38583304	7.655382139	6.741190495	6.881666668	6.781004774	3.111728388		2.336235852	8.477083338	5.781129223	8.532302431	8.996443102	1.034722188	0.045455507
	4:00 AM	5:00 AM		1.608333378	15.46187455	1.212121182	4.379444455		9.364285726	20.07083351	12.8121469	14.8925539	15.32354903	6.788827953	6.174828383	6.485156252	6.21106321	2.984513735	5.492333343	2.320566651	8.613275032	7.599034518	8.403112778	8.738416321	1.184444459	0.039393889
	5:00 AM	6:00 AM		1.534649145	29.63926173	1.529197852	10.94434642	14.29166666	15.13208195	29.32750031	28.97052211	24.63407592	24.45402962	6.344623909	6.162734494	5.456210603	6.1062.58293	2.884504426	5.153333277	4.389061189	9.523456875	7.589393519	11.85916955	11.29651824	1.236851852	0.053138889
	6:00 AM	7:00 AM		1.538070952	29.1999	1.543916222	23.71444449	32.92499995	35.73030302	39.56997804	38.59952239	42.83488594	42.977967	7.337499933	5.961213208	6.725000009	5.995286182	2.884686992	4.853514466	3.968543725	9.825456318	6.885137812	11.85685977	12.21637187	1.315443268	0.032799995
	7:00 AM	8:00 AM		1.533707054	18.59535118	1.44952385	24.14319727		34.9452385	42.0713875	28.60927253	42.24044791	43.7125	7.10867863	5.8861.70186	6.663586957	6.027050191	2.852566686	5.661196451	3.497123722	9.272171176	6.971488763	10.15699566	10.16853074	1.309714307	0.030270305
	8:00 AM	9:00 AM		1.563902083	9.030952381	1.412290166	13.50972621	25.06750002	23.29407498	28.08452381	17.39682161	32.67309526	33.39462367	7.124685512	6.116421566	6.857716053	6.185338347	2.871939915	4.973333331	3.759835598	9.166396211	6.18869204	10.51333334	11.20330788	1.326767884	0.031742631
	9:00 AM	10:00 AM		1.764380316	6.775613514	1.834413245	5.498833327		13.04513793	21.64230772	12.35220149	24.0067.1296	22.54388147	7.262777772	6.206213439	6.749739132	6.382526.312	2.928133898	4.732261626	2.7575.3851	8.183974828	5.689486796	10.77891026	11.19614244	1.314024377	0.038010267
	10:00 AM	11:00 AM		1.589189182	6.524050138	1.637137679	3.992666659	10.83750002	9.551292045	18.5476	12.92370542	15.83252682	16.81858975	7.114259254	6.373262316	6.829566931	6.41843972	2.915863917	5.043333207	2.421360144	7.638112784	5.810577997	9.28940129	9.820224721	1.248252888	0.033989943
	11:00 AM	12:00 PM		1.627688174	6.479418835	1.653136793	3.929918307	11.19277778	9.697037053	14.36833336	12.91833329	15.91246998	16.35313975	7.289629634	6.533137622	6.889466469	6.528591965	2.994047636	5.311666656	2.497751302	7.748227735	5.741185902	8.546976314	8.996589638	1.290525823	0.037301583
Noon	12:00 PM	1:00 PM		1.567393953	6.430582902	1.605661496	3.885714282		9.459952388	14.3056666	12.17456141	15.45688432	16.3647.368	7.908333054	7.038052806	8.067372454	7.087268827	3.242626196	5.428125625	2.515151493	7.72412278	5.672095402	8.373905448	8.806508644	1.279006288	0.039892704
	1:00 PM	2:00 PM		1.589607751	6.520286857	1.624122823	3.828125003	9.550000003	9.440833373	14.5346154	12.2458.7803	15.0177936	15.29800429	12.38184443	10.33986516	11.85208333	10.4224359	6.2971449	5.673958534	2.412179487	7.695666663	5.709385733	8.360318696	8.710116279	1.287105268	0.033377659
	2:00 PM	3:00 PM		1.847372981	6.502000011	1.912195156	3.896099265		9.112121228	13.74791664	12.889693	14.93016954	15.54900002	17.98495833	17.78715849	17.10992065	18.0949359	9.589435492	8.148484831	2.389483858	7.449825007	5.773735754	8.459836456	8.810825166	1.296890701	0.050004874
	3:00 PM	4:00 PM		4.077083329	6.677364679	4.08851964	3.8617.4244	11.55000005	9.429411788	14.08358974	12.65208337	15.67634514	16.48828125	22.41833333	20.70295288	19.10581.394	21.00197197	9.507929699	9.076833377	2.426025838	7.518939084	5.813620992	8.610461622	9.020983353	1.54328921	0.061803375
	4:00 PM	5:00 PM		4.089625855	6.950480769	4.277566652	3.973015877	10.53333336	9.308333337	13.40000001	13.01161618	17.38141036	18.63244048	20.7359803	20.03787715	19.3699773.4	20.92630951	8.806577075	13.62115.386	2.370666453	7.350374698	5.953995688	10.01805016	10.65839826	2.330302162	0.060143585
	5:00 PM	6:00 PM		3.948839515	6.570351419	4.222048612	4.108695851		9.83384523	14.4859091	12.60769697	18.8191667	19.66570514	14.14364407	14.68988551	14.47210989	14.57726398	5.969179801	8.169444483	2.423212577	7.560729181	5.901722921	11.13373999	12.01799979	2.975103431	0.055957515
	6:00 PM	7:00 PM		2.622083352	6.296354161	2.653962979	3.939939962		8.801388887	14.7658333	12.12341269	15.92888998	16.54541666	20.01929824	20.02939842	19.98261.248	20.4942874.4	10.0861.7086	9.016666721	2.395502646	7.650256497	5.799787887	8.673561945	9.062826272	1.413999985	0.04362963
	7:00 PM	8:00 PM		3.106321829	6.453873501	3.177222228	3.729562487	9.81249992	8.933333328	13.16333329	12.47777778	14.77583334	15.25745745	12.8502907	11.83283898	11.98904.383	12.02162887	6.682958897	5.954999955	2.424999993	7.282133885	5.399505105	8.510154531	8.810241182	1.324452401	0.064620759
	8:00 PM	9:00 PM		1.535714258	6.456845524	1.584935492	3.798397448		9.149999991	13.59166676	12.2712986	15.2803332	15.72234845	6.838257556	6.331507943	7.017824098	6.363419977	2.99467535	5.075000133	2.498598977	7.549953347	5.811449982	8.594876116	8.92070317	1.294761884	0.029955081
	9:00 PM	10:00 PM		1.503079158	6.37143857	1.562916663	3.815384603		8.462499948	13.475	12.564375	15.17453705	15.36990708	10.16498543	6.587223407	9.196078456	6.647549603	2.909652572	5.356249993	2.453750014	7.548214272	5.937109539	8.526162796	8.845813472	1.294047613	0.025647253
	10:00 PM	11:00 PM		1.568145836	6.601333354	1.595588308	3.783333308		9.427380972	14.3571485	13.76785718	15.29833333	15.89583333	11.23448846	6.515062602	12.18750001	6.544651745	2.864513108	5.316666663	2.458333181	7.742261906	6.070781913	8.661256003	9.087706771	1.219771208	0.732611114
Midnight	11:00 PM	12:00 AM		1.535416665	6.561666654	1.588888848	3.972222213		9.488095258	15.30416664	13.06208324	16.78833336	17.37407403	11.39071424	6.616522493	11.85000003	6.696577361	2.983214285	5.578333318	2.543621455	8.182291688	6.05595237	8.777777787	9.166209534	1.233888893	0.043229177

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 11-Dec-13
Day of Week: Wednesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	BS8_EE8 Site H-1 to Site G	BS8_2A5 Site H-1 to Site D	BS8_9A2 Site H-1 to Site F	BS8_D69 Site H-1 to Site E	BS8_BB1 Site H-1 to Site C	BS8_D7C Site H-1 to Site B	BS8_D35 Site H-1 to Site A	BS8_D6D Site H-1 to Site Z	BS8_28E Site H-1 to Site J	BA2_DED Site F to Site I	BA2_C45 Site F to Site H	BA2_EE8 Site F to Site G	BA2_2A5 Site F to Site D	BA2_BS8 Site F to Site H-1	BA2_D69 Site F to Site E	BA2_BB1 Site F to Site C	BA2_D7C Site F to Site B	BA2_D35 Site F to Site A	BA2_D6D Site F to Site Z-1	BA2_28E Site F to Site Z	D69_DED Site E to Site I	D69_C45 Site E to Site H	D69_EE8 Site E to Site G
					9.917481918	6.009488204	3.656647186	7.398098849	8.331683306	11.46374762	15.60514454	15.88859953	16.17561232	3.734509261	3.908745328	3.218672327	2.982726284	3.956847186	4.289227306	5.195218854	9.944599301	9.078726284	15.64724128	12.14156404	5.479614645	7.329118252	6.45833165
Midnight	12:00 AM	1:00 AM		0.807722191	6.784216518	3.645000031		9.145614598	12.67499998	13.38444401	15.71908565	15.98302858	16.44405584	3.644812277	8.006444403	2.938585658	3.696401502	4.281333408	5.412373752	9.604166825	9.366666698	13.65884354	12.02910853	15.08085545	8.888111137	
	1:00 AM	2:00 AM		0.833372536	6.129385973	3.779535771	10.42499985	9.539979123	14.54444446	12.1406825	16.60119044	16.84935896	9.191071364	3.578828841	8.517502987	2.783499996	3.617998751	6.693333298	5.629310345	11.54166659	8.853442021	12.45154322	12.55448718		8.51666974	
	2:00 AM	3:00 AM		0.797458999	6.218181839	3.499476359	34.96666901	8.354999995	13.73333327	12.25729167	14.91184213	15.63012821	7.248333346	3.674382711	8.436664789	2.64928338	3.754761913	4.799999983	5.219767437	13.34166672	8.627999533	11.56729131	12.23804878	11.25	10.29999999	
	3:00 AM	4:00 AM		0.789074524	6.651242014	3.508809862	8.499666583	8.755625018	15.75000007	12.23873897	14.95775196	15.39664488	1.808333343	3.571568851	4.892948878	2.728083225	3.609801952	4.71066691	5.026238741	11.20625007	8.413451536	11.2423077	11.71430954	9.005000008	8.723333293	
	4:00 AM	5:00 AM		0.783790911	16.48445341	4.181429469	25.12083328	9.629952201	15.98409208	20.12964287	14.84024825	15.09199452	4.298076901	3.339825382	3.929547811	5.148937498	3.371161949	8.374999985	5.026898802	13.96724765	12.36723727	11.05261355	11.39826067	6.462037949	8.173500118	
	5:00 AM	6:00 AM		0.823385804	12.97355243	12.90299476		37.81272223	25.34107143	49.82459578	43.7562873	45.04004096	4.608757741	3.299376282	3.857508748	5.930727773	3.321884063	9.833333321	11.20233901	14.9267349	12.08128099	14.96798302	15.21994988	13.44892926	14.27083338	
	6:00 AM	7:00 AM		0.863498402	30.03660439	25.49273273		37.81189549	42.05595238	38.85110884	44.82369994	45.17614378	3.943981772	3.206340584	3.637295682	5.930727199	3.252388118	7.34583333	12.29240186	18.85751365	12.56811598	26.44774173	21.02875743	13.45666663	12.15833332	
	7:00 AM	8:00 AM		0.762349587	15.84583333	21.93888888	19.04999999	34.85770041	41.3032738	29.13001418	43.82377778	44.21111109	4.221084328	3.24028904	3.794148936	4.392424236	3.301573415	6.191666664	8.279637688	15.153653	11.2318663	15.88932622	16.3881.3634	12.80749613	11.72083332	
	8:00 AM	9:00 AM		0.817248042	8.609976589	11.07183096	9.908333341	19.80534421	29.19359038	15.3705596	28.51922348	29.846	4.235666668	3.356526255	3.794403306	3.185023347	3.399423757	5.185507254	6.038734024	13.83131314	9.975030298	14.98523707	15.5061683	9.630009991	8.491666703	
	9:00 AM	10:00 AM		0.748255875	8.1.6549892	5.658059998	10.56904763	12.46144278	17.21929278	12.92564716	20.77124723	21.83509089	4.272659985	3.356517694	3.915023845	2.658849008	3.420638704	5.001190458	6.172965022	11.52804125	8.305223268	14.20786364	14.77302644	8.85424999	8.096833353	
	10:00 AM	11:00 AM		0.801257857	8.047460948	3.568784026	10.43472221	9.022916653	13.99841272	12.05136954	15.57887647	16.2709701	4.286224493	3.47555555	3.824387258	2.643014704	3.514066201	5.255000004	5.236067228	10.41449277	8.579992652	11.81033044	12.54272505	9.664583333	9.308333352	9.200000045
	11:00 AM	12:00 PM		0.807394317	8.013913898	3.488099308	9.336666651	8.961295832	13.87777775	11.76819923	14.77966559	15.20852402	4.318556577	3.502029076	3.930943801	2.625083733	3.551519047	5.1.1501.285	5.335754274	10.05859585	8.447860907	11.39711111	11.83637699	9.725977188	10.1583333	21.87083331
Noon	12:00 PM	1:00 PM		0.809992058	6.103239232	3.443181822	8.998333302	9.193424864	13.3466849	12.06205674	14.50852713	14.69125164	4.369262332	3.92074614	3.978710191	2.621148738	3.995999822	5.215809954	5.396370369	10.7223331	8.368402051	11.13917524	11.59726878	11.45882353	14.08	10.47500048	
	1:00 PM	2:00 PM		0.781143788	5.968333334	3.501282059	8.695833153	8.764000013	13.4295545	11.57945455	14.91267713	15.42094296	5.074916673	5.36973151	4.935998864	2.611066125	5.422985351	5.20641666	5.204761901	10.5367644	8.33866667	11.09010685	11.40762634	17.41458333	19.09555561	22.51666665	
	2:00 PM	3:00 PM		0.809374986	6.12446971	3.471546538	8.775000013	8.230005342	13.3472221	11.98958338	14.2733156	16.1695601	6.970189011	6.080842592	6.158589748	2.635709598	9.433333308	5.027777785	5.090873015	10.2037888	8.452083132	11.0677661	11.50182649	23.48854168	19.8166666		
	3:00 PM	4:00 PM		0.7617709	6.163511923	3.525737472	9.999583345	8.872348511	13.8445278	11.91643051	14.72059563	15.1929538	8.902303977	10.5958929	7.963096754	2.695181.18	11.0572666	5.209818229	5.269035451	10.4833193	8.488401568	11.3439944	11.66039429	27.08166663	28.63333343		
	4:00 PM	5:00 PM		0.809967318	6.44423078	3.585310722	10.64666663	8.985833332	13.7749999	12.36947268	15.03132184	16.72989586	12.34941175	12.8808642	9.212570912	2.791885007	12.70833303	8.391666658	5.138185211	9.982906475	8.739166648	12.70435021	13.43630344	27.86944442	30.52222234		
	5:00 PM	6:00 PM		0.840740739	6.270370272	3.731000017	8.550000008	8.957539712	14.1409143	12.40604869	17.7537778	18.85497696	13.18140351	7.862656536	10.65347234	2.671.996302	8.036054423	5.285009502	5.364285713	10.2653.7032	8.590351075	13.99459381	14.88751269	17.08979168	19.07485187		
	6:00 PM	7:00 PM		0.777142866	6.229714288	3.651190474	8.108333273	8.954545166	13.94374998	12.13410256	15.2572.0164	15.84319985	7.467841879	11.43433333	7.53472222	2.622448998	11.66486048	5.156000006	5.188580206	10.42791666	8.488333338	11.33752834	11.78243892	20.38266232	21.4364584	31.99166645	
	7:00 PM	8:00 PM		0.797777759	6.096257762	3.554705872	7.627777725	9.111537699	12.38899048	12.30744578	14.91067185	15.27443319	10.82805513	4.36773809	10.6511282	2.609477523	4.435889563	4.738666624	5.259374999	9.731018497	8.525333569	11.25044348	11.58466997	12.3937.4998			
	8:00 PM	9:00 PM		0.771153854	6.234139769	3.484846237	7.455555571	8.95829251	14.43690474	12.32765353	14.9539007	15.39777778	5.49550726	3.449345033	4.995362073	2.667286497	3.502733316	4.677058278	5.269642857	10.2979166	8.518659417	11.27997166	11.59343434	8.72023807	17.2	11.07499999	
	9:00 PM	10:00 PM		0.777237253	6.296418564	3.544230439		9.229629642	15.11666665	12.46622031	14.85756916	15.3481457	4.98113196	3.660368018	3.949858392	2.648811101	3.698505579	4.98011.1056	5.270858929	10.3666667	8.690434088	11.3572.858	11.71903284	13.73333336	8.626833324	
	10:00 PM	11:00 PM		0.718925832	6.323124898	3.663394995		9.50156247	13.72499995	12.43547099	15.0235.4496	15.62222221	7.485624874	3.549806091	6.307757699	2.76257.0773	3.596088439	4.383333369	5.335752673	10.4201.3889	8.785895578	11.39012681	11.94081186	13.23833331	8.416666698	
Midnight	11:00 PM	12:00 AM		0.788056515	6.474924078	3.56111119		9.254166698	13.54583333	12.80555556	15.42.71794	15.69730856	8.423611084	3.565491474	9.450000003	2.710740734	3.642699193	4.824999817	5.433333368	11.1428.715	8.818749983	11.47152777	11.84259.139	14.54583329	8.613888826	

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 11-Dec-13
Day of Week: Wednesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D69_2A5 Site E to Site D 3.72128E+14	D69_BS8 Site E to Site H-1 7.39920E+14	D69_9A2 Site E to Site F 4.28920E+14	D69_BB1 Site E to Site C 4.16777E+12	D69_D7C Site E to Site B 3.80527E+14	D69_D35 Site E to Site A 7.45481E+14	D69_D6D Site E to Site Z-1 10.46097953	D69_2BE Site E to Site Z 10.70759231	BB1_DED Site C to Site I 8.82934425	BB1_C45 Site C to Site H 3.19418.E+13	BB1_EE8 Site C to Site G 8.95182E+08	BB1_2A5 Site C to Site D 2.21019E+08	BB1_BS8 Site C to Site H-1 9.19145E+08	BB1_9A2 Site C to Site F 5.18923E+08	BB1_D69 Site C to Site E 4.36772E+08	BB1_D7C Site C to Site B 5.56561E+13	BB1_D35 Site C to Site A 3.89105E+08	BB1_D6D Site C to Site Z-1 8.87369E+08	BB1_2BE Site C to Site Z 7.27292E+08	D7C_DED Site B to Site I 11.73212454	D7C_C45 Site B to Site H 16.42562728	D7C_EE8 Site B to Site G 11.86787254	D7C_2A5 Site B to Site D 6.87983E+08
	Midnight	12:00 AM	1:00 AM		3.99166564	8.99444488	5.00138866					13.96785713	8.67222213	12.94537036	2.22107842E	8.77233334E	5.11430887E	8.08333324E	5.08333325E	9.77355553	8.76222228E	7.08309554		14.47883338	17.75000008	7.96166652	
		1:00 AM	2:00 AM		4.25000082	8.51666674		6.37499985		10.3166667		14.03333327	8.89722233	13.973885E	2.20299144E	8.91372548E	5.22337962E		6.66666661E	3.89833966	7.01634616E	7.28809005E		12.7883347		6.88333383	
		2:00 AM	3:00 AM		4.38611112	10.51666662	5.45000002	6.66666671E		10.52291653	13.07499986	13.5249999	12.34583326	8.97685184E	13.30416667	2.21291666E	8.85085544E	5.14531247T	8.34583333E	6.66583330N	3.62517362E	8.38074074T	6.82028635J	12.5750005	16.1833334	7.83333333	
		3:00 AM	4:00 AM		3.98499999	8.56666637	5.09047620E	6.88518518E		10.2871214E	13.01805562	13.9888889	8.53750016E	9.38509788S	9.58333334	2.25405494T	9.52055553N	5.46644145		6.41666662	3.61530778S	6.35162338S	6.73801175S				7.96666675	
		4:00 AM	5:00 AM		5.39358485Z	8.67500005	5.29154252Z	6.36999985Z		13.11749134	13.67166655	12.811111	9.96777776	6.84999994	8.97546016T	2.21797466	9.09259216	5.29078431		5.25188411E	3.54553135E	6.22724393E	6.52812424S		18.17499998	14.97222235	8.85952382	
		5:00 AM	6:00 AM		12.87322533	14.41250003	9.65205191	9.10083334	15.47037035	13.68804378	16.72454761	17.19134617	8.16992733J	8.32456312E	8.87169278J	2.20521346E	9.16986070T	6.48909259Z	7.7833333S	5.47699972S	4.52580349E	6.48563851J	8.39884079E	14.57499998	12.5814666	13.87291668	7.35706125J	
		6:00 AM	7:00 AM		11.0542422	12.23888889	9.72598039S	16.87499377	23.05514709	17.77548147	23.1538233	23.23995729	8.57005208T	8.11402084J	8.58545454E	2.07115384T	8.07385057Z	4.85120337Z	7.194444453	5.65007764E	3.76753787S	6.18684942E	8.78656477E	14.03666637	14.13854168	17.5842582	7.2606772	
		7:00 AM	8:00 AM		8.31136363J	11.1136416T	7.96130208E	14.66788369	20.5810977	16.8350002	21.0753876	21.6153152	9.43920769S	7.95158333E	8.53701156Q	2.07640937T	8.02749999Z	4.95180968J	6.48472223E	5.40533334E	3.56288515S	6.50853548E	7.56811224J	15.14499998	12.88680507	13.82999997	7.09545833	
		8:00 AM	9:00 AM		4.06458331J	8.58148152	5.25916367S	12.8369627J	18.10269607	11.41230158	20.32867648	20.8802083S	9.26961701S	7.99809116J	8.77418360Z	2.06016144	8.08217952J	4.90730826H	7.18818441T	5.31885112N	3.52644163S	7.26368227T	8.12727713E	14.17983333	12.79596764	13.66250006	7.14999999	
		9:00 AM	10:00 AM		4.03351135H	8.08351852Z	5.13728070S	6.98958250Z	12.9104167	9.77499993J	15.82166667	16.3833333H	9.10154222S	8.3541752J	8.14822428E	2.0881465S5	8.32538166S	4.8443971S	6.9511904S	5.47562894T	3.71533822S	8.17186527T	8.88203180A	14.09166662	13.3658854	14.19434764	7.32727273	
		10:00 AM	11:00 AM		4.08583333	8.42500004J	5.35998592	6.49629628J	12.0545833H	8.79166667H	13.1530702J	13.74517541	9.68108974E	8.26172248S	8.76101193T	2.12930464L	8.32534245E	5.08583622T	6.77919048S	5.65092580T	3.73020833T	7.70380116T	8.37530304S	14.68083233	13.45854761	13.75705124	7.40149573J	
		11:00 AM	12:00 PM		3.98114634T	8.66666666E	5.19305555S	6.53333334A	11.2138888S	9.89487179S	13.4166655S	13.4166655S	9.40433287E	8.70242055H	8.96595253J	2.03899583.71	8.76723013E	5.12983487I	6.48333333Z	5.68872291B5	4.11945237T	7.24825432E	7.83577354J	15.14833333	13.09520852J	14.30179785	7.18361112J	
	Noon	12:00 PM	1:00 PM		4.11369458	11.93833333	5.56630735E	6.67233333J	10.7833332A	9.72749999E	12.64444465	12.9013889	9.46243698Z	8.70000000N	9.37870937F	2.13982049Z	8.7154998	5.16322117S	7.41833335N	5.80185182A	3.86004085A	6.82519378K	7.21533102J	14.30555563	14.2724288L	14.1083333E	7.69310244K	
		1:00 PM	2:00 PM		4.08121146J	20.54166673	5.44285717A	6.56458335	11.31666673	10.01410758	12.9607142T	13.45416668	10.57442531	9.39389443S	10.74404767J	2.18722944U	9.54846993T	5.53622554J	8.57291668T	5.74166662J	3.66400644K	6.52454536N	6.96108956S	16.49166668	14.45476193	15.41308512	7.72081534T	
		2:00 PM	3:00 PM		4.31944448	20.09000005	14.04395078	6.55277778S	11.61833331	10.08541668	12.8397435E	13.25897436	14.09567981	12.59309523	15.43766664	2.47889171	12.78767935	8.61288784J	8.13541671K	5.69939391I	3.62859846J	6.45472223N	6.82720187N	20.89500002	18.71999998	19.871111I	8.00088389	
		3:00 PM	4:00 PM		4.43795416	29.17083339	14.3951388S	6.64791892N	11.6812499T	10.3666666S	12.8291665J	13.2361113	22.9473035S	22.92905359	21.5495279E	5.24960283X	23.3351113E	14.8272417J	12.3053035	5.14418664J	3.7055313S7	6.69685182N	7.15019841A	29.47291667	30.81666667	32.66666666	13.15392896	
		4:00 PM	5:00 PM		4.64799998	30.6666445	13.8527957	6.93214283Z	12.0703703S	10.6827381J	14.4099958	15.7882823	28.3012349E	27.07870068	25.495202	6.03166399E	27.3533333E	15.0475684J	14.8976195K	5.01111110T	3.62904762J	6.19059139E	9.17043016S	39.8974999E	38.40160258	39.2374998E	21.83815252	
		5:00 PM	6:00 PM		4.28779835J	17.54479166	8.89949599W	7.11250002	12.2642857	9.95499999J	15.9010566	17.5757577S	25.2104781S	26.3058333Z	24.7510983K	5.94589418S	26.2518636M	14.3423811	13.1949999K	5.14499999T	3.68666664J	9.02524507S	9.97499991J	47.5729167S	48.34166665	43.5409794	27.6781692	
		6:00 PM	7:00 PM		3.9825002	21.314814B	8.94866662	6.44999998J	11.7621212S	9.63124997B	13.3361111T	14.0333333E	19.1285987B	20.1408297	20.2499091	4.82569839S	20.1584999E	11.1304304J	13.5953335	5.25245897	3.71646827S	6.80131578B	7.22072074Z	49.07999996	46.40992079	47.8733328	28.09477461	
		7:00 PM	8:00 PM		4.24814814T		6.7333333Z	6.24375002S	11.13999998S	10.2919666T	12.2246999J	12.5875002S	23.9904145W	24.6352987A	24.8135416J	3.87469112G	24.2884329E	14.3358248J	12.3775	4.93124999S	3.73746741J	6.58117284N	6.94647438J	39.5138888J	37.4675438Z	39.72166668	13.1052632	
		8:00 PM	9:00 PM		4.20625002E	17.3187499A	4.87254900B	6.99333334Z		10.860416B	13.0511994B	13.4166666T	16.7076388B	16.4008541G	2.60188393G	15.6195238Z	10.3632609B	8.2308525S	5.42083330N	3.65216048J	6.37985184T	6.85833332N	20.66547618	17.7059524Z	19.9641666B	8.31551726	
		9:00 PM	10:00 PM		4.05257142E	8.66354163E	4.82787613J	6.54444468S	15.22499998	10.0729166B	13.6027498S	13.9416665B	8.96099998A	8.48872556Q	9.12222224S	2.14053051Z	8.64986139A	5.04488756		5.44666662N	3.61358023S	6.48188442N	6.83412988J	14.81666664	14.4833333J	16.2516622S	8.23291864	
		10:00 PM	11:00 PM		4.18750002J	8.56399203J	5.1009258	5.98333348U		10.6249999B	13.1861108S	13.1722223	12.0164481A	8.82956628	11.86527777	2.13049588Q	8.99684079Z	5.05968012N	7.66111113S	6.03541676K	3.75176758S	6.66985293N	7.07060803K	16.99666667	15.61874998	21.49583343	7.92878788	
	Midnight	11:00 PM	12:00 AM		4.22333359J	8.78333333U	4.72777722T	7.54166665H	11.66666653	10.4833334A	11.2249999T	11.5833333J	13.4107143	8.83069325	15.16805554	2.11838418J	8.77670454H	4.99691357H	7.41666667T	5.52777782H	3.79536884J	6.77485279B	7.18066667J	22.16333337	14.41666656	21.11666674	7.74833334T	

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 11-Dec-13
Day of Week: Wednesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	D7C_BS8	D7C_9A2	D7C_D69	D7C_BB1	D7C_D35	D7C_D6D	D7C_2BE	D35_D6D	D35_C45	D35_EE8	D35_2A5	D35_BS8	D35_9A2	D35_D69	D35_BB1	D35_D7C	D35_D6D	D35_2BE	D6D_D6D	D6D_C45	D6D_EE8	D6D_2A5	D6D_BS8
			Site B to Site H-1	Site B to Site F	Site B to Site E	Site B to Site C	Site B to Site A	Site B to Site Z-1	Site B to Site Z	Site A to Site I	Site A to Site H	Site A to Site G	Site A to Site D	Site A to Site H-1	Site A to Site F	Site A to Site E	Site A to Site C	Site A to Site B	Site A to Site Z-3	Site A to Site Z	Site Z-3 to Site I	Site Z-1 to Site H	Site Z-1 to Site G	Site Z-1 to Site D	Site Z-1 to Site H-
			Length (miles)	12.4631478	8.6648599	9.6892774	5.1069189	3.2468937	6.1681875	12.6986249	19.8853499	12.7459457	6.1008019	13.5321455	9.0782549	7.4649149	3.8825467	5.2458957	3.0651954	2.7853139	15.5898211	15.5417281	15.2367813	9.0961854	15.5899582
Midnight	12:00 AM	1:00 AM		14.42083336	10.75166669		5.827083285				18.84444439	12.75287356	18.83833325	5.999780703	12.86388889	9.130952368	12.36666664		3.751649286		2.795277778	3.124038458	19.68055556	15.46092869	19.66666662	8.782449506	15.4217742
	1:00 AM	2:00 AM		12.7833334	9.508333393		5.366666643				16.33541662	13.12993825	18.07916665	6.249761898	13.00057472	9.155277766			3.830172406		2.990166986	3.347499998	20.3722222	15.75309527	21.32499998	9.063178308	15.8472229
	2:00 AM	3:00 AM		12.57500002	9.747222219		5.291666653				12.0958333	13.2587301	13.85714285	6.352027	13.08858648	9.356299077	12.54166662		4.00758606		2.739455413	3.135483134	19.10833335	16.18033333	21.01527781	9.204047614	15.9872223
	3:00 AM	4:00 AM		13.5500001			6.216666643				13.86399479	12.99701757	13.58999999	6.051282067	12.84527028	9.248972613			3.938575205		2.701804138	3.057926841	14.72916653	16.47173813	16.12749998	9.008765683	16.4242249
	4:00 AM	5:00 AM	19.13499993	11.40833335	10.90000002	6.699238154					12.58388867	11.9954552	12.25952382	5.760264568	12.00759002	8.654851858			3.764528656		2.850566958	2.950934138	17.01754184	15.73529413	17.02272228	8.543222715	15.7634259
	5:00 AM	6:00 AM	19.30000005	10.925	11.09999996	5.452222222					12.29500555	11.99783752	11.48333325	5.753704542	11.9209722	8.490534377	12.50277791		3.614043398	6.49166666	3.133982833	2.930095329	15.79566485	23.48293137	14.94652228	8.693286266	14.7629359
	6:00 AM	7:00 AM	14.94558622	10.08209999	12.16666673	5.252159473	6.755555514				13.47500003	11.46758291	14.48587302	5.725208334	11.43850211	8.651393878	12.22333322		3.602554744	6.266666565	4.08785885	4.602107697	14.73685497	15.79248389	15.34529281	8.395458819	14.4472222
	7:00 AM	8:00 AM	12.96180554	9.857666672	15.57142853	5.097833333	6.523861107	9.716666922	11.16666852	13.27804169	11.5365278	13.81752137	5.721284659	11.67973213	8.484124469	10.42916668	14.58787088	6.799144003	3.342888353	3.967680178	16.49846486	14.01272522	17.7271528	8.483312707	14.6984234
	8:00 AM	9:00 AM	12.89382714	10.02518939	15.19583336	5.185416655		10.52333335	11.375	13.09654087	12.09902211	13.17329432	5.769889536	12.14205347	8.747263073	10.82391672	13.57409688	6.712345555	3.684725971	4.236084659	16.18238094	14.26430554	17.69357143	8.389748857	14.1477864
	9:00 AM	10:00 AM	13.40357143	10.22893452	14.07500002	5.279457806	6.788111072			13.63325332	12.10747126	12.98333325	5.792876776	11.9759868	8.798224039	12.10995955	13.57157428	6.517424239	4.528392155	4.972988116	16.23293851	15.05841668	15.53424132	8.63923865	15.0965554
	10:00 AM	11:00 AM	13.56333336	10.07965749	11.73333336	5.096969713	6.341666635	11.87500002	12.26944439	13.10851852	12.2226526	12.36291105	5.641936941	12.24315477	8.573076931	9.585333321	3.827841173	7.049999982	3.600433789	4.201703947	16.39109195	14.85844444	15.13785433	8.59299992	14.8589266
	11:00 AM	12:00 PM	13.41833336	10.31953134	13.05833325	5.82777776	7.031750065	9.049999953	9.524999965	13.26529787	12.69183946	12.9586785	5.861083321	12.83227789	8.98907469	11.88458335	3.857826285	8.527777753	2.733354487	3.07223258	15.25838837	15.22083334	14.99139907	8.34143976	15.1793333
Noon	12:00 PM	1:00 PM	14.29616386	10.80459772		5.634313714	7.175000068			13.63987123	12.99071438	16.12068966	5.929539012	12.89611786	9.112226939	11.14166663	3.714417884	6.733333357	2.697399354	3.031971467	15.99612403	15.59179078	15.83720038	8.66544733	15.3241839
	1:00 PM	2:00 PM	14.78928574	11.14166647	14.50833337	5.66527778	6.91500003	10.08611111	10.50000004	18.52124163	16.78394598	17.68568872	6.274707024	16.74058333	12.2864525	11.76270807	3.954453117	7.341666503	2.683425972	3.919555554	16.9480369	15.77333318	18.0413887	8.691912797	15.7563617
	2:00 PM	3:00 PM	18.71833333	14.05381945	18.22083341	5.374122805	6.991666654		9.554166729	26.78466733	26.175	26.10919538	10.27929198	26.5516954	19.23187777	11.77083206	3.986070566	7.045833336	2.721042878	3.078642333	20.94561403	19.63113307	21.25416666	8.98243334	19.7234925
	3:00 PM	4:00 PM	31.58297102	21.17237654	30.45935554	7.738836476	6.899583135	10.12916666	10.63999984	38.03579545	34.2964397	34.85869804	14.50236693	34.2436111	24.36533472	17.96533202	7.36151646	6.633333229	2.88505.1901	3.354133503	29.53003977	28.65311909	27.8893766	12.7919703	29.1882999
	4:00 PM	5:00 PM	38.6528846	29.64323899	38.90833333	16.4499173	7.458522908	10.51666668	10.72500004	38.67784932	38.99548878	41.90364564	15.29566667	39.06683674	24.88958933	21.3208334	13.18502143	9.408333264	4.307456711	5.012123251	38.95618518	37.04841953	38.28117284	16.95982143	37.5508959
	5:00 PM	6:00 PM	48.5347222	35.56497685	40.39166668	20.74434156	7.648864203	12.8633333	13.42078333	51.25153059	34.56938134	51.78903509	14.08964613	34.44438894	29.48429223	21.3763889	14.62404459	11.68333331	5.369105249	6.103013617	42.52500031	40.98585069	44.1909859	20.12116458	41.5997487
	6:00 PM	7:00 PM	46.09583332	38.20229885	22.27833333	20.92788462	6.786458362	10.07516668	10.48416665	32.01746032	34.44739907	35.45601861	12.32355372	34.38003319	23.18949098	18.4998335	14.21396719		2.818885464	3.172691716	35.38437486	37.99023968	35.83914726	19.54859972	37.7863401
	7:00 PM	8:00 PM	37.85752967	29.2900794	15.39583333	9.868234106		9.548666618	9.796666804	20.21275253	19.32686851	18.04583333	6.373001699	18.4122222	13.88982063	27.35000001	5.952377778	9.266666696	2.71447594	3.018541662	35.50598454	37.5291208	40.60681817	15.50618362	37.3457486
	8:00 PM	9:00 PM	21.08750003	15.13306453		5.279487197				12.4311111	12.16543718	12.80499986	5.773496248	12.17289993	8.617899958	11.63229169	3.787354195	6.35833329	2.702656252	3.029440693	22.58023299	22.51925597	21.03873007	9.203211974	22.5394236
	9:00 PM	10:00 PM	16.62333333	10.83593751	12.44166657	6.026473195				16.66994444	12.43482964	14.81717465	5.787495918	12.4254811	8.643320987		3.68137255	6.583333416	2.686824337	3.011748648	14.94745137	14.81147341	15.61695972	8.38301701	14.8180953
	10:00 PM	11:00 PM	15.97500004	11.77023811		6.281250003	8.183333371			17.05312502	12.62113096	18.53124984	5.757921814	12.47296421	8.659859167	11.61666669	3.707650236	6.608333364	2.749263781	3.10950157	18.36277777	15.39862456	18.20166668	8.473452388	15.1352539
Midnight	11:00 PM	12:00 AM	13.77499997	10.06666669		5.775000025				17.58166668	12.52366669	17.80952387	5.904301074	12.59761905	8.894627368	11.2999999	3.752380949		2.826754377	3.169156716	19.19583336	15.35472227	22.80000019	8.418452904	15.2109445

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 11-Dec-13
Day of Week: Wednesday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label / Length (miles)	D6D_9A2 Site Z-1 to Site F 17.6472124	D6D_D69 Site Z-1 to Site E 19.4598604	D6D_BB1 Site Z-1 to Site C 6.4729699	D6D_D7C Site Z-1 to Site B 6.1696329	D6D_D35 Site Z-1 to Site A 3.5491994	D6D_28E Site Z-1 to Site Z 9.2797223	28E_DED Site Z to Site I 15.7258104	28E_C45 Site Z to Site H 16.1808818	28E_EE8 Site Z to Site G 15.4583257	28E_2A5 Site Z to Site D 9.2842488	28E_B58 Site Z to Site H-1 16.1728753	28E_9A2 Site Z to Site F 12.6410498	28E_D69 Site Z to Site E 10.7078820	28E_BB1 Site Z to Site C 7.4299154	28E_D7C Site Z to Site B 6.1912870	28E_D35 Site Z to Site A 3.2780183	28E_D6D Site Z to Site Z-1 9.2272223
Midnight	12:00 AM	1:00 AM		11.73515196	15.50833337	6.5181481481		2.7645833	8.3205645131	20.6098485	15.8868686	19.7941665	9.1894877	15.7337899	11.9554392	16.0916666	6.8650132		3.1085978	8.3367579
	1:00 AM	2:00 AM		12.0699765		6.6880952753		2.8475225	8.4025000	21.3035713	16.0781	21.6527	9.277	16.1345	12.2	16.4	6.8		3.1	8.3
	2:00 AM	3:00 AM		11.9810344	15.8666666	6.6666666		2.8	8.3	19.4	16.0	20.7	9.3	15.6	12.0	16.2	6.8		3.2	8.3
	3:00 AM	4:00 AM		12.1810975		6.8164414		2.8277778	8.3285878	15.2233333	16.6	15.8	9.3	16.7	12.5	16.8	7.1		3.2	8.3
	4:00 AM	5:00 AM		12.1521111		6.4944		2.8	8.2	17.2	16.0	17.2	9.1	16.0	12.4	16.7	6.9		3.1	8.3
	5:00 AM	6:00 AM		11.3464483	15.725000	6.2052		2.8	8.4	15.4	15.9	15.1	9.1	14.9	11.5	16.0	6.5		3.1	8.3
	6:00 AM	7:00 AM		11.1139491	16.8566666	6.2324	10.0316667	2.8	8.5	14.9	14.5	14.3	8.9	14.3	11.1	15.4	6.3	9.8	3.0	8.2
	7:00 AM	8:00 AM		11.3047311	12.8583333	6.2	9.3425925	2.8	8.5	14.9	14.2	13.7	8.7	13.7	10.7	14.7	6.0	9.4	2.9	8.0
	8:00 AM	9:00 AM		11.2779761	15.8604166	6.2	9.2444444	2.7	8.6	13.9	13.7	13.2	8.6	13.2	10.4	14.3	5.8	9.1	2.8	7.8
	9:00 AM	10:00 AM		11.6256238	17.5472222	6.4	9.0249999	2.7	8.5	13.4	13.2	12.8	8.4	12.8	10.1	13.9	5.6	8.8	2.7	7.6
	10:00 AM	11:00 AM		11.7368381	11.9549999	6.4	9.7583333	2.7	8.5	13.0	12.8	12.4	8.2	12.4	9.8	13.5	5.5	8.6	2.7	7.4
	11:00 AM	12:00 PM		11.3065279	14.5958333	6.4	9.3611666	2.7	8.5	12.6	12.4	12.0	8.0	12.0	9.5	13.1	5.3	8.4	2.6	7.2
Noon	12:00 PM	1:00 PM		11.7522084	15.8883333	6.4	9.7333333	2.7	8.6	12.2	12.0	11.6	7.8	11.6	9.2	12.7	5.1	8.2	2.6	7.0
	1:00 PM	2:00 PM		11.9269992	15.1347222	6.7	8.5833333	2.7	8.5	11.8	11.6	11.2	7.6	11.2	8.9	12.3	5.0	8.0	2.5	6.8
	2:00 PM	3:00 PM		14.9724384	14.3041666	6.7	9.8874999	2.7	8.5	11.4	11.2	10.8	7.4	10.8	8.6	11.9	4.8	7.8	2.5	6.6
	3:00 PM	4:00 PM		22.0150152	20.0847916	9.9	11.2	2.6	8.3	11.0	10.8	10.5	7.2	10.5	8.3	11.5	4.7	7.6	2.4	6.4
	4:00 PM	5:00 PM		26.5933957	22.5111111	15.1	12.3249999	2.7	8.5	10.7	10.5	10.2	7.0	10.2	8.1	11.2	4.6	7.4	2.4	6.3
	5:00 PM	6:00 PM		28.9674573	29.3258333	19.2	13.2500000	2.7	8.6	10.4	10.2	9.9	6.8	9.9	7.9	10.9	4.5	7.2	2.3	6.2
	6:00 PM	7:00 PM		27.3760768	29.9475167	18.3	12.0249999	2.7	8.5	10.1	9.9	9.6	6.6	9.6	7.7	10.6	4.4	7.0	2.3	6.0
	7:00 PM	8:00 PM		26.3503975	30.4583333	12.8	10.6666666	2.7	8.5	9.8	9.6	9.3	6.4	9.3	7.5	10.3	4.3	6.8	2.2	5.9
	8:00 PM	9:00 PM		16.498454	14.2583333	8.5	6.5603998	2.7	8.5	9.5	9.3	9.0	6.2	9.0	7.3	10.0	4.2	6.7	2.2	5.8
	9:00 PM	10:00 PM		11.1723158		6.3	5.0393829	2.6	8.4	9.2	9.0	8.7	6.0	8.7	7.1	9.7	4.1	6.5	2.1	5.7
	10:00 PM	11:00 PM		11.2707783	21.5666666	6.4	7.4758892	2.6	8.3	8.9	8.7	8.4	5.8	8.4	6.9	9.4	4.0	6.3	2.1	5.6
Midnight	11:00 PM	12:00 AM		11.3603575	14.3000005	6.5	5.5513071	2.7	8.3	8.6	8.4	8.1	5.6	8.1	6.7	9.1	3.9	6.1	2.0	5.4

TRAVEL TIME DATA

1 HOUR CORRIDOR STATISTICAL SUMMARIES

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 12-Dec-13
Day of Week: Thursday
Measure: Mean Travel Time
Units: minutes

Time	Segment Label	Length (miles)	DED_C45 Site I to Site H 1.001	DED_EE8 Site I to Site G 1.473	DED_2A5 Site I to Site D 5.666	DED_B58 Site I to Site H-1 0.883	DED_9A2 Site I to Site F 3.722	DED_D69 Site I to Site E 7.499	DED_BB1 Site I to Site C 8.800	DED_D7C Site I to Site B 11.799	DED_D35 Site I to Site A 13.698	DED_D6D Site I to Site Z-1 15.969	DED_2BE Site I to Site Z 16.775	C45_DED Site H to Site I 1.000	C45_EE8 Site H to Site G 0.858	C45_2A5 Site H to Site D 6.801	C45_B58 Site H to Site H-1 0.000	C45_9A2 Site H to Site F 3.909	C45_D69 Site H to Site E 7.316999634	C45_BB1 Site H to Site C 9.104484999	C45_D7C Site H to Site B 12.43042739	C45_D35 Site H to Site A 14.98539004	C45_D6D Site H to Site Z-1 16.79167317	C45_2BE Site H to Site Z 16.13982147	EEB_DED Site G to Site I 1.471999955
	Begin Time	End Time																							
Midnight	12:00 AM	1:00 AM	1.134	1.259	6.605	1.167	3.896		8.629		12.221	15.223	15.594	1.313	0.913	6.672	0.080	3.721		9.088889918	12.26666668	13.16304044	15.52816666	16.1272727	1.492156855
	1:00 AM	2:00 AM	1.088	1.284	6.535	1.142	4.046		9.430		12.343	14.975	15.103	1.310	0.816	6.549	0.105	3.749		9.491145816	16.31666576	12.56293663	16.45952376	17.12859876	1.532843129
	2:00 AM	3:00 AM	1.017	1.314	6.456	1.145	4.036	8.333	9.364	13.333	12.145	15.297	15.213	1.421	0.756	6.153	0.112	3.705	8.778166741	9.53655559	13.35000001	12.1707483	15.43125001	15.81510415	1.511110372
	3:00 AM	4:00 AM	1.069	1.228	6.636	1.147	4.090	9.699	8.913	10.683	15.036	14.902	15.089	1.201	0.862	6.853	0.096	3.536	9.481666989	9.328998248	16.09166984	12.78989025	15.05416667	15.52982483	1.505624981
	4:00 AM	5:00 AM	2.033	1.235	21.883	2.111	7.080	20.767	12.065	20.686	26.950	16.661	17.395	1.270	0.830	17.370	0.099	4.274		9.786391169	15.85758769	21.83858704	26.34485169	26.64881027	1.487398853
	5:00 AM	6:00 AM	1.143	1.343	21.318	1.481	16.822		23.977	53.538	38.810	29.359	30.005	1.513	0.889	31.093	0.149	14.198		30.29939859	29.54982753	37.40840859	23.78903401	23.59703907	1.405255259
	6:00 AM	7:00 AM	1.370	1.288	25.864	1.501	23.914	20.504	36.039	47.305	34.663	42.837	43.447	1.348	0.918	22.833	0.169	25.386		34.12787214	48.28505923	31.65965092	41.61340853	42.16208788	1.445653272
	7:00 AM	8:00 AM	1.252	1.277	12.248	1.318	19.724	13.666	30.137	41.485	19.658	38.877	39.177	1.266	0.898	11.038	0.099	17.410	12.29169985	26.9789124	33.47106481	17.85297818	36.4678515	36.41353846	1.464669215
	8:00 AM	9:00 AM	1.306	1.278	10.215	1.404	7.962	12.367	15.607	23.708	16.553	25.115	26.494	1.297	0.886	6.956	0.091	6.880	11.38313328	14.54304262	21.48393966	13.25736434	21.92454127	23.09918561	1.394444442
	9:00 AM	10:00 AM	1.804	1.338	10.411	1.826	7.486	11.913	12.686	19.061	16.609	20.741	23.216	1.431	0.916	6.458	0.093	4.188	8.391666654	9.588739536	15.38611111	12.23814719	17.69057417	18.5655	2.018578706
	10:00 AM	11:00 AM	2.079	1.431	9.544	2.074	7.726	12.861	13.325	18.023	15.661	21.202	21.872	1.294	0.902	6.103	0.094	3.730	10.01111107	9.515897433	14.80131577	11.94427083	16.30071428	17.14561781	1.409615408
	11:00 AM	12:00 PM	1.875	1.385	9.505	1.895	6.954	11.969	12.506	18.800	14.809	19.379	19.795	1.342	0.891	6.237	0.094	3.608	8.462499948	9.324444439	13.70972222	12.30004699	15.47938123	16.13505324	1.438039228
Noon	12:00 PM	1:00 PM	1.646	1.422	7.443	1.712	5.737	10.307	12.241	16.669	13.504	17.828	18.210	1.368	0.898	6.173	0.093	3.657	8.956249952	9.449525873	13.23488448	12.09912498	15.04863845	15.59456752	1.388592266
	1:00 PM	2:00 PM	1.564	1.536	7.822	1.659	4.854	11.216	10.768	15.542	13.705	14.199	16.954	1.345	0.906	6.175	0.095	3.599	9.395833332	8.89525521	13.86217952	12.03566666	14.77354469	15.04856648	1.421934878
	2:00 PM	3:00 PM	1.453	1.366	8.064	1.534	5.257	10.677	10.743	15.773	13.821	16.526	16.950	1.467	0.936	6.231	0.094	3.624	9.589952403	8.957539704	13.553174E	12.03307699	15.12443366	15.73034398	1.399410028
	3:00 PM	4:00 PM	1.700	1.343	10.774	1.761	5.588	14.733	11.021	14.845	16.640	16.427	16.826	1.489	0.929	6.495	0.093	3.676	9.603388962	9.250724644	13.82631515	12.51246507	14.85723944	15.23053894	1.850398417
	4:00 PM	5:00 PM	2.164	1.400	9.877	2.235	7.985	12.874	13.155	20.014	16.188	22.646	22.671	2.775	0.897	6.627	0.095	3.798	9.666666521	9.149858335	14.29859078	12.74232482	17.85777311	18.348	5.128665291
	5:00 PM	6:00 PM	2.234	1.419	7.070	2.189	6.962	9.521	12.872	18.618	13.177	23.207	23.947	6.459	0.948	6.146	0.100	3.828	8.566666457	9.486954485	14.56093748	12.03600429	20.10383333	20.84179436	9.007568914
	6:00 PM	7:00 PM	1.281	1.255	6.812	1.367	4.491	9.573	9.719	14.325	12.733	17.292	17.475	6.882	0.895	6.040	0.095	3.647	8.974999934	8.759952367	14.27727272	11.92893519	15.84563402	16.44491849	11.14702367
	7:00 PM	8:00 PM	1.223	1.277	6.566	1.348	4.375	8.490	9.422	14.987	12.332	15.365	15.800	3.800	0.902	6.168	0.094	3.520	9.029166725	8.760833757	13.94555557	12.04648727	14.72595238	15.31019951	4.038137501
	8:00 PM	9:00 PM	1.152	1.216	6.477	1.243	4.229	10.550	8.975		12.127	14.954	15.024	1.360	0.870	6.135	0.093	3.544	8.913888893	8.611174253	13.14983334	12.24594917	14.76854762	15.09512578	1.387202378
	9:00 PM	10:00 PM	1.138	1.277	6.788	1.252	4.353	9.365	8.597	13.750	12.264	14.976	15.440	1.274	0.857	6.242	0.094	3.598	8.400555481	8.781294154	12.55320341	12.46633333	15.08607886	15.61596544	1.3915
	10:00 PM	11:00 PM	1.113	1.282	6.654	1.191	4.283	10.508	8.965	13.453	12.958	15.609	15.539	1.259	0.833	6.524	0.109	3.648	9.467500888	8.822569966	12.92499997	12.7698527	15.27350768	15.90955385	1.429375009
Midnight	11:00 PM	12:00 AM	1.094	1.342	6.371	1.218	4.169	11.030	9.343		11.873	15.454	16.163	1.336	0.860	6.461	0.092	3.722	7.799999927	9.331504045		12.51338364	15.53623187	15.91571959	1.498148125

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 12-Dec-13
Day of Week: Thursday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Length (miles)	EE8_C45 Site G to Site H 0.9581185541	EE8_2A5 Site G to Site D 6.1153150977	EE8_D58 Site G to Site H-1 5.9173481109	EE8_9A2 Site G to Site F 3.1226527327	EE8_D69 Site G to Site E 6.4513126	EE8_BB1 Site G to Site C 9.1002620297	EE8_D7C Site G to Site B 11.9579780	EE8_D35 Site G to Site A 12.7280985	EE8_D6D Site G to Site Z-1 15.2563625	EE8_2BE Site G to Site Z 15.4526357	2A5_D6D Site D to Site I 6.6662486127	2A5_C45 Site D to Site H 6.8810272121	2A5_EE8 Site D to Site G 5.1753813004	2A5_BS8 Site D to Site H-1 5.4209198533	2A5_9A2 Site D to Site F 2.9872702804	2A5_D69 Site D to Site E 5.1781882648	2A5_BB1 Site D to Site C 7.2201922751	2A5_D7C Site D to Site B 6.8738138146	2A5_D35 Site D to Site A 6.1009520239	2A5_D6D Site D to Site Z-1 5.8954854047	2A5_2BE Site D to Site Z 5.9826546492	BS8_D6D Site H-1 to Site I 6.8574718892	BS8_C45 Site H-1 to Site H 0.8574718892
Midnight	12:00 AM	1:00 AM		1.5300000033	7.0985294609	1.5608333351	4.0016666687				13.444877179	15.9027777	16.3041666	11.247619063	6.7527777427	11.9916666871	6.9771353868	3.0772225568	5.9916666871	2.4771193803	7.2166666597	6.1986111104	8.6828202894	6.3634954548	1.2499053158	0.8763441113
	1:00 AM	2:00 AM		1.5030036304	7.0523809668	1.6270833337	4.2354166948		10.49999994		13.8822222	16.5724358	16.9397435	8.733333279	7.1787038677	6.8923076996	7.2533174577	3.1379629957	6.6083333364	2.6444444434	6.9083333392	6.1571721181	9.1740196	9.8480072751	1.1545454525	1.3979166669
	2:00 AM	3:00 AM		1.5499999751	6.7854762037	1.2062499995	4.1717948821		10.03148153		13.2125555538	16.8153846	17.49375	7.1104166556	6.9032407701	6.7133333853	6.9200140113	3.1337209108		2.6538116439	6.4694444485	5.9257440431	8.9284223839	9.2734848331	0.9983133217	1.3260833361
	3:00 AM	4:00 AM		1.3291166866	7.1403985598	1.5399999998	3.9712500011		9.3230392056	14.5833333	13.0955882353	16.2750000	16.5828571	7.50833332	6.6237744877	6.6971428571	6.7299999944	3.0402307144		2.4868644403	6.4427083389	5.9925129781	8.7400463894	9.0813344685	0.9444444453	0.9312500009
	4:00 AM	5:00 AM		1.5833678816	15.714129317	1.5584423869	4.9100694433		9.8333047999	17.1847222	21.1503191489	23.5750000	16.0516666667	8.9534458201	6.3421764477	6.7200723899	6.4258824485	2.9644444252	9.9388888919	2.4481666572	8.2542708699	7.2440769877	8.8493503158	9.3814102056	1.2991666645	0.9481.3522
	5:00 AM	6:00 AM		1.4837975919	20.934043997	1.5933797951	13.907297968		14.625454955	34.3666666677	31.4338774194	23.7666666	23.7500000	21.5750000	7.0923076923	6.8926406452	6.7499987877	6.1850606063	2.9285024455	5.3458333335	6.6389021163	10.139691016	7.2892456353	10.215843135	12.545454336	1.2499047413	0.9834722222
	6:00 AM	7:00 AM		1.5360215307	20.3502140997	1.5985393988	20.507208885	33.31666667	38.38838382	36.5463333	31.6086774	37.7323529	38.6729799	7.2658747133	6.0215635666	6.3295555557	6.1351700853	2.9142990432	5.0888888446	3.6512223778	9.6003193618	6.3285384038	12.0369761	12.538551289	1.1481388889	0.9405694444
	7:00 AM	8:00 AM		1.5951388875	11.21564422	1.6806130617	15.035285115		24.86088433	30.97613636	18.5780952	35.6957576	37.0166833	6.9854166833	6.1126914461	6.5618055552	6.2923605172	2.8871264126	5.1194444778	2.8381053155	6.6309981568	6.6076087011	9.7540933888	10.2873405	1.1347561115	0.9305059949
	8:00 AM	9:00 AM		1.582528977	7.4188405573	1.6258802884	6.9527777759		14.974179166	21.7296874	14.3178873	24.4209597	26.0810344	7.5318037699	6.1408804666	6.5762051125	6.2562324952	2.9101814481	5.0988888664	3.3000018815	6.6890000099	6.0751457761	10.678864881	11.179583134	1.1897163083	0.9271718855
	9:00 AM	10:00 AM		2.1993635571	6.7291668478	2.2901785715	6.4166057908	11.04999991	15.18530351	15.3683333	13.0731.0937	18.922043	21.2910.1342	7.3041785.4	6.2141518007	6.8547614.2	6.3554455321	3.0820044481	4.9178625741	2.5142585367	6.0586335441	5.8437489991	10.107577.837	10.513.48594	1.3251441258	0.1184810353
	10:00 AM	11:00 AM		1.6052535812	6.4988303393	1.6615000004	4.0912280571		8.7478236278	14.9841666	12.2929648	18.912.5926	21.1934.2106	7.4254423.74	6.3425431852	6.8429620747	6.4329320792	2.8801253951	5.5283330405	2.4383535351	7.8944852796	5.7839035232	10.377465954	10.886811.88	1.1712500009	0.3052235043
	11:00 AM	12:00 PM		1.5806122459	6.473656699	1.6650230119	3.9341750021	16.59166683	8.3059444.31	14.8736.1315	12.4213.95413	16.1.1.0.5877	18.7997.9369	7.5241161.65	6.3587.13.03	7.0533.0733	6.4981.19275	2.9893.20483	5.1437.49503	2.4758556441	8.3539787.83	5.9478.25.033	9.1937.03.036	9.7.7965687	1.2233333356	4.0413.97.185
Noon	12:00 PM	1:00 PM		1.4150992.1	6.6604497731	1.7065547627	3.8861.788.82	28.45000008	9.328024.1656	14.1183333	12.8486.4686	15.4955.2.75	16.0.3.2.8.83	7.7784548.39	6.8507.18.998	7.2.2.3.9.0274	6.9513.5502	3.0932.79.106	5.4222.22.188	2.6035.55.458	7.2749.9.9.94	5.8.3.5.8.7.1.87	8.8891.6.0.1.62	9.0.0.0.5.3.6.6.4	1.1871.5.2.7.82	0.4553.0.3.0.46
	1:00 PM	2:00 PM		1.5359.4.3.9.3	6.4.9.9.9.9.6.9.9.4	1.6764.6.1.4.79	3.9.8.3.3.2.3.2.6	8.8.6.0.3.1.3.4.4.3	9.5.6.2.2.2.2.2.4.6	13.7.5.4.7.2.2.1.6	12.4.0.6.8.9.4.0.5	15.4.9.4.6.1.4.5.5	16.8.6.3.9.7.0.5.9	7.8.1.6.8.2.2.2.2.2	6.3.9.6.4.8.7.7.1	7.2.3.6.4.8.7.7.1	6.5.8.6.3.3.3.1.6.8	2.5.2.5.1.1.1.6.8.6	7.1.2.3.9.3.1.5.4	5.7.9.9.2.5.0.7.4	8.4.7.8.9.3.0.2.8.4	8.5.5.1.0.2.8.1.5.4	8.9.2.9.3.4.9.2.6.7	1.2.4.1.0.1.3.9.7.2	0.0.5.0.8.9.3.6.3.8
	2:00 PM	3:00 PM		1.6971.4.2.8.5.8	6.5.9.7.7.4.3.0.3.8	1.7.7.8.3.3.3.3.3.6	3.9.2.6.3.8.8.9.9.1		8.9.0.7.4.5.6.1.3.2	14.3.0.1.6.6.6.6.3	13.0.5.3.2.6.2.9.3	15.3.5.2.4.1.2.9.5	15.8.2.3.7.0.5.5.9	7.5.6.8.3.3.3.2.2.2	6.4.2.3.7.7.4.4.7.7	6.9.5.3.3.5.5.5.5.7	6.4.2.2.7.0.7.9.8.1	2.9.0.1.2.5.3.8.5.5	5.8.6.3.3.3.3.3.1.6	2.4.2.4.7.9.3.6.8.8	7.6.3.2.5.7.5.8.1	5.9.9.5.2.5.0.7.8.4	8.5.5.1.0.2.8.1.5.4	8.9.2.9.3.4.9.2.6.7	1.3.7.2.2.7.2.7.3.4	0.1.2.8.1.7.4.6.1.2
	3:00 PM	4:00 PM		1.1413.4.9.4.3.4.1	6.8.4.3.1.8.1.8.2.9	1.1.9.4.4.9.9.8.9.5.5	3.9.5.4.5.0.0.2.5.9	9.0.6.2.5.0.0.0.4.7	9.3.9.3.8.8.8.9.9.8	13.9.3.0.3.5.7.1.5	12.9.6.5.9.7.2.2	15.7.8.9.4.1.4.4.5	16.3.2.9.6.4.5.3	7.2.4.1.7.3.8.6.0.2	6.2.1.7.2.3.9.8.2.2	6.5.5.9.5.5.0.9.3.8	6.5.4.1.1.6.0.5.8.6	2.9.1.4.4.4.2.5.3.2	5.1.3.9.6.6.8.7.7.1	2.4.4.9.1.1.0.3.3.4	7.8.5.5.4.7.5.3.8.6	5.8.3.2.4.8.7.2.5.4	8.5.9.3.2.7.9.5.6.2	1.3.6.7.4.7.9.4.1.1	0.0.9.4.0.3.5.9.3.7
	4:00 PM	5:00 PM		4.4242.0.3.9.9.6	6.9.8.4.4.2.0.3.5	4.5.3.0.8.1.7.6.2.5	4.2.1.4.3.9.3.9.4.4		9.1.4.3.7.4.9.9.6.2	14.4.3.4.8.4.8.6.6	13.2.6.3.3.7.7.2	16.8.8.3.7.1.2.3.1	20.5.0.7.6.8.7.2.3	7.9.5.5.4.7.5.3.8	6.2.4.8.1.3.5.4.5.3	6.5.9.8.0.4.9.5.9.3	6.2.4.8.3.5.4.1.5.3	2.9.1.4.4.4.2.5.3.2	5.1.3.9.6.6.8.7.7.1	2.4.8.1.3.5.4.1.5.3	7.8.5.5.1.0.4.1.7.5	6.0.9.6.5.9.9.9.2.2	8.5.9.3.2.4.9.1.9.9	1.2.2.2.3.4.7.3.1	2.6.0.1.2.9.6.3.1.2	0.0.6.5.4.1.9.9.4.6
	5:00 PM	6:00 PM		4.9625.0.9.0.0.5	6.7.0.5.8.8.2.0.5.4	5.3.1.4.0.3.9.3.4.8	4.1.9.5.1.1.4.9.6.9		9.5.4.8.9.5.9.7.3	14.6.8.9.7.0.5.9.5	12.7.1.1.1.1.1.2	20.5.4.8.3.9.7.4.5	22.7.9.5.4.1.8.6.4	8.7.6.1.0.2.5.4.5	6.8.6.9.0.1.6.7.9	7.2.3.9.6.7.1.1.6.9	6.8.6.9.0.1.6.7.9	3.0.3.1.9.8.0.2.9.4	5.1.5.5.6.6.0.5.0.9	2.9.3.7.7.0.3.2.0.1	7.6.5.9.8.0.3.0.9.5	5.9.5.3.4.9.1.9.9.2	12.8.2.5.7.4.1.3.5	1.3.1.6.9.9.2.4.7.3	6.4.9.8.3.3.5.9.3.7	0.9.5.8.0.3.3.0.9.2
	6:00 PM	7:00 PM		3.4277777853	6.3004761482	3.6330289568	4.1574224044		9.5398.1.4.8.3.4.4	14.2.8.9.5.8.3.9.2	12.5.8.5.5.6.9.1.1	16.4.4.5.4.9.2.8.1	17.0.9.8.6.4.8.7.9	8.5.9.6.4.8.9.0.8.4	7.1.4.5.7.0.3.5.2	7.4.6.2.7.5.2.1.6	7.1.4.5.7.0.3.5.2	4.0.2.7.5.5.2.1.6	5.3.0.1.6.3.1.6.9.3	3.8.4.6.1.3.2.9.5	8.7.9.1.6.6.6.7.8	2.5.9.4.3.0.1.6.9.3	7.8.5.9.5.2.3.8.5	5.9.0.6.3.2.8.1.2	10.1.1.9.5.3.0.0.3	7.2.2.5.9.0.9.6.9.2	0.0.3.4.1.1.4.5.6.4
	7:00 PM	8:00 PM		1.9.4.0.6.9.8.2.5.3	6.5.5.2.1.7.3.9.1.3	1.9.2.4.5.4.5.9.5.8	3.9.5.6.7.5.9.5.1.2		9.1.0.0.0.0.0.0.1.4	14.2.9.5.4.5.4.5.8	12.4.9.7.7.7.8	15.7.1.8.3.9.3.3.8	16.3.8.6.4.5.8.7.9	8.9.0.1.4.5.9.8.2	8.8.6.5.0.3.4.9.5	8.8.9.0.4.5.7.7.7	8.8.6.5.0.3.4.9.5	4.0.3.5.9.2.4.4.5	5.1.3.6.6.8.7.7.1	2.4.4.9.1.1.0.3.3.4	7.7.7.3.7.2.5.0.8	5.8.3.2.4.8.7.2.5.4	8.5.0.7.8.5.1.2.2.1	8.3.2.0.3.7.9.5.6.2	3.7.3.9.1.1.2.3.2.3	0.9.4.1.0.8.5.1.9.8
	8:00 PM	9:00 PM		1.5.1.1.2.7.4.5.9.7	6.5.9.4.1.6.9.6.6.3	1.6.1.5.4.7.6.1.9.2	3.8.1.5.4.3.2.9.9.2		9.2.9.0.7.4.9.7.1.3	14.3.9.1.6.9.9.6.4	12.6.2.8.1.3.9.3.8	15.2.7.6.1.1.1.3.2	15.7.6.7.2.5.3.9.3	8.0.1.6.6.6.6.9.4.5	8.2.6.4.8.7.1.7.8	7.2.1.9.1.9.1.8.8.8	8.4.0.1.3.9.7.2.8	2.9.7.9.2.7.6.3.8	5.0.6.6.9.6.6.6.2.2	2.3.9.5.4.8.3.3.7	7.5.0.3.1.2.5.0.2.8	5.8.8.1.2.5.2.9.0.6.6	8.2.5.0.7.1.7.9.9.5	8.8.1.0.1.4.5.9.3.8	1.2.3.3.3.3.2.9.3.2	0.3.7.7.4.9.9.9.9.6
	9:00 PM	10:00 PM		1.5438.5.7.1.4	6.7.8.7.3.0.1.5.7.2	1.6.3.3.8.0.2.5.0.9.9	3.8.7.4.9.9.9.9.4.1		9.0.1.1.1.1.1.1.2	15.6.0.3.3.3.3.5.5	13.1.7.4.6.7.9.1.4	15.4.2.9.3.4.7.8.5	15.8.4.6.4.2.9.5.8	8.9.3.2.9.5.0.5.1.2	7.7.5.7.4.1.7.5.8	8.1.2.4.0.2.1.3.9.6	7.4.4.7.2.5.7.5.7	3.0.7.8.0.1.2.5.4.2	5.1.1.6.6.6.6.8.8.2	2.4.0.1.2.3.9.4.8.5	7.6.4.3.8.1.5.0.1	6.0.1.5.4.8.2.7.4	8.6.7.5.8.7.7.2	9.0.0.1.8.9.7.0.1.7	1.1.9.1.6.6.6.9.5.2	0.4.1.6.6.6.6.7.9
	10:00 PM	11:00 PM		1.4.9.6.9.2.9.8.1.4	6.8.5.4.1.6.6.5.3.2	1.6.3.7.4.9.9.9.9.0	3.9.5.0.4.1.6.9.7.2		9.4.8.3.7.9.6.3.1.2	15.7.0.3.3.3.2.8.9	13.0.4.2.8.5.7.1.3	16.1.9.4.1.1.7.8.5	16.1.4.7.7.7.7.7.9	6.7.7.5.8.7.1.8.8	6.4.9.3.1.3.8.6.8.1	7.4.4.8.2.7.5.9.4	6.5.6.9.5.0.8.0.3	2.8.4.5.9.3.8.3.6	5.0.0.0.0.0.0.0.3.7	2.4.2.5.3.5.1.6.9	7.9.4.9.9.9.6.6.3	6.6.9.6.6.6.6.9.2	8.8.4.3.6.0.1.8.4	9.2.1.7.1.9.2.9.7.6	1.1.7.6.1.9.0.4.7.6	0.0.3.1.6.9.2.0.2.9
Midnight	11:00 PM	12:00 AM		1.5.0.0.0.0.0.0.3.4	7.1.3.9.1.4.2.7.9	1.6.0.4.8.6.1.1.2.7	4.0.0.7.8.7.0.3.9.0		9.6.1.8.5.9.7.2.7	16.7.1.9.9.6.4.8.9	13.9.1.3.2.3.5.3.9	16.4.1.2.5.0.0.3.1	17.2.8.4.2.9.4.2.9	6.7.9.6.3.5.4.1.8.3	6.3.7.3.9.1.5.9.8	6.8.8.5.8.9.7.4.1.8	6.5.4.9.0.4.2.1.2.2	2.9.5.3.2.4.0.7.4.1	5.4.7.5.0.0.0.8.5.9	2.4.9.2.5.1.6.4.7	8.0.1.6.6.6.6.7.9	6.0.9.1.4.3.5.3.7	8.8.9.9.2.4.8.0.9	9.2.2.6.2.1.9.6.9.2	1.1.5.1.5.1.1.9.4	0.3.5.0.7.7.2.4.9

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 12-Dec-13
Day of Week: Thursday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	BS8_EE8	BS8_2A5	BS8_9A2	BS8_D69	BS8_BB1	BS8_D7C	BS8_D35	BS8_D6D	BS8_28E	8A2_DED	8A2_C45	8A2_EE8	8A2_2A5	8A2_B58	8A2_D49	8A2_BB1	8A2_D7C	8A2_D35	8A2_D6D	8A2_2BE	D69_DED	D69_C45	D69_EE8
			Length (miles)	Site H-1 to Site G	Site H-1 to Site D	Site H-1 to Site F	Site H-1 to Site E	Site H-1 to Site C	Site H-1 to Site B	Site H-1 to Site A	Site H-1 to Site Z	Site H-1 to Site Z-1	Site F to Site I	Site F to Site H	Site F to Site G	Site F to Site D	Site F to Site H-1	Site F to Site E	Site F to Site C	Site F to Site B	Site F to Site A	Site F to Site Z-1	Site F to Site Z	Site E to Site I	Site E to Site H	Site E to Site G
				9.917481910	6.009488204	3.956647186	7.398098845	9.331653900	11.46374762	15.60914650	15.88859953	16.17561232	3.731650953	3.908745328	3.241957237	2.992705284	3.956647186	4.298227004	5.195218984	9.941950953	9.807870426	10.54742128	12.14156404	12.47863468	7.398098845	6.453233906
Midnight	12:00 AM	1:00 AM		6.823214299	6.448333313	3.674603176		9.039583351	12.28333343	12.94206349	15.81587302	16.14761905	9.664285681	3.603190147	8.431750976	2.765246239	3.731046011		5.166666699	9.158333370	8.939583334	11.70662698	12.08226188	12.74166668	8.398582927	
	1:00 AM	2:00 AM		6.636458339	6.419444448	3.654166644		9.335309498	14.99166668	12.92500256	16.05666999	16.90883253	8.612037922	3.771252087	7.733333381	2.700347247	3.805852369		5.497348461	12.13958334	8.779634038	11.94792396	12.39656863	10.5018667		
	2:00 AM	3:00 AM		6.545833300	6.13709218	3.573412686	8.708333373	9.455555578	13.31666668	12.35764545	15.37129534	15.59059557	4.788333276	3.853174601	4.09454542	2.611718178	3.685416647	4.960416625	5.604824581	10.16666669	8.556208832	11.52777781	11.97541668	9.969666754	6.883333381	
	3:00 AM	4:00 AM		6.717857129	6.755460381	3.472795408	9.409999989	9.263157881		12.6344886	15.03446969	15.41208294	4.047916671	3.482312055	3.537037037	2.675954593	3.605000066	5.150757635	5.176923083	11.25238986	8.624371691	11.38870311	11.77736487	9.191666802	8.070833268	
	4:00 AM	5:00 AM		6.738111114	16.77475458	4.17976604		9.549019614	17.47187503	21.52988858	25.15413873	25.52546948	4.1291666	3.352405648	3.72309308	4.515394388	3.563888888	6.389212355	5.216981364	10.39341666	11.33768228	11.34862826	11.86280152	5.958444449	9.643999961	
	5:00 AM	6:00 AM		6.806736143	30.84132578	15.67599266		13.63031217	28.59037796	31.52133985	23.42418047	23.64468593	3.68291.7519	3.243886743	3.647677401	6.440393178	3.329377628	7.659000119	7.830702226	14.47485897	13.7799427	13.89052576	14.18293.806	13.40461676	10.4027781	8.608333329
	6:00 AM	7:00 AM		6.787037048	22.42132669	25.08695652		33.68312147	39.96222228	31.25420769	41.36774195	41.66173078	4.093954799	3.218395052	3.717657528	4.766410232	3.329675579	6.538909293	10.02268956	15.6871795	11.25473293	18.71386744	19.33723989	14.2743589		9.850000000
	7:00 AM	8:00 AM		6.782389938	10.75240000	17.17295992	12.10625001	26.76939176	32.88976195	17.77495835	35.25877193	35.9430635	4.075468145	3.29764787	3.618548231	3.830779224	3.398053345	5.489972224	7.709297223	13.43964515	10.47290888	14.84922566	15.41912972	10.92445481	9.436904801	13.35166800
	8:00 AM	9:00 AM		6.774113464	6.979891304	6.693607258		14.2857778	21.87500001	13.41214467	21.89864339	22.37171051	4.093421064	3.276948053	3.718618801	2.822342995	3.40959772	5.356666698	7.067197992	12.43862983	9.027810084	14.52149999	15.07985397	9.343589794	8.358333327	
	9:00 AM	10:00 AM		6.725268335	6.398428578	4.193400447	8.375000046	8.630555559	15.23500004	12.38772727	17.45883934	17.85937823	4.132692132	3.350942859	3.7251.3899	2.633752948	3.387643514	4.763636367	5.378788141	10.97553764	8.483431377	13.68586155	13.60358797	8.479166668	8.172727302	24.26666668
	10:00 AM	11:00 AM		6.770634908	6.013771183	3.640490126	9.655555543	8.399358601	14.40509261	11.87533003	16.39439778	16.8383334	4.228712863	3.372425472	3.831071429	2.595129108	3.49759508	5.313137282	5.181592536	10.21565041	8.302478447	12.89898219	13.38907803	8.868541681	7.900000034	18.66250043
	11:00 AM	12:00 PM		6.732143858	6.164181277	3.516543403	8.404166595	8.855974355	13.42426244	12.14516329	15.25350703	15.7510732	4.298566113	3.453197953	3.925813893	2.633061122	3.529095325	5.229497336	5.166125531	10.45161391	8.769237587	13.84139255	12.42151884	9.601388889	8.259722337	9.616666541
Noon	12:00 PM	1:00 PM		6.738295288	6.063869548	3.575032262	8.648333362	9.272838262	13.14583334	11.9304191	14.79888116	15.42604167	4.398826186	3.818320821	4.098252492	2.593375592	3.882538765	5.269279167	5.592925926	10.16500001	8.412521588	11.44845491	11.91217228	10.93240742	8.996277682	
	1:00 PM	2:00 PM		6.791856521	6.065303557	3.536073256	9.083333361	8.853874999	13.66809091	11.83914.8261	14.55560145	14.9495873	4.916145839	5.480309624	4.364527016	2.6171069	5.556511803	5.177499646	5.334761909	10.2247222	8.424352525	11.12437811	11.46329588	18.75303029	18.64166661	10.02083149
	2:00 PM	3:00 PM		6.788759712	6.164995597	3.548062022	9.099166666	8.888157912	13.61928823	11.97108262	15.07138048	15.78587399	7.088228808	9.123941788	6.884782602	2.618813122	9.325008769	5.290825012	5.131488242	10.10406503	8.473218666	11.17705127	11.55975491	25.5311111	24.31250008	34.10000011	
	3:00 PM	4:00 PM		0.795620181	6.431887241	3.604301072	8.439583256	9.229924234	13.67708336	12.42716359	14.79279999	15.19942245	9.222462627	11.99514026	8.418954297	2.740442828	12.36829366	5.161666648	5.277826091	10.18660712	8.758154118	11.19308813	11.67935405	31.23796298	27.15833335	23.71666677	
	4:00 PM	5:00 PM		0.778849163	6.550149947	3.743958177	9.572916753	9.080483731	14.24300003	12.72418898	17.65222222	18.13255208	13.26761954	15.58916666	10.06709771	2.813916134	11.73731568	5.5466665	5.243589746	10.76985188	8.926768538	14.44102183	14.958	33.95833336	28.41805556		
	5:00 PM	6:00 PM		0.815337398	6.696273578	3.775990753	8.619444518	9.421739134	14.40175438	11.92353375	19.79025	20.96438575	16.98037758	8.955796131	10.7936192	2.589974618	9.928233149	5.113904793	5.507327931	10.5371213	8.547480629	15.74572193	16.53487103	37.68055553	23.70277778		
	6:00 PM	7:00 PM		0.753911577	6.000729155	3.564583328		8.858838357	14.22579363	11.86668967	15.80754903	16.32833985	23.12356887	5.837893077	14.74770314	2.582361778	5.883872555	5.219999987	5.182882872	10.36421863	8.581352499	12.34910942	12.6752163	25.77986113	19.10476185		
	7:00 PM	8:00 PM		0.770238089	6.113963958	3.486892431	8.945833426	8.843859649	14.47156952	11.91	14.66908773	15.17133123	10.88028574	3.99582783	8.398284322	2.583296559	4.09573379	4.981333408	5.142351903	10.34334535	8.384468387	11.29439551	11.69947752	11.39833337	25.3583334		
	8:00 PM	9:00 PM		0.743209869	6.043349693	3.523417723	7.741666753	8.574031008	13.1283334	12.10869865	14.73093231	15.00939718	5.040044243	3.329444442	4.9127725	2.545837018	3.421809589	5.158333535	5.031666656	10.21805565	8.417607531	11.13621212	11.49659788	11.28166673	8.035714282	8.216666693	
	9:00 PM	10:00 PM		0.707683218	6.298631034	3.5217803	7.638888911	8.671666652	12.88194448	12.45283333	14.99699929	15.43440959	3.90968888	4.752101854	3.854614524	2.648102317	4.905222113	4.941666643	4.971884134	10.42958744	8.691761284	11.2427214	11.58874988	12.00000008	10.31666663	7.020833298	
	10:00 PM	11:00 PM		0.659444466	6.451744185	3.583764356		8.770156033	12.88055557	12.61979166	15.30305121	15.90955283	5.974396133	3.466333333	6.106290906	2.680651274	3.539583329	5.711111269	5.100095786	10.42569523	8.884513687	11.5454224	12.01093305	8.941666698	8.433333188	
Midnight	11:00 PM	12:00 AM		0.619716958	6.401186274	3.650000009	7.808333397	9.264964849		12.36722224	15.37385727	15.79875926	4.021254339	3.355028747	4.022222726	2.720464784	3.485201068	4.508333198	5.215492948	10.36333351	8.812500007	11.62644445	11.9472977	9.114583349	8.226666704	

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 12-Dec-13
Day of Week: Thursday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D69_2A5 Site E to Site D 3.370286242	D69_BS6 Site E to Site H1 7.3680084	D69_9A2 Site E to Site F 4.280027598	D69_BB1 Site E to Site C 4.187734127	D69_D7C Site E to Site B 3.859277743	D69_D35 Site E to Site A 7.464864488	D69_D6D Site E to Site Z-1 10.46089868	D69_2BE Site E to Site Z 10.70278823	BB1_DED Site C to Site I 8.820934426	BB1_C45 Site C to Site H 3.104184493	BB1_EE8 Site C to Site G 4.955282008	BB1_2A5 Site C to Site D 2.210103526	BB1_BS8 Site C to Site H1 3.191450398	BB1_9A2 Site C to Site F 5.1952856	BB1_D69 Site C to Site E 4.387724247	BB1_D7C Site C to Site B 5.556016191	BB1_D35 Site C to Site A 3.882064877	BB1_D6D Site C to Site Z-1 5.872892039	BB1_2BE Site C to Site Z 7.229235142	D7C_DED Site B to Site I 11.73212464	D7C_C45 Site B to Site H 12.42527238	D7C_EE8 Site B to Site G 11.9078724	D7C_2A5 Site B to Site D 6.879813645
Midnight	12:00 AM	1:00 AM			4.352380934	9.249999909	5.099999998	7.144444477		10.74722233	13.71500001	14.15333334	13.22833326	8.622142886	14.76500005	2.114814818	8.832175906	5.07687873	8.922222236		3.783225265	8.804999978	7.19261862		12.93333326		7.95166672
	1:00 AM	2:00 AM			4.308333378		5.251666714	6.986666857		11.15277786	13.67361115	14.04583331	15.34583333	8.12447917	13.00416662	2.255166703	9.288095273	5.279166665	8.349999972	6.416666731	3.817013984	6.901139391	7.267045479				
	2:00 AM	3:00 AM			3.977083345	6.808333413	5.12500003	7.225000039	12.71666676	10.09375029	14.06666972	14.43750026	15.23333332	8.434027723	8.523916536	2.189772729	9.353333398	5.247727246			3.87465276	6.814655106	7.192599953		12.13333334	8.26666677
	3:00 AM	4:00 AM			3.945555573	7.819444388	4.723958317	6.589888858		10.1342908	13.27166663	13.72166663	14.89739651	8.899356022	8.759999994	2.141016466	8.9095238	5.127827942		6.164583282	3.712960043	6.508499585	6.919333332	16.29999983		8.07083331
	4:00 AM	5:00 AM			4.492307953	8.279166772	5.240886269	6.513127753	16.38333349	12.23421874	12.45416667	12.91875	9.883061293	8.85709876	8.52083334	2.054396562	9.045172269	5.11779814		6.46136953	3.892382155	6.488478748	6.725821423	16.13999987		15.1259993	9.31944437
	5:00 AM	6:00 AM			10.13738312	11.29166693	8.724166681	8.548888446	14.76428578	12.19531833	15.35991387	15.55987853	8.882934692	8.109312965	8.934817639	2.258089574	9.279253793	4.931594727	8.141666707	6.546432658	3.974662803	6.479853923	13.11666693	15.02833336	14.86111093	8.609426853
	6:00 AM	7:00 AM			10.33738316		10.01142857	13.54138889	19.49565788	18.98836898	21.21093366	21.70416666	8.996705418	8.055555566	8.71314013	2.050293328	8.185152133	4.937630788	7.514583333	5.495037456	3.791155294	6.682744738	9.369647822	17.01666662	13.24629629	13.42083333	6.999456737
	7:00 AM	8:00 AM			5.557227309	9.673611066	6.553888893	13.26352186	19.24309001	12.83456782	20.3488635	20.91171468	9.298089418	7.97552469	8.2613063696	2.016895376	8.080042859	4.913554834	7.066666674	5.614566835	3.585536832	6.967863242	7.603070172	13.87037042	12.76844448	13.40537816	7.072369425
	8:00 AM	9:00 AM			3.950666669	8.514166662	4.983333342	8.965666649	15.62333333	10.34423072	17.28024692	18.72533336	9.004432634	8.056574393	8.577777774	2.022899071	8.174999997	4.87458877	7.197222218	5.345942035	3.544262937	7.676553654	8.32403426	14.01515153	13.00598236	13.55960391	7.054730777
	9:00 AM	10:00 AM			4.025297606	8.288333338	5.087837625	6.419444425	12.09861109	9.969748772	13.87129626	14.1333333	9.585118043	8.185851983	8.478901793	2.053443039	8.297564563	4.856897077	7.058333298	5.299578044	3.682053481	7.781909863	8.2255141	13.67083333	13.05895788	14.14999959	7.191212117
	10:00 AM	11:00 AM			4.235526326	8.004166712	5.078944446	6.477222215	11.74166664	10.14809955	14.4854167	14.99956142	9.218439725	8.323151999	8.860416682	2.054253294	8.40522807	5.05045045	6.872222214	5.297499988	3.639720199	8.429999999	9.096089514	14.49027775	13.12569441	14.3883337	7.573525745
	11:00 AM	12:00 PM			4.032254883	8.551190458	5.113405795	6.985277765	12.92705133	10.14758055	13.1971795	13.943452	9.713957495	8.497067885	8.827013474	2.065	8.618931048	5.068545079	7.13365	5.545535035	3.603988885	7.039444432	7.72211535	14.23055548	13.15647059	13.93911107	7.359473688
Noon	12:00 PM	1:00 PM			4.100452562	9.056944433	5.560483875	6.888283302	11.90625	10.12727724	12.97920001	13.77500006	9.681628692	8.331018522	9.146428577	2.069814278	8.457048222	5.080997882	7.218749998	5.556276012	3.872424242	6.946953172	7.366959472	14.73333338	15.00272223	14.47592592	7.698811136
	1:00 PM	2:00 PM			4.071052617	18.75166651	11.49484129	6.587499997	12.25833348	9.69083533	12.92142854	13.24999997	9.504629636	9.10312507	9.300000009	2.10017059	8.354289228	5.349408986	7.378166634	5.76285719	3.766440625	6.690543509	7.034562839	20.49285711	15.01666607	15.0583333	7.867231619
	2:00 PM	3:00 PM			5.170977006	26.68333344	15.82666664	6.633333312	11.92380949	11.1872548	12.90512802	13.35555555	15.72049951	14.3821948	17.32698413	2.565177132	14.45652171	9.607029296	9.18888888	5.271438557	3.537017694	6.400833333	6.796581208	23.70641026	19.3783333	20.07833338	8.469615349
	3:00 PM	4:00 PM			5.600000012	28.58999999	15.80666143	8.258333394	12.1716667	11.39469785	14.17892159	14.60520836	24.97659972	24.16822926	23.81587953	5.659633542	23.76452361	15.69720833	14.38488093	5.453709648	3.711799914	6.651744176	7.1094951	33.32420635	32.38305555	32.6074994	15.3336484
	4:00 PM	5:00 PM			7.668790848	29.2	17.33582796	8.120555542	13.14499995	14.00889447	17.96428573	19.0363095	31.31997708	29.18277242	28.063125	6.940472939	29.23778735	16.95614857	14.82628205	5.534057954	3.699255724	10.09952379	10.8405926	45.98541664	45.12909885	41.4800716	26.43702381
	5:00 PM	6:00 PM			5.192628197	23.78333339	15.97142859	10.24807953	15.3416667	12.01666657	21.40804349	22.41666677	30.28851355	25.76391739	24.48540677	5.535548649	25.97857143	13.45048039	14.82707695	5.446111109	3.777868857	10.78895429	11.79666667	54.38333359	52.58557972	49.93240768	27.197002
	6:00 PM	7:00 PM			4.071296295	18.69285715	10.58730158	8.412037963	14.11583335	10.72619047	16.375	39.35064185	24.87587301	28.51637932	58.57958812	24.83967238	15.70783691	15.50837585	5.528756002	3.834549122	6.968194448	7.433615823	83.65	52.45952083	52.11666668	27.31666666
	7:00 PM	8:00 PM			4.296666653	19.5207143	8.007575732	6.623437963	11.71666669	10.13166653	15.45203832	13.73476518	24.84559745	19.70406503	21.54631818	4.278547986	18.75293703	13.08818717	14.13645837	5.45592278	3.672008526	6.468444437	6.81642857	44.92333338	41.19703888	40.33333335	19.59305555
	8:00 PM	9:00 PM			4.081904762	8.395238039	4.936904782	6.534999983	17.90833326	9.899428585	11.84166664		12.45333383	11.34522088	12.9666698	2.411798703	11.45682786	7.405300277	7.364583327	5.340151597	3.55530364	6.267412938	6.614617494	18.36428568	18.7814706	20.26190472	7.814999997
	9:00 PM	10:00 PM			3.883333302	10.92222222	4.799479161	6.171666683		10.52361114	13.39583338	13.73611109	8.892291703	8.33879022	8.982171913	2.144897558	8.405922696	5.060105669	7.262499941	5.565555581	3.585613218	6.423098047	6.75890153	13.84666663	14.78074072	16.36333315	7.786953849
	10:00 PM	11:00 PM			3.758333274	8.616666703	5.187499968	6.147916725			13.69375003	14.10416669	11.58841395	9.948789178	11.48958301	2.225273575	10.09576923	5.308933814	7.293333309	5.697777741	3.628100763	6.490852423	6.840259741	17.13333398	15.19166668	17.39791964	7.553151549
Midnight	11:00 PM	12:00 AM			4.333333299	8.271666697	4.771736819	6.027777717	10.64166661	10.99874997	13.94166645	14.19999992	8.60156248	8.552462539	9.24597888	2.023122719	8.578333329	4.988351851	6.781499981	5.681111149	3.72563027	6.573903524	6.912508988		14.66388887		7.91249997

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 12-Dec-13
Day of Week: Thursday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Length (miles)	D7C_BS8 Site B to Site H-1 12.46174762	D7C_9A2 Site B to Site F 8.904999902	D7C_D69 Site B to Site E 9.699277748	D7C_BB1 Site B to Site C 5.506918011	D7C_D35 Site B to Site A 3.245999707	D7C_D6D Site B to Site Z-1 8.168835269	D7C_2BE Site B to Site Z 6.198197907	D3S_D6D Site A to Site I 12.69862498	D3S_C45 Site A to Site H 19.88534286	D3S_EE8 Site A to Site G 12.27409457	D3S_2A5 Site A to Site D 4.109836038	D3S_BS8 Site A to Site H-1 13.93734456	D3S_9A2 Site A to Site F 9.078125488	D3S_D69 Site A to Site E 7.466864488	D3S_BB1 Site A to Site C 4.38325e+07	D3S_D7C Site A to Site B 5.245985937	D3S_D6D Site A to Site Z-1 3.965169432	D3S_2BE Site A to Site Z 3.278531109	D6D_D6D Site Z-1 to Site I 25.38928231	D6D_C45 Site Z-1 to Site H 9.990189147	D6D_EE8 Site Z-1 to Site G 15.75172801	D6D_2A5 Site Z-1 to Site D 9.990189147	D6D_BS8 Site Z-1 to Site H-1 15.39916982
Midnight	12:00 AM	1:00 AM		12.93333326	11.49166661		5.216666648				18.03809525	12.9391025	18.81666653	8.100877723	13.01354166	9.246354168	12.80833335	3.747619048		2.818504897	3.170833019	20.62083333	15.3682298	20.70416673	8.721354165	15.29766709
	1:00 AM	2:00 AM									14.61458331	13.63561482	12.92142851	6.096921823	13.70719696	9.139546481	12.56666657	4.111574997		2.925009093	3.319699981	23.35937495	15.96404763	23.99166666	9.012573981	16.04166666
	2:00 AM	3:00 AM			9.099999931		6.187750935				12.97177779	12.96039414	12.92500004	6.118940556	12.91246999	9.229166672	13.37499987	3.949929836		2.78796375	3.127833681	17.45416658	16.62749998	15.59514811	9.031018535	16.65833334
	3:00 AM	4:00 AM			11.99166667		5.439555548				13.71823076	12.55633888	12.78333333	5.889751906	12.81752876	8.989652547		3.88992753		2.733185838	3.041366223	15.2761905	15.75049038	15.6566667	8.933560385	15.68333331
	4:00 AM	5:00 AM			10.39583334		5.124999953				12.58519608	11.9462564	12.45059524	5.805424531	12.58516468	8.648682542		3.784746012		2.730895415	3.022252748	16.3934444	15.89999998	15.31458222	8.703811698	15.88046878
	5:00 AM	6:00 AM	14.79166681	11.75520834			5.324166808				12.03964702	11.9455174	11.9605357	5.878784	11.9854466	8.677348993	12.68611108	3.694602445	6.358333379	3.089911589	2.9859592	15.53107915	14.83303283	15.29791667	8.573737218	14.82296849
	6:00 AM	7:00 AM	12.76333526	9.855854758		12.81041671	5.03642854	6.34999999			13.37065972	11.46838536	12.11176477	5.647087903	11.5824998	8.538343547	12.45277768	3.728807619	6.545833298	4.736263588	5.352411668	15.7445238	14.43143333	16.05892858	8.647611117	14.87301452
	7:00 AM	8:00 AM	12.92633578	9.815906108			5.103974356	6.511450345	9.924998811	11.03333317	13.04851727	11.74541664	12.11458333	5.648148144	11.87786388	8.491339867	10.98888888	3.810443026	6.594313708	3.37713389	3.93598652	16.20139274	14.1615942	14.44580578	8.3997123255	14.0845238
	8:00 AM	9:00 AM	13.39476192	9.845833338	12.48749994	5.067329262	7.263333475	11.52500002	12.10000008	14.03101204	12.01401959	12.0916665	5.790928823	12.13944886	8.7564604	10.98125001	3.991170637	6.557812543	4.062736249	4.677424248	16.2669282	14.2513021	14.66388889	8.337183905	14.43731865
	9:00 AM	10:00 AM	13.14380124	10.11083403	12.11666548	5.145229406	6.575000046	10.3166678	10.90833351	13.1333333	12.4214287	12.61631335	5.710625395	12.15134801	8.789783148	11.10833331	3.771039872	6.547619525	4.072576172	4.501485131	16.7708597	14.6364583	14.94079848	8.433001402	14.79907834
	10:00 AM	11:00 AM	13.43333166	10.3583.3008	11.41388889	5.513978497	6.65388886			13.20592949	12.1432016	12.7566992	5.705299152	12.1186274	8.695425731	10.5709334	3.852083338	10.39666674	4.59034772	5.127394912	15.84820262	15.07672765	15.15833334	8.428351953	15.19801136
	11:00 AM	12:00 PM	13.3277778	10.25000003		5.597023793	6.977083336	9.292857148	9.704166643	13.3742187	12.0714129	12.9545173	5.725851068	12.18055555	8.716352983	12.73750003	3.873333336	3.23745.0325	3.958819543	15.78502086	14.8545496	15.68993054	8.458141755	14.8763158
Noon	12:00 PM	1:00 PM	14.78066819	10.80892964	13.7166667	5.370238282	6.50000006	12.78666442	12.36205957	13.6159583	12.5265.392	13.0952.3845	5.717880958	12.5752548	8.804411799	10.88333205	3.897373545	6.693750028	2.778271458	3.093406604	16.17447088	14.69655958	16.4553.5257	8.443404252	14.7619842
	1:00 PM	2:00 PM	15.1421875	10.85.405641	20.33333327	5.773275878	7.151041645	9.366666656	9.599999981	19.50257552	18.09836771	20.44563334	6.139526513	18.15164211	13.23654972	11.7166665	3.68259878	6.850000061	2.715606361	3.011200723	16.3948.306	15.20833333	15.63854168	8.442242599	15.2781.4625
	2:00 PM	3:00 PM	19.09719899	15.60385574	19.10624995	5.876041864	8.071354172	18.7999998	9.783333362	27.70465739	26.83754298	27.67654322	10.64286616	27.37138947	19.91678572	12.9597221	3.741225185	12.04166673	2.794267877	3.139650723	21.60780423	20.76842105	22.87763158	8.811401807	20.90790813
	3:00 PM	4:00 PM	32.57083332	24.65873016	31.71944445	10.15365166	9.501666641	12.88583336	15.4591667	40.44854529	37.7767.0906	41.58999999	15.16682709	38.1334.9897	28.35596669	21.81666601	7.434129089	13.8472216	2.844602961	3.354410087	30.7354511	29.791.4007	30.53679572	13.2566197	29.99315749
	4:00 PM	5:00 PM	45.59812502	35.9724606	27.52333334	19.9353752	9.831944475	15.78541675	18.58796257	41.10845184	43.0413888	41.32142856	8.357857145	41.9252.5853	25.78770327	27.30277785	13.18279412	21.49166677	5.886855234	6.380457124	43.81476189	40.76814213	45.73809555	22.21155038	41.25999999
	5:00 PM	6:00 PM	51.91057691	37.29824269	34.47499992	21.06413651	9.038507952	16.46666598	18.92833351	42.45940851	41.3978741	44.99563.409	10.24464643	42.9854.4699	29.35920582	18.3531501	8.413121238	21.99375033	6.852364531	7.643899598	48.84919355	45.46656119	44.94494123	23.15998218	44.1536.7066
	6:00 PM	7:00 PM	53.496875	39.64999998	29.5642857	21.72833332	6.688714284	12.30958334	15.9077777	40.98235.833	38.2795397	37.42951666	15.83043982	38.1101.5874	28.27451852	16.07777774	14.2984.6545		3.712730423	4.113973098	56.5132114	48.1952.1977	53.85509552	22.32217453	46.8681.1594
	7:00 PM	8:00 PM	41.30572918	29.82100595	11.47499995	13.17274325	7.133333189	9.49833338	14.41875	32.7556.1033	22.60802468	23.73207987	10.3.755969	22.5915.5455	16.44419998	15.60333343	15.63917853	13.92500038	2.71389431	3.038854178	45.48290781	40.5966.4091	45.83409091	22.11859316	41.7.4882.197
	8:00 PM	9:00 PM	19.17916665	12.8991667	13.43333329	5.409313712				13.16119048	12.917.9487	13.12662315	6.312837839	13.1107.132	9.391805564	13.80833343	8.223172878		2.692706838	2.983530183	28.39429962	28.85218927	28.59192707	16.9012.2498	28.4309.9745
	9:00 PM	10:00 PM	14.4222222	11.02417539	12.39166668	5.749122795				15.43818527	14.4815.7403	15.85329091	6.454.786209	14.5318.8461	9.626898739	11.32499933	1.966975205		2.777019734	3.096481472	24.11874998	26.98916666	23.81811.1561	18.6503.497	26.92132.769
	10:00 PM	11:00 PM	15.95000002	11.10833335		5.719937505				17.17115387	12.2413.1946	13.35677883	5.73465732	12.3899.5878	6.782354733	12.26041663	4.269628517	6.912499974	2.785907883	3.129290434	23.1929.7387	20.57.204051	22.80948278	11.02563.8705	20.60595229
Midnight	11:00 PM	12:00 AM	14.23958334	10.76249998		5.526190417	7.212500027			12.69984489	12.1961.5386	12.6582276	5.747751304	12.2832.4286	8.697849459	10.7708333	3.672967708		2.780804786	3.128197579	14.52666669	14.32083.209	15.8783.3333	8.592750767	14.9050954

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 12-Dec-13
Day of Week: Thursday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D6D_9A2 Site Z-1 to Site F	D6D_D69 Site Z-1 to Site E	D6D_BB1 Site Z-1 to Site C	D6D_D7C Site Z-1 to Site B	D6D_D35 Site Z-1 to Site A	D6D_28E Site Z-1 to Site Z	28E_DED Site Z to Site I	28E_C45 Site Z to Site H	28E_EE8 Site Z to Site G	28E_2A5 Site Z to Site D	28E_B58 Site Z to Site H-1	28E_9A2 Site Z to Site F	28E_D69 Site Z to Site E	28E_BB1 Site Z to Site C	28E_D7C Site Z to Site B	28E_D35 Site Z to Site A	28E_D6D Site Z to Site Z-1
					14.6412185	16.4588869	6.8736629	6.1686329	3.2461954	9.2732233	15.7245154	16.1288519	15.4583257	9.2627484	16.1782753	12.6410495	16.7078224	7.4299154	6.1912705	3.2780183	9.2732233
Midnight	12:00 AM	1:00 AM			11.6977513	15.78541987	6.5162393		2.7827588	8.341137554	21.78541988	15.45851282	21.08214288	8.951995385	15.46166666	11.8033584	17.29811133	6.765258259		3.075288418	8.330135989
	1:00 AM	2:00 AM			12.225		6.83756000		2.84598747	8.352883333	23.87499988	16.42824673	24.28333333	9.311240323	16.59999999	12.51471633	7.087179487			3.214999996	8.332516335
	2:00 AM	3:00 AM	11.80504555	16.41666664	6.87708334		2.81306304	8.304596251	24.2763888	17.07675435	15.88703703	9.301754362	16.99366423	12.09055042	16.94166664	7.141666666		3.232575756	8.308104335	
	3:00 AM	4:00 AM	11.8217948		6.60033334		2.86425271	8.310747661	15.58537089	15.82833331	15.56111114	9.248125012	15.90326083	12.05034721		6.891369222		3.219017	8.332791981		
	4:00 AM	5:00 AM	11.85483568		6.57756881		2.79971969	8.289472334	16.98583334	16.07459998	15.34809552	8.98169555	15.97009804	11.9377359		6.906189883		3.110237585	8.332780418		
	5:00 AM	6:00 AM	11.33435943	16.03611114	6.49033201		2.79963553	8.284037698	15.41527776	14.66145666	15.43539	8.83160921	15.82204684	11.92036666	16.3972222	6.836081219		3.068937707	8.332470419		
	6:00 AM	7:00 AM	11.57956621	15.27777777	6.48873248	10.35833333	2.75825069	8.585601265	15.9344083	15.10787037	15.80833333	9.0289362	15.00918366	11.62079924	15.49999999	6.636346414	9.49166666	3.053758073	8.332901421		
	7:00 AM	8:00 AM	11.20818362	13.62916666	6.27154648	9.48249965	2.64517424	8.599398425	16.3529083	14.6927033	14.651139	8.572031358	14.53805555	11.521232	14.01805552	6.563813856	9.8852777	2.947994505	8.3009975		
	8:00 AM	9:00 AM	11.0674648	15.22000003	6.27128449	9.534375044	2.69488728	8.595003798	17.0803572	14.70287402	14.94730394	8.642714389	14.77277132	11.4153406	15.66833344	6.536909271	9.8870337072	2.965007288	8.287308773		
	9:00 AM	10:00 AM	11.39521178	13.83545838	6.45000005	9.87143857	2.7054383	8.53173798	17.12999337	14.88165262	15.54104536	8.74471236	14.97984286	11.56524405	14.18274998	6.689714403	9.9770833202	3.002118054	8.3057 1509		
	10:00 AM	11:00 AM	11.55428356	12.76666671	6.36509999	11.4291867	2.70344513	8.505012831	16.08038475	15.26105974	18.9521787	8.747278917	15.18251634	11.82952815	13.15277778	6.670833331	11.6874999?	2.996979167	8.300301692		
	11:00 AM	12:00 PM	11.49624277	15.50994452	6.41029975?		2.73961388	8.527043148	16.15345833	15.93285418	15.21486497	8.71832109	15.11957576	11.8972477	15.9597223	6.648425184		3.020988929	8.295352535		
Noon	12:00 PM	1:00 PM	11.4118291	13.53333322	6.42367814	8.929999954	2.729963227	8.314156122	16.9522681	15.12815534	17.6925	8.715893816	15.19495412	11.7166666	13.8916666?	6.72451268	9.1749999936	3.021621617	8.295559854		
	1:00 PM	2:00 PM	11.44485407	15.2666666	6.44220766?	9.258333407	2.76628163	8.3166439	16.75011417	15.48719985	15.96133333	8.702958159	15.52469603	11.77861771	15.2175	6.714743604	9.54166666	2.989645126	8.285546962		
	2:00 PM	3:00 PM	15.63606259	15.70333335	6.43956916?	12.52499966	2.67585799?	8.350886071	22.23892857	20.87976192	22.89533935	9.148442908	20.84968848	15.9201308	16.09499997	6.6997412	14.94166656	2.966111456	8.290892857		
	3:00 PM	4:00 PM	22.3664566	23.21869033	10.0875258	19.01666663	2.70201236?	8.360569756	30.52986773	30.37552763	31.78866561	13.59224253	30.39363586	22.8543058	23.5683178	10.2173604	17.52916655	2.971166666	8.281864921		
	4:00 PM	5:00 PM	31.97816092	29.24999999	17.7853188?	15.9416667	3.57871446?	8.675753422	44.7929522	41.05997151	44.69978632	22.72843855	42.38373017	32.9925382	29.6216667	16.90418699	24.47083348	3.858238727	8.289238583		
	5:00 PM	6:00 PM	33.36193183	24.1697917	16.8731209?	30.79166663	6.81456333?	9.715934156	51.72748213	49.5457978	49.49809556	26.67669367	48.98139098	36.79418684	25.2145833?	21.70983454	31.02500003	7.443189133	8.494462292		
	6:00 PM	7:00 PM	34.88727422	22.68888893	19.4770833?		6.02717904?	9.368146133	55.77132916	49.6838843	55.31908691	24.9872186	50.35761155	38.08784681	23.4895554?	22.67989977		6.581432299	8.448709248		
	7:00 PM	8:00 PM	33.85235054	18.28333341	20.4254656?	21.03746997	5.53929487	9.303837723	47.96599045	43.5487353?	48.88892111	21.37375328	42.91885869	35.48894851	18.4416667?	22.3978197?	17.3666666	5.973483018	9.277551577		
	8:00 PM	9:00 PM	22.73655797	20.71388897	14.9327472?		6.67224842?	9.315350883	28.71833119	30.7283957	29.49263567	16.98135483	29.75854762	23.5633933?	20.8861111?	16.12753524		7.007879151	9.287209303		
	9:00 PM	10:00 PM	22.85639024	22.37500001	14.9792113?		12.0801382?	9.312203998	25.24616666	26.62366924	25.59566565	30.62354102	28.69263413?	23.9900955?	23.4458333?	17.7811566?	23.14833333	13.13744123	8.9914537?1		
	10:00 PM	11:00 PM	15.2371633	20.9458333	8.12107568		2.97452306?	8.318240094	25.02916667	21.40715278	25.52456784	12.0406148?	21.69230767	16.22661522?	21.3599999?	9.259037033		3.459773115	8.298640384		
Midnight	11:00 PM	12:00 AM	11.3861862?	13.44999997	6.43029834?		2.71143976?	8.321021014	15.01590909	15.31179924	16.1458333?	8.76864408	15.29544444	11.68120438	13.9083333?	6.704646026		3.024850274	8.318277776		

TRAVEL TIME DATA

1 HOUR CORRIDOR STATISTICAL SUMMARIES

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 13-Dec-13
Day of Week: Friday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	DED_C45 Site I to Site H	DED_EE8 Site I to Site G	DED_2A5 Site I to Site D	DED_B58 Site I to Site H-1	DED_9A2 Site I to Site F	DED_D69 Site I to Site E	DED_BB1 Site I to Site C	DED_D7C Site I to Site B	DED_D35 Site I to Site A	DED_D4D Site I to Site Z-1	DED_28E Site I to Site Z	EEB_DED Site C to Site I
					1.001	1.471	5.166	0.883	3.722	7.499	8.900	11.792	13.636	15.569	16.775	1.003	0.859	6.861	0.000	3.909	7.339169124	9.104181499	11.43542739	12.98533604	15.94173233	16.13982147	1.471419886
Midnight	12:00 AM	1:00 AM			1.056	1.302	7.262	1.187	3.981		8.751		13.950	14.801	15.058	1.169	0.810	6.431	0.114	3.722	7.850000003	8.948275861	18.21349995	12.88281244	15.27777778	15.81235833	1.458764713
	1:00 AM	2:00 AM			1.053	1.273	6.517	1.188	4.483	9.025	10.446	13.683	12.706	16.539	16.912	1.198	0.796	6.249	0.141	3.854		9.057291595	18.65833338	12.62249998	15.57916661	16.03558383	1.540625057
	2:00 AM	3:00 AM			1.097	1.333	6.786	1.218	4.217	9.945	9.295		12.371	15.126	15.558	1.178	0.879	6.182	0.130	3.626	9.952778675	9.009862724		11.97429633	15.39534917	15.9297037	1.532169842
	3:00 AM	4:00 AM			0.986	1.273	7.829	1.162	4.270	10.373	8.931	13.621	13.247	14.895	15.405	1.261	0.785	6.661	0.153	3.642	11.29166681	8.719017105	15.24166681	12.54199515	14.65872015	14.98811443	1.431790131
	4:00 AM	5:00 AM			1.163	1.194	16.982	1.337	5.489	17.706	10.340	19.730	20.043	15.815	16.096	1.251	0.860	14.154	0.128	4.065	14.33666667	9.198394737	25.71392143	19.50971159	15.23109516	15.59831873	1.481239313
	5:00 AM	6:00 AM			1.393	1.292	22.952	1.370	13.332	26.720	19.921	30.395	34.693	25.663	25.986	1.373	0.881	23.256	0.138	10.573	33.66728548	29.56057999	39.34921438	29.42153773	23.19696202	23.92634716	1.444252359
	6:00 AM	7:00 AM			1.233	1.253	13.722	1.389	16.652	16.460	26.464	32.632	34.550	37.410	37.286	1.358	0.909	11.313	0.136	14.059	13.87999997	25.97066488	29.42153773	21.31949541	34.69412203	34.72535841	1.503958889
	7:00 AM	8:00 AM			1.392	1.291	7.321	1.426	8.303	9.901	16.407	25.302	13.780	29.098	28.830	1.313	0.876	6.297	0.139	6.711	8.515666394	15.74159333	22.21843435	12.29837535	26.92482457	27.3825	1.463244869
	8:00 AM	9:00 AM			1.319	1.282	7.879	1.423	4.717	9.931	9.925	14.476	13.838	17.397	18.134	1.278	0.882	6.252	0.130	3.693	8.67555555	8.89037414	14.47143858	12.15923306	16.16989365	16.64505814	1.453723597
	9:00 AM	10:00 AM			1.370	1.314	10.326	1.455	5.381	12.368	10.423	16.838	16.491	18.490	18.092	1.365	0.886	6.514	0.135	3.664	9.00104166	8.71325758	14.43425483	12.79318831	16.46239669	16.95387436	1.64555596
	10:00 AM	11:00 AM			2.068	1.437	9.273	2.161	7.440	12.313	13.051	19.102	14.612	21.536	22.358	1.300	0.919	6.192	0.330	3.725	8.329411749	9.552734377	13.67750002	12.24554678	18.12533929	18.74482203	1.438988113
	11:00 AM	12:00 PM			1.654	1.543	7.914	1.778	5.687	11.935	11.435	16.225	14.134	20.254	21.159	1.329	0.898	6.175	0.329	3.630	8.582500034	9.356666666	13.9529714	12.03375757	18.54526469	18.03765151	1.412905595
Noon	12:00 PM	1:00 PM			1.517	1.496	7.883	1.662	5.286	10.734	11.091	14.361	13.574	17.178	17.892	1.355	0.920	6.097	0.328	3.623	9.213888861	9.233921164	13.73185818	11.90619548	16.20436617	15.83101374	1.489087726
	1:00 PM	2:00 PM			1.397	1.343	7.624	1.564	5.262	11.267	10.821	15.502	13.493	17.286	18.661	1.362	0.911	6.224	0.122	3.602	9.183332061	8.773809523	13.76231481	12.13705474	14.84753623	15.03290757	1.412121312
	2:00 PM	3:00 PM			1.625	1.369	7.954	1.745	5.124	10.697	10.716	16.906	13.568	17.680	18.530	1.351	0.873	6.184	0.126	3.746	9.29166656	9.243055587	13.52051285	12.07019232	14.94551282	15.34699947	1.414335648
	3:00 PM	4:00 PM			1.671	1.321	11.094	1.775	5.454	12.629	10.593	15.722	16.975	16.166	16.459	2.061	0.897	6.471	0.134	3.687	10.31000007	9.173863636	13.50169907	12.23170104	14.86490385	15.25379747	3.930075126
	4:00 PM	5:00 PM			2.179	1.464	11.803	2.292	8.365	14.901	13.885	18.195	17.736	22.644	23.220	3.116	0.897	6.884	0.135	3.887	10.48444441	9.527777801	13.88888897	12.8736413	18.17163462	18.525	7.995303039
	5:00 PM	6:00 PM			2.125	1.636	8.611	2.337	9.047	10.872	15.739	19.117	15.257	24.610	26.179	4.743	0.997	6.383	0.130	4.151	8.02499993	9.753707709	15.01166668	12.50448275	19.36616161	19.90073594	8.756495955
	6:00 PM	7:00 PM			1.573	1.254	6.843	1.625	5.838	9.742	12.310	16.630	12.798	19.024	19.917	5.337	0.933	6.003	0.130	3.736	8.375000004	9.290333321	14.72541668	11.90881877	16.03953272	16.74535986	6.088951282
	7:00 PM	8:00 PM			1.355	1.282	8.753	1.491	4.434	10.158	9.419	16.858	12.515	15.425	15.723	1.562	0.888	6.033	0.128	3.559	7.966666705	8.466481481	13.06395121	11.53804051	14.52169419	14.88229745	3.648620149
	8:00 PM	9:00 PM			1.220	1.280	6.585	1.361	4.351	9.172	9.568	13.794	12.151	15.145	15.444	1.290	0.838	6.009	0.141	3.567	8.566666745	8.618148163	13.79513887	11.95303303	14.47952381	14.91389849	1.411714988
	9:00 PM	10:00 PM			1.198	1.270	6.764	1.327	4.263	8.972	8.898	14.170	12.509	14.675	15.157	1.317	0.878	6.006	0.135	3.567	8.144444459	8.454922748	14.36999998	12.00100459	14.71268939	15.16233975	1.38305049
	10:00 PM	11:00 PM			1.148	1.269	6.488	1.274	4.261	8.817	9.086		11.958	15.208	15.493	1.271	0.870	6.094	0.134	3.531	8.948333312	8.479844969	14.05833336	11.84351849	14.61690822	15.10648718	1.368555539
Midnight	11:00 PM	12:00 AM			1.145	1.278	6.386	1.274	4.124	8.790	8.619	14.246	11.892	14.483	14.771	1.214	0.904	6.038	0.133	3.551	8.908333344	8.615173425	11.59999995	12.34454577	14.69845152	14.8867916	1.389888849

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 13-Dec-13
Day of Week: Friday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	EE8_C45 Site G to Site H 9.958138954	EE8_2A5 Site G to Site D 6.131328097	EE8_B58 Site G to Site H-1 5.617848109	EE8_9A2 Site G to Site F 3.132562737	EE8_D69 Site G to Site E 6.45033906	EE8_BB1 Site G to Site C 9.329382039	EE8_D7C Site G to Site B 11.95787904	EE8_D35 Site G to Site A 12.27808952	EE8_D6D Site G to Site Z-1 15.25619525	EE8_2BE Site G to Site Z 15.45263257	2A5_D6D Site D to Site I 5.665249512	2A5_C45 Site D to Site H 6.881022121	2A5_EE8 Site D to Site G 5.179185304	2A5_B58 Site D to Site H-1 5.629589533	2A5_9A2 Site D to Site F 2.982729284	2A5_D69 Site D to Site E 3.179198524	2A5_BB1 Site D to Site C 7.291992251	2A5_D7C Site D to Site B 5.873838249	2A5_D35 Site D to Site A 6.109590039	2A5_D6D Site D to Site Z-1 8.090489364	2A5_2BE Site D to Site Z 8.239714589	BS8_D6D Site H-1 to Site I 9.98254E-02	BS8_C45 Site H-1 to Site H 8.95971E-02
Midnight	12:00 AM	1:00 AM			1.586666518	7.438333594	1.556250035	4.195833268		9.777777772	14.51666572	14.23749997	16.87708338	16.96363637	6.636904757	6.467916678	6.782575808	6.414855096	3.005113634		2.436445888	9.354666516	6.482380853	8.854347817	9.16721312	1.148809967	0.778703357
	1:00 AM	2:00 AM			1.068749987	6.93055545	1.243333362	4.353703707		10.32592593	20.200009997	13.33833747	17.4231481	17.76018517	6.779166672	6.709663538	7.177941214	6.858875053	3.170754716	5.104166726	2.648212695	10.84791671	6.079232799	8.325450437	9.750231472	0.835418745	0.03333333
	2:00 AM	3:00 AM			1.019047648	6.784999518	1.225000055	4.051148351		9.651388731		12.79462754	16.28933833	16.90562498	6.560714283	6.613111093	6.680555572	6.777159545	3.079614254	5.091666542	2.482344625	9.670833348	5.934412686	8.004722216	9.1883641	1.116666973	0.037083333
	3:00 AM	4:00 AM			1.343333269	6.837500015	1.722916706	4.022346898		9.493115938	22.604166652	12.73333336	15.62575756	15.82412283	7.384583345	6.892652928	6.556944447	7.105384558	3.2282173	5.991666522	2.468069318	8.365277722	6.01475	8.623052998	9.003779074	1.095833324	1.25666669
	4:00 AM	5:00 AM			1.347916713	13.85434703	1.464487186	4.509462986		9.669333344	18.250002958	20.32963902	15.57812501	15.8449227	6.983870723	6.247792772	6.697222222	6.389766745	2.989417476	5.808333401	2.510333344	8.350002602	7.508890803	8.767062645	8.990152727	0.991666661	4.772777772
	5:00 AM	6:00 AM			1.584895833	21.35964101	1.764583305	5.692937307		9.61333625	23.423611111	21.1625736	15.49875002	15.6567555	7.143703704	6.677638886	6.781205687	6.75057472	2.969852648	5.818333603	3.630340383	8.365420833	8.783789545	10.60017235	1.09763888	4.482333349
	6:00 AM	7:00 AM			1.541666665	11.89972233	1.857552077	15.85722218	25.85200003	25.54579495	32.427083332	23.4607143	15.49476198	15.55453333	7.102721106	6.78235837	6.539455578	6.175916667	2.93939875	4.905111111	3.842110358	9.389986103	8.788549851	14.88569684	14.81710129	1.222303803	2.793749996
	7:00 AM	8:00 AM			1.561979165	6.571249988	1.705284528	7.500000026	15.21666666	14.94130598	24.833333337	16.2774999	10.11176811	10.1707576	7.33951999	6.670909536	6.601550393	6.280186169	2.9698352	4.885333398	3.3457425	9.092549649	8.037182724	13.05096599	13.19872548	1.162013005	6.899713537
	8:00 AM	9:00 AM			1.627777766	6.763194473	1.746992908	3.969181832	8.606333329	9.347979782	14.86999986	13.01436782	21.23072915	21.49374999	7.230788299	6.201699028	6.9454518	6.342887929	3.004981548	4.898484847	2.598444744	7.765634215	5.908118718	9.757255523	10.29135101	1.190104169	7.606782949
	9:00 AM	10:00 AM			1.568421959	6.643421866	1.702500002	4.046945306	8.600000009	9.489029534	15.15984848	13.23641308	17.8534508	18.5606587	7.381034479	6.220238802	6.954411743	6.313272969	3.021103568	5.027827931	2.473446735	7.851754118	6.159742628	10.3021782	10.89835711	1.202727272	5.511499997
	10:00 AM	11:00 AM			1.567045436	6.473731869	1.713285328	4.004326928	12.52666662	9.544010408	14.86666669	12.44772777	18.24504504	19.49999999	7.549572398	6.440099453	7.089650228	6.500235523	2.991266909	5.924166643	2.75731881	7.907777784	5.932139237	11.52419978	11.98578816	1.175434461	6.926833314
	11:00 AM	12:00 PM			1.567013542	6.46831896	1.668956462	3.931953206	8.883333262	9.29865155	14.92314813	12.55453778	18.052451	18.9395237	8.287916654	6.623959079	8.070924669	6.8275641	3.074853289	5.263333317	2.535668189	7.752540598	5.882423213	11.53297878	12.09601427	1.203181809	8.165409993
Noon	12:00 PM	1:00 PM			1.708187331	6.548999127	1.817292212	3.995729168	10.29999996	9.394444488	13.64166666	12.72957692	15.79849844	16.3825892	12.16928896	10.902	11.80454542	11.12182309	6.609883578	6.639983322	2.611569092	7.744135891	5.842693823	8.823826998	9.509807838	1.242278408	2.429828832
	1:00 PM	2:00 PM			1.612719317	6.624722222	1.710853613	3.966649968	9.775166765	9.52916663	14.25925927	12.61789716	15.47023811	16.1161457	16.833	14.73106061	15.88750952	14.81374008	9.674973077	7.460185186	2.531388889	7.771279703	5.898643607	8.549860179	8.836630204	1.181078374	8.787354343
	2:00 PM	3:00 PM			1.74593022	6.730151534	1.903252008	4.042138378	8.606333245	9.417307691	14.73039214	13.01640626	15.36818181	15.94999997	18.83812955	16.91479701	16.30296119	16.98303224	9.275813012	7.430303068	2.560595235	7.838930391	5.958482149	8.626920618	9.003569031	1.203240737	7.862162166
	3:00 PM	4:00 PM			3.008901517	6.887578616	3.13899061	4.11542211	10.63759005	9.436383613	14.50277778	13.89301803	15.63854171	16.5092989	22.78643791	18.0460766	17.33316668	18.23903084	9.571067738	7.915585559	2.547500004	7.806903862	5.946461443	8.642903014	9.062725797	1.926422791	2.743910256
	4:00 PM	5:00 PM			4.039444428	7.568939377	4.11790775	4.190451362	12.20416666	9.540000031	14.30950354	14.07458333	16.2502451	16.9096956	25.83617886	17.9502778	19.08489797	18.10553972	8.323249356	11.94541667	2.501785733	7.425112543	6.104956322	11.54222399	12.22395832	2.899904769	0.06499269
	5:00 PM	6:00 PM			4.182882949	8.975379199	4.379121938	4.698734979	10.87083339	10.55681816	15.53377357	13.3920453	20.56291695	21.23253809	29.03970588	15.98141447	15.09735772	15.25924145	6.929749705	8.144287871	2.644485291	7.878912585	6.052074832	12.68103774	13.30089985	4.597083171	0.06871049
	6:00 PM	7:00 PM			3.557971002	6.532118063	3.809751799	4.072286827		9.464999933	14.67391305	12.73778049	16.54696685	17.1617287	11.87686569	11.30704225	11.47499997	11.36633333	5.781683545	7.111111116	2.539711945	8.128529431	5.879957768	9.369953962	9.973373011	5.224272088	6.239754169
	7:00 PM	8:00 PM			2.471568613	6.352703694	2.59853597	3.952949923		9.050859978	14.6809524	12.4062497	15.52786458	15.8622027	7.110233619	6.385775851	7.205801153	6.53752501	3.091581373	4.96999994	2.417027785	7.466229695	5.826751888	8.533333233	8.829209875	1.329655209	0.857638893
	8:00 PM	9:00 PM			1.529166978	6.526111105	1.670666668	3.778088418		8.754999977	12.96833329	12.85579707	15.23498687	15.59959991	7.050490189	6.314473873	6.94444444	6.485674923	3.025859585	4.925000008	2.429418437	7.39824568	5.818807876	8.451024259	8.795525726	1.15099998	9.799166679
	9:00 PM	10:00 PM			1.615833331	6.70987403	1.727525229	3.95250669		9.654834578	14.52916673	12.68733335	15.47438557	15.98229128	6.870736104	6.344018655	6.851715686	6.488888811	3.001666248	4.605555407	2.417502611	7.642283667	5.916566657	8.462145048	8.813616073	1.150659953	9.425666529
	10:00 PM	11:00 PM			1.578234582	6.469166656	1.702419352	4.05267898		9.213847299	15.0999444	12.88888892	15.47651516	15.73068183	7.32941177	6.342999422	7.13484851	6.470273641	3.031818181	4.825641003	2.433183184	8.249999685	5.846661481	8.567890447	8.899479908	1.149441174	14.60092589
	Midnight	11:00 PM	12:00 AM		1.529923061	6.642857143	1.729583319	4.036574084	9.2875	9.088888893	14.72500001	13.29642858	15.4952961	15.98756003	6.769841263	6.694736853	6.994166698	6.173284323	2.995367727	4.898809509	2.430139977	7.558333334	5.958966854	8.506979164	8.858709479	1.096666688	4.882142875

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 13-Dec-13
Day of Week: Friday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	BS8_EE8	BS8_2A5	BS8_9A2	BS8_D69	BS8_BB1	BS8_D7C	BS8_D35	BS8_D6D	BS8_28E	8A2_DED	8A2_C45	8A2_EE8	8A2_2A5	8A2_BS8	8A2_D49	8A2_BB1	8A2_D7C	8A2_D35	8A2_D6D	8A2_2BE	D69_DED	D69_C45	D69_EE8
			Length (miles)	9.917481031	6.009486204	3.956547186	7.398098842	8.331605304	11.40216764	15.60514454	15.88695953	16.17561232	3.734509261	3.908745328	3.218672327	2.982726284	3.956547186	4.298227504	8.195218854	9.941959261	15.44742126	12.14156404	5.479614454	7.329118252	6.45533165	
Midnight	12:00 AM	1:00 AM		0.833333351	0.408796328	0.628333336		0.808333336	16.24583336	13.35000001	15.11812965	15.43765433	3.937333388	3.382758531	3.820588221	2.778809951	3.462878781			5.272881365	12.03333334	9.308333334	11.55833333	11.88052288	8.287499975	7.605555988	
	1:00 AM	2:00 AM		0.691666519	0.067999978	3.588511114		9.291736592	18.44166672	12.33458331	15.78154761	16.2641636	3.588194442	3.399074087	3.707638922	2.584924646	3.588837422	5.357083307	5.486858031	15.23333335	8.779333243	11.96249988	12.44722223	7.774999999	7.813888883	
	2:00 AM	3:00 AM		0.408333331	6.127963339	3.514583333	9.391666669	8.753821519		12.33257201	15.13824995	15.75088274	3.794607861	3.437286953	3.841666669	2.586749991	3.5808613	5.438333407	5.223151141		8.525905788	11.92083332	11.99704962	10.89583333		
	3:00 AM	4:00 AM		0.618333366	6.514880948	3.561944442	11.17499991	8.880574864	15.08333333	12.40146714	14.77407407	15.19650592	3.723583214	3.523033227	3.438541666	2.646428569	3.682533071	4.88757143	5.081944448	11.59761682	8.607611832	11.25474805	11.82146118	9.152777808	7.770833345	7.333333297
	4:00 AM	5:00 AM		0.690536132	14.05452699	3.929675269	14.03541665	9.095833336	25.56395268	19.57953259	15.59014178	15.3844613	4.098358025	3.217668224	3.541666651	4.272215152	3.314351912	5.381666676	5.188491564	12.2948718	11.19874638	11.25422784	11.84518703	9.258721256	9.366666614	
	5:00 AM	6:00 AM		0.690687979	13.84208504	3.929675269		9.095833336	25.56395268	29.35302049	22.0757262	21.87133686	4.953429573	3.187466666	3.530070381	4.272215152	3.314351912	7.181944465	7.924533995	14.74769369	13.17854533	11.45718283	14.15916678	11.13703166	11.11833331	7.974999955
	6:00 AM	7:00 AM		0.736486506	10.89664268	13.58899536	13.38951111	23.76292738	29.46246928	20.57680383	24.64921272	24.41522633	4.024479764	3.264444424	3.655025341	4.252108738	3.376182799	6.03291668	9.944434568	15.79059547	13.19645497	21.54772922	21.47437318	9.803295088	9.803112848	
	7:00 AM	8:00 AM		0.706818181	6.183418078	6.43721895	8.296153862	15.04024823	21.74855555	12.13423424	26.32869317	26.88777054	4.044879713	3.224040764	3.678168837	2.642989994	3.3574944	4.958139548	7.567852563	13.463553722	8.638746116	17.53299731	17.80984113	8.441319469	8.456533318	8.220833333
	8:00 AM	9:00 AM		0.706961985	6.086941394	3.570229677	8.271428538	8.725614031	14.19679488	11.80811782	16.05412913	16.49847059	4.220158739	3.291551732	3.66194443	2.637685764	3.451478528	4.953835996	5.227110619	10.3686405	8.561805548	12.34885477	12.69894445	9.226053861	8.047727238	15.63333336
	9:00 AM	10:00 AM		0.806818176	6.240909094	3.531318103	8.713636407	8.517553136	13.80500035	12.44388893	16.13482705	16.71477664	4.23276384	3.323857143	3.853503111	2.812454548	3.446363365	4.946397148	5.182916554	10.64842344	8.991669938	12.98314958	13.539775	9.521821528	8.281375455	9.425000009
	10:00 AM	11:00 AM		0.728773905	6.004331143	3.570892754	8.27892231	9.131214674	13.39311594	12.12983871	17.74007938	18.1421147	4.269568761	3.506351612	3.898268396	2.563208057	3.630307016	4.969861459	5.657297824	10.32007657	8.523958343	14.12835497	14.72059522	9.743095543	9.928703722	8.595833313
	11:00 AM	12:00 PM		0.747348512	6.058585225	3.505287799	8.625000322	9.10995688	13.67500015	11.88241985	18.48283133	17.91139807	4.57017663	3.88754734	4.13313078	2.545969113	3.598892329	5.180000325	5.327322368	10.25333393	8.481874388	14.06210953	14.62804187	11.01777781	9.659484699	
Noon	12:00 PM	1:00 PM		0.707539893	5.953936544	3.505629084	8.803333361	8.924673468	13.4240196	11.74573125	15.22558681	15.67453182	5.238950299	5.212183888	4.856161491	2.544604091	5.387127264	5.035416654	5.418491038	10.13716718	8.405979881	11.95455247	12.07952127	16.54999996	11.06944447	
	1:00 PM	2:00 PM		0.709080913	6.107902298	3.448184083	9.699166598	8.553076157	13.65582759	11.98950539	14.75816987	14.93943797	7.297018239	5.589900559	6.448495841	2.599637678	5.789935902	5.051923039	5.232352957	10.2410781	8.507799687	11.14678819	11.44606094	27.10192398	25.45555568	
	2:00 PM	3:00 PM		0.735416675	6.029353716	3.631489078	9.091666639	9.073076938	13.5827778	11.98094962	14.85561594	15.17422223	7.305851074	7.319498399	6.535681697	2.563058035	7.497391744	5.488333337	5.340138883	10.6623582	8.466136852	11.2357083	11.61612745	30.92135416	29.97916667	
	3:00 PM	4:00 PM		0.744871812	6.353346402	3.554310348	9.691666658	9.012499999	13.31875998	12.11913468	14.7033333	15.1263697	8.913565486	9.902035833	6.73754037	2.663814108	10.15433304	5.314709989	5.503585817	10.1645236	8.5897802	11.3013866	11.66099073	34.92804168	29.3066476	
	4:00 PM	5:00 PM		0.741319429	6.802803041	3.764275389	10.16944442	9.443435807	13.77055558	12.84802082	17.03529412	18.65364586	14.55903568	9.436261255	8.90479798	2.825648502	9.782880261	5.859166682	5.290977222	10.1982643	8.914853018	14.40867742	15.13784561	35.87499999	28.76190476	
	5:00 PM	6:00 PM		0.648135018	6.267660952	4.019964573	8.141666765	8.633795309	14.71233333	12.36033333	19.33968932	20.01859546	16.98779339	8.533496343	10.35993648	2.650789748	8.788147394	5.071874982	5.627976183	10.90225863	8.768083777	15.33379004	16.24934989	31.53907404	27.54166669	
	6:00 PM	7:00 PM		0.753787882	5.872528246	3.61740412	8.474999787	9.354452277	14.42480317	11.78513971	15.86187288	16.95208333	13.06382362	5.25271187	8.396491224	2.499708344	5.43035477	5.009723181	5.247795317	10.7350752	8.33456638	12.17219048	12.69520964	17.58749998	18.19523813	
	7:00 PM	8:00 PM		0.719696967	5.881547618	3.439814658	7.783333405	8.351742427	12.34821436	11.71284153	14.4237655	14.74789156	5.722275642	3.415895287	5.193297675	2.486333333	3.56833331	4.95257143	4.978595757	10.04333332	8.33510736	11.01598181	11.33333333	10.49521288	12.98499999	
	8:00 PM	9:00 PM		0.644097256	5.880349879	3.450578707	9.416666672	8.499518512	13.80000002	11.85393196	14.41415341	14.77954545	4.186197915	3.342361103	4.032249484	2.495083929	3.499987348	4.926388878	4.964497724	9.71944442	8.324814813	11.01851994	11.37985875	9.1369048	10.3525	9.450000098
	9:00 PM	10:00 PM		0.72013888T	5.942761074	3.472405094	8.030555564	8.380224487	13.86851648	12.04166664	14.62708334	15.14934254	4.054870136	3.3503008	3.786402488	2.559587103	3.477987084	4.809555525	5.025368143	10.5317081	8.532427528	10.9794277	11.45154167	9.295833271	8.441666644	8.766666729	
	10:00 PM	11:00 PM		0.6838888T	5.963555571	3.414855078	8.522916581	8.374404757	14.0277774	11.8486111	14.68809524	15.06168871	4.026666656	3.321413492	3.715650396	2.519999996	3.411619735	4.804562996	5.017499881	11.0798851	8.368713447	11.18908334	11.51984397	8.713809526	8.338333368	8.437499919	
Midnight	11:00 PM	12:00 AM		0.663233323	5.964896958	3.441287899	8.758333401	8.460975298	11.8974998	12.31625	14.47308714	14.74643869	3.882611116	3.223625171	3.847916678	2.526767684	3.398111126	4.991666691	4.988028724	9.840476196	8.611904767	11.11799399	11.41464669	8.848611102	8.199999999	

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 13-Dec-13
Day of Week: Friday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D69_2A5 Site E to Site D 3.72128214	D69_BS6 Site E to Site H1 7.3692838	D69_9A2 Site E to Site F 4.2800275	D69_BB1 Site E to Site C 4.1827124	D69_D7C Site E to Site B 3.8562771	D69_D35 Site E to Site A 7.4548644	D69_D6D Site E to Site Z-1 10.4629956	D69_2BE Site E to Site Z 10.7278212	BB1_DED Site C to Site I 8.6293142	BB1_C45 Site C to Site H 3.1941854	BB1_EE8 Site C to Site G 8.3953928	BB1_2A5 Site C to Site D 2.2101925	BB1_BS8 Site C to Site H1 3.1914557	BB1_9A2 Site C to Site F 5.1952256	BB1_D69 Site C to Site E 4.3677214	BB1_D7C Site C to Site B 5.5956491	BB1_D35 Site C to Site A 3.8826547	BB1_D6D Site C to Site Z-1 6.8736209	BB1_2BE Site C to Site Z 7.2728214	D7C_DED Site B to Site I 11.7312364	D7C_C45 Site B to Site H 12.4352728	D7C_EE8 Site B to Site G 11.8672764	D7C_2A5 Site B to Site D 6.8798384
Midnight	12:00 AM	1:00 AM			4.047916571	7.812500037	4.260000061	7.098749964	13.1416666	10.7472223	13.98791964	14.43333333	8.7561111	4.3057575	8.971704962	2.048587569	8.497453704	4.992018755	7.658333452	8.66250003	3.658611837	6.475718398	6.807051256			13.29166648	7.724999925
	1:00 AM	2:00 AM			4.089583321	8.058333322	4.622916612	6.877777764		9.762499938	14.26666673	14.06111112	8.894047585	8.596071474	8.697500049	1.992276427	8.488729399	4.953175573		8.997222316	3.66538463	6.901785711	7.277976193		12.77500011	15.00000031	8.691666759
	2:00 AM	3:00 AM			4.196258257		5.121666715	6.628552363	13.9041677	10.7594444	12.85416659	13.04999998	9.166055533	8.798953527	9.124509783	2.060007721	8.841319472	5.245744673	7.066666726	6.933333363	3.668367344	6.530620159	6.910556924			12.46333343	6.519666692
	3:00 AM	4:00 AM			3.94444444	7.796666723	4.568749948	7.01458334	12.6666666	10.3708333	14.08500065	14.84791664	8.450925048	8.481313123	9.284722251	2.031340078	8.602450978	5.024021468	7.178833331	5.954166697	3.592775988	6.330769229	6.643075116	13.54166664		17.18333388	8.241666663
	4:00 AM	5:00 AM			4.500543473	7.458333448	4.838904763	8.75	10.7750000	12.1895484	13.96333333	13.34722223	9.211249744	9.817342367	9.949122943	2.895277787	10.08666803	6.205000014	8.108333275	5.991166403	3.649999952	6.379413487	6.675414163		13.57500009	13.28095544	6.747222229
	5:00 AM	6:00 AM			8.382265266	12.08749994	7.494697003	8.35231323	14.0541663	18.1499997	19.52499333	19.32499333	9.038194451	8.137268529	8.97583065	4.267761039	8.267761039	4.521666778	8.108333275	8.322222319	5.95749995	4.287500049	7.309523707	7.998392953	14.57222235	13.8145833	7.339762319
	6:00 AM	7:00 AM			5.153269863	10.01979169	5.649833349	12.26316373	18.7518519	14.6188595	21.98473345	22.2740478	9.092246375	8.057631564	8.766812864	2.093728699	8.241746039	4.942904173	7.407499971	5.733489107	7.078897947	12.24037916	12.33798453	14.54444453	12.77541667	13.35309354	7.372979727
	7:00 AM	8:00 AM			4.045499143	8.451851844	5.142297977	8.573809521	15.0227778	10.1454953	19.04833331	20.2802857	9.024059611	8.038564186	8.436615916	1.854648372	8.141009109	4.846921527	6.7481 78584	5.539327678	5.512531473	10.03717949	10.40080207	13.72833334	12.7886274	13.49433344	6.960384619
	8:00 AM	9:00 AM			3.998571423	8.153787833	5.133597381	6.775134411	11.8375000	9.8291666[illegible]	14.12126436	14.72417792	9.491011229	8.045638622	8.580902763	1.965821756	8.141598348	4.964368871	6.920161295	5.152876866	5.536638539	7.445192309	8.018002689	14.22916666	13.23499998	13.65256407	7.164145821
	9:00 AM	10:00 AM			4.085166578	8.500877193	5.155045947	8.5251.4961	11.8249999	10.4899538	14.38436377	15.2047222	9.272488594	8.145057246	8.953000024	1.998703752	8.338635082	4.946420387	7.053151538	5.341265997	3.579456755	8.004799528	8.650784758	18.2388148	13.55809094	14.96588668	7.197955172
	10:00 AM	11:00 AM			3.929699926	8.761666685	5.153181191	6.837280726	12.3270833	9.98795432	15.73125001	16.2995833	9.539231879	8.23820332	8.891263424	2.014107884	8.281282217	5.022312231	7.109599974	5.274047645	3.581565857	8.71451613	9.473095472	14.44444447	13.3543478	14.1027778	7.365594439
	11:00 AM	12:00 PM			3.843118798	9.642361158	5.354797977	6.244999955	12.1794737	10.0127778	15.45154302	15.7851851[illegible]	9.782676736	8.533979742	9.549875053	2.03357292	8.639488539	5.039729309	7.284722203	4.94927459	3.884765977	9.341181188	10.34780701	15.58145829	13.50952388	14.64999821	7.452513213
Noon	12:00 PM	1:00 PM			4.283333317	11.21944459	10.24166664	6.962499954	10.8249999	9.499624992	13.07277776	14.22963589	10.0070343	8.609034489	10.02698515	1.951398899	8.725138889	5.092881944	7.399999938	5.221865462	4.039989253	7.423149596	8.059295809	16.80416668	14.06249998	17.15694441	7.453484848
	1:00 PM	2:00 PM			8.756333346	24.44166667	20.02976192	7.253333363	15.2639655	13.9653888	12.16317998	12.52466477	14.19732192	13.2832855	13.81993159	4.268526373	13.32301507	8.98638944	8.904250014	5.185608651	3.611706361	8.478545445	6.861309516	25.79047619	18.22420838	20.17666668	7.785714289
	2:00 PM	3:00 PM			10.47970087	30.83333331	21.86328125	11.33749999	16.0611111	16.534999	18.29236107	17.22833334	20.22004505	18.57049318	19.74784949	3.944543278	18.60536399	13.6692371	11.19629629	5.578030299	3.988459783	6.520947725	6.913207563	29.59166667	25.48552285	27.91562499	10.69972054
	3:00 PM	4:00 PM			9.054901952	29.71111113	19.6634031	12.81969701	18.1782609	15.2568888[illegible]	19.22142861	19.61353887	23.97623456	22.7295687	21.47972973	5.251971464	22.77739198	14.46084998	12.25500003	5.148076967	3.713211361	6.525813009	6.923985743	36.58958339	34.56840278	32.46722222	19.2391.4739
	4:00 PM	5:00 PM			9.088617383	29.04629654	18.48776042	12.07083334	16.6818315	15.3846848	20.95905766	22.25714285	27.77134147	23.2026856	22.42129827	5.173923662	23.92494573	13.30056258	12.93194446	4.994393895	3.685470953	6.988218393	10.65897434	50.22083308	42.61102939	44.18725481	27.53755274
	5:00 PM	6:00 PM			6.843298251	27.61458259	17.71333332	11.86458333	17.0379629	13.3[illegible]	22.03825755	23.33931375	30.9854938	22.98400001	24.45190476	5.697408141	23.3852753	13.46140509	17.54555556	5.738157975	3.983571442	10.75606062	11.54797981	48.49500002	45.13787879	47.63139535	29.7875
	6:00 PM	7:00 PM			3.998484816	18.58809526	10.01799258	9.483333263	15.61	10.1052083[illegible]	16.98690476	17.8487936	24.97524113	20.56833393	20.71451431	4.379833997	20.76666667	11.40997151	13.785	5.200833337	3.646895429	6.980054408	7.54498085	44.84999992	40.33114494	35.4953768	19.68909546
	7:00 PM	8:00 PM			3.878125004	13.09666668	5.338257589	6.318055554	11.4233333	9.937500038	12.7581536	12.97952139	14.58794543	14.06555556	13.62164483	2.304222722	14.14746094	8.331207141	10.01388892	5.141071407	3.497751144	6.230777778	6.592934353	19.87812497	20.2128788	18.99102581	7.781296305
	8:00 PM	9:00 PM			4.101041635	16.43958339	5.125724634	6.333333303	11.0833334	10.09047623	12.56666668	12.86111112	9.188734583	8.462634467	9.301356594	2.0597452	8.605198222	5.140481655	6.919444466	5.305208329	3.558901235	6.319001409	6.633712113	14.42916677	13.64250001	15.19999998	7.425537613
	9:00 PM	10:00 PM			3.903133353	8.608333287	4.977333312	6.576388897		9.910714342	12.7345238	13.04880951	9.95972727	8.338511358	8.941666647	2.020118554	8.554340268	5.094722229	6.936111096	5.617195244	3.588944455	6.254636272	6.674662148	14.83611109	13.29666661	16.13095229	7.575754394
	10:00 PM	11:00 PM			3.970370366	8.422222165	4.896000005	6.279925934	11.2583329	10.2645834	12.7194446	12.85999998	8.749277781	8.324999974	8.809325412	2.01498016	8.511018833	5.027225871	6.548851047	5.911274515	3.557417678	6.294243992	6.575749362	14.3093333	14.48899828	14.59833388	7.78333333
	Midnight	11:00 PM	12:00 AM		3.852777869	8.366666657	4.795652159	6.693333277	10.5833334	9.488888888	12.96111117	13.10000002	8.764705888	8.284861106	9.204761914	2.004736217	8.367107788	4.995614038	6.848611057	5.258333348	3.527242591	6.270887638	6.585209288		13.11666648	15.57833339	7.450555545

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 13-Dec-13
Day of Week: Friday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	D7C_BS8	D7C_9A2	D7C_D69	D7C_BB1	D7C_D3S	D7C_D6D	D7C_2BE	D3S_D6D	D3S_C4S	D3S_EE8	D3S_2A5	D3S_BS8	D3S_9A2	D3S_D69	D3S_BB1	D3S_D7C	D3S_D6D	D3S_2BE	D6D_D6D	D6D_C4S	D6D_EE8	D6D_2A5	D6D_BS8
			Site B to Site H-1	Site B to Site F	Site B to Site E	Site B to Site C	Site B to Site A	Site B to Site Z-1	Site B to Site Z	Site A to Site I	Site A to Site H	Site A to Site G	Site A to Site D	Site A to Site H-1	Site A to Site F	Site A to Site E	Site A to Site C	Site A to Site B	Site A to Site Z-3	Site A to Site Z	Site Z-1 to Site I	Site Z-1 to Site H	Site Z-1 to Site G	Site Z-1 to Site D	Site Z-1 to Site H-1
		Length (miles)	12.4621762	8.6648990	9.6892774	5.1069180	3.2458997	8.1688	6.1981	12.6982	12.8953	12.2	8.1008	13.9	9.0	7.4	4.8	3.8	3.2	3.2	15.5	15.5	15.5	9.0	15.5
Midnight	12:00 AM	1:00 AM	13.55000001	9.983333333		5.833333333				12.88904758	13.35208333	12.8641667	5.655128198	11.8647058	8.7166854	11.82500007	3.691666663	6.700000037	2.808424849	3.134358697	15.38819448	14.77665978	15.29423081	8.415942826	14.94770853
	1:00 AM	2:00 AM		10.62083336		6.825000026				13.14166666	12.80416666	13.3738887	5.939732133	12.9873187	9.235329073		3.672656236		2.860478193	3.333088727	15.62500003	15.48013853	15.85740747	8.604065857	15.42280755
	2:00 AM	3:00 AM		9.333333336		4.783333373				12.06833335	12.42833245	11.73654166	5.811821714	12.515000	8.743537418	10.71249998	3.672685183		2.772529927	3.127923988	14.95312501	15.72992424	16.43447614	8.820452294	15.88791669
	3:00 AM	4:00 AM		11.01111107		6.360416617				16.30416665	13.65153183	13.38511109	6.943089427	14.11542199	10.39502314	10.88749995	3.731707307		2.700681816	3.035466602	14.18645831	15.06510413	14.36416668	8.492441883	15.35176759
	4:00 AM	5:00 AM	13.85833337	10.99666669	13.50000003	5.179166512				12.81497144	11.8542	12.34166663	5.582710922	12.05798399	8.82439298	12.09166663	4.056964078		2.71202705	3.082958178	16.33125	16.83756287	14.25833329	9.992746985	17.14666429
	5:00 AM	6:00 AM	13.75333337	10.09964287	10.86166667	5.916479844				12.29000001	11.79166681	12.34249571	6.1857789312	12.0257143	8.9285063	11.83541677	4.606826426	6.683333293	3.492270987	3.909956216	15.94791905	14.89287963	14.89916667	9.3922685422	14.60666429
	6:00 AM	7:00 AM	12.95583333	10.04779411	12.18333333	5.231547816	6.249999953		29.33333333	13.48279532	11.49666666	12.14264767	5.421276519	11.58507963	8.409859169	11.64416664	4.041169742	8.2150003	5.297919987	5.503735548	16.98524999	14.41467963	15.73729167	8.958216333	14.90934828
	7:00 AM	8:00 AM	12.9894275	9.714403058	11.99079333	4.997361104	6.559722263	12.9999998	13.3634986	13.65240383	11.56805556	12.7641953	5.7350397	11.53031324	8.1787121	10.1265185	3.544429288	6.777314853	4.384377316	4.758836047	16.31356989	14.06364704	14.7115947	8.2398275	14.25379788
	8:00 AM	9:00 AM	13.32696823	10.24439393	12.04375001	5.383040925	7.036111169	9.608333185	17.53749963	13.22528737	11.78119918	12.46170215	5.583726418	12.0763204	8.6352819123	10.3705126	3.682451508	6.630701761	3.818488156	4.357890452	16.54519304	14.68244949	16.11944444	8.39984848	14.34535714
	9:00 AM	10:00 AM	13.69519229	10.13928572	12.71833332	5.225136125	6.7609836	10.1	16.86333359	13.2751884	11.7795453	13.38541666	5.853882083	11.84404703	8.652522282	10.53875	3.805741633	7.069333319	4.417895835	4.959750735	16.16503773	14.38358487	15.18569697	8.1854798824	14.41435545
	10:00 AM	11:00 AM	13.69309355	10.15497075	11.80833336	5.252891358	6.841666773	12.03750009	14.91666673	13.46483912	11.85988406	14.1770001	5.572976199	11.9585789	8.548909534	10.3254923	3.840555557	6.700000037	5.41691763	5.307750542	16.3340909	14.70426356	16.93518519	8.434049088	14.62970549
	11:00 AM	12:00 PM	13.54945239	10.28975003	11.14166658	5.511153846	6.875166653	12.52083331	12.86666669	13.94113478	12.23398935	13.58015152	5.505939756	12.4131499	8.6013111323	11.2135779	3.647995987	7.005555511	5.664573585	5.873021978	16.5031964	14.8548335	16.65256292	8.307603909	14.82399538
Noon	12:00 PM	1:00 PM	14.16214285	10.51256293	14.01249994	5.710249927	6.452777763			14.4478521	12.4258286	17.3495819	5.827375631	17.6183339	11.5600767	11.3145826	3.958999958	7.416666758	3.87143386	3.959606864	16.72222223	16.08843139	21.36262627	8.187232325	15.22092946
	1:00 PM	2:00 PM	16.41856563	13.93944873	16.6729166	5.387272726	6.413333303	9.27291662	9.687500059	23.9457577	21.96612297	21.9438673	6.477027039	22.179078337	17.3811852	15.2500013	3.687741943	9.291666619	2.705269844	3.026373518	20.29230303	19.51675439	19.55019379	8.552001648	19.857553
	2:00 PM	3:00 PM	25.37600002	20.56354165	29.99583336	6.998836381	8.597777788	9.391666632	9.999666587	31.16101022	29.97037636	31.4007142	13.63590182	29.30614758	23.067178398	16.9861112	5.650951128	7.152777761	2.757023803	3.111785798	26.48837209	24.81539115	24.72363888	11.29159402	24.90933642
	3:00 PM	4:00 PM	34.32499992	27.64541668	38.07499998	14.58052356	7.138760348	9.73583336	10.04791806	41.8598873	35.4442572	36.1004016	15.03483643	35.2437333	26.977802553	24.30729167	11.97940338	10.95277783	2.76651431	3.139937498	34.10452383	31.61294443	34.59619048	16.10902401	32.00994827
	4:00 PM	5:00 PM	42.54144145	34.53724567	38.74791665	21.53170732	7.197916655	12.89722217	14.01944445	43.3195238	39.71161859	39.73046875	19.89871795	40.02745536	27.874776736	19.4156662	16.76835585		5.647760117	6.416418831	44.89512194	39.40916502	41.37475488	22.80455868	38.77233333
	5:00 PM	6:00 PM	49.16901711	37.24520202	39.79666668	21.43470401	6.991666652	14.40555561	15.03214289	34.69945833	32.4478139	33.0007575	13.73071205	33.46443895	22.027921728	24.14166648	16.70529823	12.88333336	6.852900839	7.516166828	49.9794225	43.79958762	40.93413688	23.75565522	44.08397348
	6:00 PM	7:00 PM	40.01829822	28.41314164		13.94726847	6.439999972	10.2694444	10.7263882	20.20696667	20.7050163	22.74475397	8.827668212	20.64507248	15.420756318	23.99444439	12.48919986		3.395636617	3.952245418	41.98354703	37.36307398	39.23957143	18.25264483	37.68253652
	7:00 PM	8:00 PM	26.02033334	13.79314743	12.2333332	5.443142228	6.806333285	9.038888988	9.388444418	12.63986112	12.1354175	15.48547638	5.65825283	12.3458765	8.72087623	17.63029834	4.562151166	6.816666837	2.679102541	2.981009511	24.16409091	23.55958948	25.87756411	9.427753008	23.00742525
	8:00 PM	9:00 PM	13.83108974	10.40486113	11.93611108	5.207954944	8.133333307	8.325000197	7.452777763	12.41413043	12.025	12.6541887	5.65885123	12.3016667	8.681632299	10.15833333	3.629910716	6.929166634	2.663128933	2.956727875	15.97134503	14.92543288	17.02675438	8.395953362	15.11233759
	9:00 PM	10:00 PM	13.68541666	10.35740736	11.53333331	5.730769224	6.629166666			12.35435507	11.9402431	12.61001701	5.6398953	12.1464497	8.505161211	10.56944445	3.646501636	7.274999931	2.651022501	2.958524173	15.02833333	14.68868046	15.51363634	8.387546324	14.9295754
	10:00 PM	11:00 PM	14.78574074	11.03589743	11.63055556	6.023397436		9.245833391	9.550000001	12.41720771	12.03869048	13.12299583	5.632352953	12.1907502	8.650880764	9.991666619	3.995771141	7.416666502	2.682135416	2.971934473	15.11535088	14.63256408	15.29866666	8.325254453	14.79916667
Midnight	11:00 PM	12:00 AM	13.51249997	10.70972219		5.624074079				12.95111114	11.64754958	12.97678575	5.810729159	11.9502525	8.790082244	10.41666663	3.9052571	6.528833336	2.669365186	2.959585653	14.93636365	14.81149424	15.96929752	8.349861738	14.98666717

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 13-Dec-13
Day of Week: Friday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D6D_9A2 Site Z-1 to Site F 15.64124199	D6D_D69 Site Z-1 to Site E 10.45089609	D6D_BB1 Site Z-1 to Site C 6.672969199	D6D_D7C Site Z-1 to Site B 6.168639262	D6D_D35 Site Z-1 to Site A 2.549169649	D6D_28E Site Z-1 to Site Z 9.272722232	28E_DED Site Z to Site I 15.72481047	28E_C45 Site Z to Site H 15.1269819	28E_EE8 Site Z to Site G 15.45832252	28E_2A5 Site Z to Site D 9.29274393	28E_B58 Site Z to Site H-1 15.17367519	28E_9A2 Site Z to Site F 12.64109495	28E_D69 Site Z to Site E 10.70788234	28E_BB1 Site Z to Site C 7.429926154	28E_D7C Site Z to Site B 6.168126707	28E_D35 Site Z to Site A 2.270801828	28E_D6D Site Z to Site Z-1 9.272722232
Midnight	12:00 AM	1:00 AM			11.36049478	14.79583349	6.451271177	9.291668725	2.707894742	0.330633806	15.60572937	15.23945579	15.52555558	8.821222231	15.30442177	11.71993871	15.35833345	6.788383843	9.633333385	3.016055692	9.344812564
	1:00 AM	2:00 AM			11.77333335		6.451576583		2.858974391	0.338888895	15.9125	15.54478166	15.8783879	8.776736129	15.47766419	11.96847826		6.870593236		3.183733864	9.322587971
	2:00 AM	3:00 AM			12.05016955	19.52083333	6.777633755		2.884119482	0.325789743	15.87722376	16.03195711	16.4343137	9.154165581	16.16149433	12.31551725	19.82500001	7.026958303		3.234322038	9.345331349
	3:00 AM	4:00 AM			11.38349359	13.69166667	6.440074597		2.763000009	0.314026494	14.65185189	15.35023146	15.2526332	8.868845833	15.38956491	11.72943549	14.11250006	6.714952281		3.113030938	9.138202179
	4:00 AM	5:00 AM			11.27521936	15.18333329	7.148769238		2.909313699	0.293401543	16.92145129	17.39079489	15.89078947	10.30527777	17.23828858	13.61031399	15.74166667	7.524157388		2.145785429	9.331687659
	5:00 AM	6:00 AM			11.2756127	14.85624999	6.336259248		2.793954543	0.258857463	15.86265712	17.2821433	15.15670161	8.606270525	14.69082992	11.9197319	13.2268333	6.586457233		2.097597138	9.336400889
	6:00 AM	7:00 AM			11.8262944	14.55083333	6.833027787	11.89444444	2.729754269	0.334236265	16.20351852	14.4807643	15.74952033	9.079525963	14.99786245	11.91257704	14.9074999	6.92535907	12.47500009	3.033586139	9.338529454
	7:00 AM	8:00 AM			11.18696391	12.58333333	6.292141269	9.71354164	2.714757599	0.454148488	16.56166667	14.6473857	15.0952361	8.56341213	14.4596634	11.4577016	13.0143975	6.423833387	10.88500005	2.98708981	9.2601774
	8:00 AM	9:00 AM			11.47541929	12.96333333	6.3037004	9.197500003	2.687984032	0.588624624	16.643375	14.9741666	15.64191915	8.623272881	14.7023838	11.6326923	13.5113636	6.59909501	9.394444468	2.987735799	9.303427025
	9:00 AM	10:00 AM			11.39994135	13.14254386	6.277588577	9.653333331	2.723617524	0.583734681	16.3651927	14.7016666	15.5334717	8.536225889	15.0952712	11.5065714	13.6347826	6.524571811	9.970000038	3.039974457	9.306526002
	10:00 AM	11:00 AM			11.52222223	12.86607145	6.496167886	9.97222222	2.747388635	0.741150284	16.49068926	14.80723665	16.7295983	8.725828149	14.8284313	11.7525678	13.5782407	6.771085565	9.643750037	3.041634364	9.311409394
	11:00 AM	12:00 PM			11.34961341	14.22978788	6.455857533	11.08333323	2.738049635	0.560419255	16.51599999	15.05047457	16.21157051	8.599547809	15.1378917	11.8137378	14.7547619	6.717453211	11.28666658	2.995118148	9.276152397
Noon	12:00 PM	1:00 PM			11.31079448	14.17291667	6.254810998		2.686264921	0.453490715	16.99924988	15.16984848	16.2568498	8.473942724	15.3458958	11.5334998	14.5276333	6.551994303	10.37500006	2.991788021	9.294904821
	1:00 PM	2:00 PM			14.2291847	15.79166658	6.367261916	13.15	2.691638707	0.324290785	20.71024589	20.15727322	20.3070754	8.8370851	20.2372967	14.5221259	16.0833334	6.625098789	9.258333334	2.961647443	9.285511468
	2:00 PM	3:00 PM			20.05239574	19.79166672	8.322955011	9.758333378	2.639115647	0.349731849	28.43701602	24.69987602	25.47179798	11.49100195	25.65264084	20.30669782	20.12777774	8.640314507	9.600000095	2.916992515	9.270468871
	3:00 PM	4:00 PM			25.7518741	26.477381	13.91529355	14.06666664	2.750954594	0.374488774	34.68114038	32.82133838	34.9164739	17.1354459	33.23582298	26.8907143	24.46095241	15.56647376	14.13666653	3.028888869	9.288466975
	4:00 PM	5:00 PM			30.79405802	22.19583358	21.99724062	21.95833263	4.620007716	0.711118368	45.85833353	39.84029993	40.55486138	22.88068291	39.84838541	32.17844612	22.98527778	22.78627451		4.329333877	9.371810483
	5:00 PM	6:00 PM			32.9699978	48.86666665	22.48147902	16.99999993	4.479903139	0.669814319	50.3499723	45.61953918	46.5521825	24.98487423	45.73800143	34.34018182	49.45499991	23.68513899	15.79833339	4.95079365	9.338011243
	6:00 PM	7:00 PM			26.35267379	29.45999997	15.82906525		3.126729347	0.470501857	43.59575758	38.88962936	40.7730952	19.62644987	39.77603447	28.15545558	30.15555548	17.28939043		3.38207317	9.279818668
	7:00 PM	8:00 PM			18.16988112	21.39454751	7.304687568	9.533333253	2.711229935	0.303875285	24.82900313	24.23568538	23.58742426	9.809497796	23.25659938	16.84699998	20.70525003	7.638668422	9.766666698	2.885053137	9.287131521
	8:00 PM	9:00 PM			11.46017094	12.67499998	6.355819043		2.727913977	0.283944957	15.80385715	15.10121358	16.0984109	8.66931089	15.3619603	11.7255569	13.0416666	6.65585271	10.10833335	2.991537998	9.282331233
	9:00 PM	10:00 PM			11.38577911	13.27777778	6.3268539		2.705139166	0.306156602	15.31100426	14.9110153	15.6344027	8.658503833	15.1847619	11.5965476	13.5636869	6.630075667		3.004871177	9.282655962
	10:00 PM	11:00 PM			11.2567823	12.43541665	6.318827168	10.64166661	2.720000005	0.30077839	15.58983634	14.79963554	15.6286953	8.585382163	14.9643939	11.5569828	12.7229166	6.591473986	10.89999998	3.013361268	9.289196309
Midnight	11:00 PM	12:00 AM			11.29761929	13.08452777	6.259874749		2.699129231	0.302152788	15.10115741	15.04641223	16.1286829	8.647552467	15.0750003	11.5774181	13.9524999	6.548479169		2.998691777	9.297827615

TRAVEL TIME DATA

1 HOUR CORRIDOR STATISTICAL SUMMARIES

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 14-Dec-13
Day of Week: Saturday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	DED_C45 Site I to Site H 1.001	DED_EE8 Site I to Site G 1.473	DED_2A5 Site I to Site D 5.666	DED_B58 Site I to Site H-1 9.883	DED_9A2 Site I to Site F 3.722	DED_D69 Site I to Site E 7.580	DED_BB1 Site I to Site C 8.600	DED_D7C Site I to Site B 11.709	DED_D35 Site I to Site A 13.698	DED_D6D Site I to Site Z-1 15.569	DED_2BE Site I to Site Z 16.779	C45_DED Site H to Site I 1.001	C45_EE8 Site H to Site G 0.858	C45_2A5 Site H to Site D 6.691	C45_B58 Site H to Site H-1 9.060	C45_9A2 Site H to Site F 3.909	C45_D69 Site H to Site E 7.339[illegible]	C45_BB1 Site H to Site C 9.104[illegible]	C45_D7C Site H to Site B 11.438[illegible]	C45_D35 Site H to Site A 12.98[illegible]	C45_D6D Site H to Site Z-1 15.941[illegible]	C45_2BE Site H to Site Z 16.139[illegible]	EEB_DED Site G to Site I 1.474[illegible]
	Midnight	12:00 AM	1:00 AM		1.119	1.270	6.395	1.219	4.059	8.758	8.644		11.828	14.511	14.876	1.185	0.877	5.798	0.149	3.618	10.54166665	8.711842128	13.03958327	11.44930556	15.19999997	15.35334077	1.392253573
		1:00 AM	2:00 AM		1.071	1.300	6.729	1.307	4.054	8.567	9.031		12.569	14.445	14.767	1.226	0.845	5.838	0.192	3.506		8.544999987	13.39999991	11.89666666	14.63333334	14.68055854	1.431950593
		2:00 AM	3:00 AM		1.137	1.364	6.526	1.355	4.211	8.253	10.508	13.750	12.890	15.195	15.448	1.231	0.840	6.052	0.205	3.385	10.3466667	7.992749978	14.41788337	12.60958598	14.44097222	14.78914778	1.381250999
		3:00 AM	4:00 AM		1.108	1.207	6.503	1.282	4.069	8.087	10.392		12.260	15.281	15.298	1.178	0.840	5.915	0.199	3.704	8.022916684	8.706761950	14.08333222	11.99382355	14.75404762	15.06875001	1.510416719
		4:00 AM	5:00 AM		1.064	1.207	6.987	1.214	4.080	8.853	9.910	13.930	12.572	14.890	15.474	1.245	0.863	5.841	0.193	3.569	7.795416641	8.546958704	12.78213342	11.58080159	14.12261904	15.20369977	1.489555539
		5:00 AM	6:00 AM		1.250	1.204	5.543	1.403	4.076	6.946	10.500	14.397	15.594	15.455	15.838	1.242	0.783	5.841	0.184	3.484	8.021666649	8.295999988	13.28472224	11.74543419	14.42261906	14.99983799	1.483999979
		6:00 AM	7:00 AM		1.179	1.235	7.100	1.379	4.152	9.376	9.255	16.856	15.360	18.308	18.876	1.214	0.846	6.308	0.178	3.509	8.351333287	9.123437950	15.66429364	14.18018997	16.25402916	16.53472222	1.452604158
		7:00 AM	8:00 AM		1.208	1.234	6.318	1.362	4.386	9.026	13.401	18.924	19.589	17.791	17.632	1.232	0.848	8.604	0.183	3.559	8.3281.74388	11.85923613	15.429606	19.17214286	16.95107262	16.80153315	1.3704109
		8:00 AM	9:00 AM		1.230	1.226	7.212	1.417	4.367	9.417	16.454	20.998	14.300	23.863	24.860	1.255	0.866	6.405	0.186	3.535	8.298814787	14.49799999	20.79429624	13.72526119	23.72238597	24.11151898	1.379279269
		9:00 AM	10:00 AM		1.274	1.276	8.363	1.468	4.561	11.948	11.864	16.250	15.200	21.380	21.837	1.281	0.874	6.556	0.185	3.564	8.411111115	10.44307143	16.7781.2498	11.84211136	20.84654835	20.58823536	1.395827746
		10:00 AM	11:00 AM		1.501	1.310	10.106	1.716	7.149	12.193	11.719	17.950	16.023	19.895	20.304	1.262	0.873	6.090	0.186	3.665	7.738888878	9.197916702	14.8867642	12.18888888	17.53373563	17.88558742	1.389377561
		11:00 AM	12:00 PM		1.827	1.357	9.066	1.955	7.711	12.642	13.729	17.829	14.948	20.994	21.199	1.291	0.892	6.008	0.183	3.648	11.35333321	9.278750026	13.64120393	11.81406982	17.08531.1377	17.58553555	1.356669568
	Noon	12:00 PM	1:00 PM		1.418	1.469	8.879	1.777	6.649	13.172	12.066	17.467	14.692	19.529	19.976	1.296	0.889	6.935	0.179	3.621	10.22958324	8.801041623	13.4653846	11.86456216	16.42076614	16.7637.8626	1.355166574
		1:00 PM	2:00 PM		1.538	1.322	8.703	1.764	6.464	10.915	11.679	17.664	14.506	17.960	18.500	1.310	0.872	5.986	0.181	3.622	9.197222181	8.993627463	13.57341272	11.77366751	15.07713334	15.49983975	1.406666655
		2:00 PM	3:00 PM		1.510	1.280	9.613	1.665	6.246	11.790	11.215	15.988	15.393	17.817	18.095	1.344	0.874	6.138	0.183	3.585	8.958333414	8.924166682	13.56588727	11.94001427	15.41119791	15.77499999	1.538260867
		3:00 PM	4:00 PM		1.767	1.314	11.756	1.912	7.222	13.526	13.049	17.619	17.855	19.854	20.065	1.722	0.886	7.018	0.175	3.673	9.141666535	8.805882357	14.33412699	13.18319568	18.65958237	17.10738641	2.351880756
		4:00 PM	5:00 PM		2.346	1.470	14.697	2.660	8.931	16.421	18.977	19.573	20.720	23.961	24.631	1.916	0.895	9.539	0.175	4.111	10.91666672	10.05191908	16.69107143	15.44247513	19.97212642	20.6838653	3.389592899
		5:00 PM	6:00 PM		2.937	1.663	17.994	3.022	12.141	20.805	18.956	20.837	25.053	26.682	26.635	2.127	0.926	10.793	0.174	6.139	14.34166692	11.99531251	17.27532051	17.2335959	21.58405333	22.06773928	3.622653715
		6:00 PM	7:00 PM		3.267	1.726	10.037	3.401	13.609	11.574	21.750	24.993	16.515	30.009	30.037	1.481	0.908	6.149	0.185	6.621	9.649999861	14.13068236	18.81600001	12.44122897	22.39803782	22.64520648	1.848917746
		7:00 PM	8:00 PM		1.679	1.354	8.703	1.818	6.857	8.661	13.533	18.758	12.498	19.999	20.524	1.365	0.869	5.964	0.191	3.921	8.49749998	9.210897432	14.75052085	11.89302302	15.60825164	15.90375371	1.395289882
		8:00 PM	9:00 PM		1.185	1.234	6.779	1.371	4.299	9.099	14.930	12.527	15.165	15.462	1.357	0.865	5.879	0.185	3.568	8.158333395	9.557738126	13.3833333	11.76378601	14.4526.7858	14.73619848	1.38048245
		9:00 PM	10:00 PM		1.232	1.250	6.745	1.418	4.380	12.463	9.925	14.858	12.629	15.265	15.494	1.357	0.865	5.915	0.179	3.536	8.424999991	8.641666679	13.82500443	11.67992593	14.3635556	14.55080362	1.358870737
		10:00 PM	11:00 PM		1.214	1.213	6.657	1.403	4.303	9.780	9.146	14.396	12.455	15.100	15.560	1.304	0.879	5.844	0.191	3.551	9.625000697	8.473333136	13.83981479	11.54414062	14.46223006	14.58218964	1.33358514
	Midnight	11:00 PM	12:00 AM		1.179	1.234	6.585	1.349	4.245	8.853	9.012	14.515	12.438	15.111	15.287	1.282	0.872	5.799	0.184	3.509	8.179166643	8.291666687	13.97499997	11.59396555	14.17847222	14.38181545	1.340364548

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 14-Dec-13
Day of Week: Saturday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	EE8_C45 Site G to Site H 9.958138954	EE8_2A5 Site G to Site D 6.115328597	EE8_D5E Site G to Site H-1 5.617948109	EE8_9A2 Site G to Site F 3.132662747	EE8_D69 Site G to Site E 6.45323906	EE8_BB1 Site G to Site C 9.295582039	EE8_D7C Site G to Site B 11.95787904	EE8_D35 Site G to Site A 12.27808457	EE8_D6D Site G to Site Z-1 15.25263675	EE8_2BE Site G to Site Z 15.45263675	2A5_D6D Site D to Site I 6.665246917	2A5_C45 Site D to Site H 6.891202711	2A5_EE8 Site D to Site G 6.175135305	2A5_B58 Site D to Site H-1 6.429268539	2A5_9A2 Site D to Site F 2.982726284	2A5_D69 Site D to Site E 3.179388264	2A5_BB1 Site D to Site C 2.293109294	2A5_D7C Site D to Site B 5.873838249	2A5_D35 Site D to Site A 5.509509039	2A5_D6D Site D to Site Z-1 8.096489164	2A5_2BE Site D to Site Z 8.296124896	B58_D6D Site H-1 to Site I 9.98254642	B58_C45 Site H-1 to Site H 8.899218896
Midnight	12:00 AM	1:00 AM			1.499999951	7.211804819	1.655864486	3.951315789		9.265833367	14.4369477	14.14329942	16.4494445	16.76025463	6.439285704	6.450714281	6.875757558	6.651388876	3.064139998	5.211666667	2.426668374	7.806833311	5.946153874	8.818214773	9.227575752	1.696266305	0.340351499
	1:00 AM	2:00 AM			1.511904762	6.892777797	1.666666596	4.182500963	9.300000016	10.25740739	12.11666666	13.72500004	17.18939394	17.6310606	6.420512839	6.403896421	6.750000009	6.650641027	3.072327074	4.499999732	2.611999988	7.806833351	6.128144664	8.627380973	9.11564205	1.096666762	11.81527719
	2:00 AM	3:00 AM			1.721238126	6.501666578	1.676666556	4.182407465		10.09511114	17.90833309	13.11666693	17.13333336	17.55254415	6.867706516	6.371916575	6.999999554	6.616888918	3.08547539	4.861111139	2.6974.2989	8.256111134	6.619784893	8.81614494	9.314957361	1.058333276	11.42083333
	3:00 AM	4:00 AM			1.726668711	6.740873046	1.626972208	4.257638888		10.09833337		12.92460318	15.66538466	15.98111114	6.656111054	6.477564666	6.580833329	6.581249969	3.15295236	4.613333288	2.772437522	8.769444432	5.933613449	8.785951188	9.158838811	1.05000006	15.45694437
	4:00 AM	5:00 AM			1.725838016	6.895416674	1.668838378	3.988282117	10.41666649	10.25625037		12.88923753	15.5527778	16.08129993	6.574309542	5.954012337	6.971.256303	6.17973564	3.381024405	4.944239812	2.568589972	7.27777789	5.958706946	8.496858723	9.262613006	1.1064.4144	8.722210142
	5:00 AM	6:00 AM			1.708206352	6.892666547	1.760955228	3.167463787	9.599999897	10.03966666		12.13994754	15.83500298	16.31166671	6.768333294	6.035072411	6.425387288	6.142624722	2.964523589	5.167826753	2.568257987	7.922222188	5.831495726	8.671987938	9.07456.926	1.023486748	12.24999959
	6:00 AM	7:00 AM			1.495555565	6.783749999	1.651388528	3.753448815		8.810416693	14.30937502	14.3390775	15.83448738	15.24889962	6.870833329	6.081887242	6.564484118	6.25874428	2.98984139	5.029186837	2.547161337	8.490238188	8.119170347	10.18864583	10.3883658	1.038333284	8.691666668
	7:00 AM	8:00 AM			1.447548968	8.861036845	1.657954548	3.922916676	9.766666833	11.0625.95	16.94333398	16.38926955	16.61499999	16.3645.4546	7.013779776	6.171861489	6.660360348	6.411.67894	3.18.349645	4.996438563	4.777960999	9.8509.4938	10.3809651.1	10.80999278	10.6795.4955	1.049744748	9.382407455
	8:00 AM	9:00 AM			1.506249995	6.664500004	1.673214293	3.853906259	8.395833392	15.68461538	20.8636881	14.23131967	23.13544871	23.65869355	6.889671353	6.235922325	6.596333358	6.389067257	2.961814343	4.938492769	6.334964233	12.11466928	7.175984537	14.79663013	15.29639854	1.042634415	14.75324074
	9:00 AM	10:00 AM			1.543269216	6.374284909	1.698892568	3.898519912	8.400000036	10.61785715	15.72472205	12.23828539	21.0706596	21.7972445	7.581765098	6.345897832	6.972453728	6.523967362	3.011284726	4.917029556	3.318888477	9.928719108	5.834313432	13.85178855	13.88629352	1.060872587	14.63722222
	10:00 AM	11:00 AM			1.573717958	6.319989974	1.762689392	3.936666682	9.170833295	9.271527808	17.07013893	12.31150734	17.79148928	18.60458332	8.461388893	7.060714274	8.20347222	7.318212121	3.105448873	5.122333372	2.514074087	8.404431832	5.8443851	11.23672709	11.67863688	1.093477269	15.34305556
	11:00 AM	12:00 PM			1.549999999	6.259327153	1.746717158	3.854957833		9.465746733	13.94545459	12.01103943	17.28717951	17.7265.516	11.61829268	10.0564.5273	12.0497.9508	10.38983049	4.451577288	5.022222186	2.524458535	7.629787663	5.792942715	10.93233985	11.37407407	1.0898344	16.55166665
Noon	12:00 PM	1:00 PM			1.606481471	6.224153819	1.73504184	3.791488362	9.402777682	9.464583294	13.91944461	12.07828849	16.78175295	17.2180.1073	11.45025253	9.744626186	11.25852279	9.886604357	5.187266573	5.356555508	2.921951729	7.488723.17	5.852671962	10.23136564	10.66056336	1.092368718	12.99772726
	1:00 PM	2:00 PM			1.648611117	6.256860253	1.799857788	3.885873946	11.62499999	8.891648718	13.58750053	11.99095217	15.16036937	15.7129.1075	13.37714643	11.6476.7297	13.30855302	11.94031339	6.804866233	5.35625926	2.9587.3964	7.985055552	5.7947.45118	8.870138883	9.454242971	1.127777768	13.50851851
	2:00 PM	3:00 PM			1.578998247	6.529666661	1.753645842	3.874056651		8.458944478	13.67583332	12.56263439	15.51041666	15.9750.0003	18.14960316	15.5382.3198	16.72878788	15.7612416	10.24063488	8.627778807	2.489999988	7.741927103	5.867986309	9.264004978	9.636899648	1.166666671	14.97990196
	3:00 PM	4:00 PM			1.624166671	7.11428788	1.777033348	4.009693861		9.2597.22266	14.11277778	13.38209724	17.46592156	17.9333333	17.61077777	15.1443.4932	15.7780417	15.3690.3291	9.398053656	7.427083303	2.485111.65	7.942111105	6.2941.66667	10.66371765	11.11666668	1.491266659	17.39444442
	4:00 PM	5:00 PM			1.388444438	9.211328121	1.437704997	4.229239767		9.570833347	14.68777778	15.03808813	20.33431373	20.8111.9791	21.3705844	17.2823.1758	18.89240742	17.4771.4425	10.17438275	8.208249997	2.515425528	7.941782393	6.268144283	13.02447166	13.36066552	1.736616145	8.677209869
	5:00 PM	6:00 PM			2.775816995	10.01595972	3.034699978	5.951867818		11.65833333	17.26393939	18.79121522	20.71158535	20.8761.9049	16.29980939	13.7997.276	15.02424249	14.02158209	8.176202853	7.271874031	2.648511624	8.121446932	6.24781504	12.99825397	13.01186858	1.992319399	5.974494103
	6:00 PM	7:00 PM			1.645312497	6.422613699	1.818137244	6.087429354		12.65357143	18.3844446	12.82321428	21.76333334	22.2611.9046	8.513350278	6.954340274	8.154666672	7.168996401	3.125291696	5.331686715	2.698703768	8.014752278	6.028618421	11.10378359	11.49949585	1.238333183	9.351987287
	7:00 PM	8:00 PM			1.538492045	6.382567568	1.716666558	3.993472223	8.341666684	9.624074083	15.2598481	12.41442308	16.08933137	16.4778887	7.229017838	6.421256305	7.213888852	6.589718511	3.091998895	4.928333383	2.612866934	7.813074818	5.880757575	8.875468568	9.241575135	1.153728693	8.452222222
	8:00 PM	9:00 PM			1.547083307	6.219444439	1.729666552	3.999048403		9.202380971	12.8027779	12.03073914	15.14827586	15.4844443	7.175406489	6.344111698	7.151149437	6.507017531	3.13058479	5.074999966	2.494047632	7.837903223	5.82543979	8.580829868	8.823419548	1.123118253	11.82797619
	9:00 PM	10:00 PM			1.550739353	6.2595.1981	1.727333325	3.817903213	8.466666676	8.673333338	14.50833335	12.08922728	14.62774526	15.0450.1948	7.140535222	6.359652916	7.029041668	6.550179217	3.130181345	5.666666697	2.447916674	7.973030211	5.854534001.7	8.469828598	8.734062508	1.157554551	15.72321427
	10:00 PM	11:00 PM			1.538541676	6.400320511	1.716025632	3.881666663		8.881666733	12.7833334	12.59027775	14.7482838	15.0245.8333	6.976422788	6.104497337	6.633653856	6.328333321	3.087911538	5.075000003	2.433666686	7.673484663	5.883688844	8.520745211	8.785269954	1.089747138	14.15833333
	Midnight	11:00 PM	12:00 AM		1.539642865	6.419625029	1.697316658	3.882930929		9.966666587	14.13472229	12.49404764	16.1441.1786	16.58	6.878000023	6.104497188	6.770139839	6.164460799	3.013840577	4.914583331	2.471666665	7.750729396	5.842604175	8.463803907	8.756278697	1.098833327	8.967382647

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 14-Dec-13
Day of Week: Saturday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	BS8_EE8 Site H-1 to Site G	BS8_2A5 Site H-1 to Site D	BS8_9A2 Site H-1 to Site F	BS8_D69 Site H-1 to Site E	BS8_BB1 Site H-1 to Site C	BS8_D7C Site H-1 to Site B	BS8_D35 Site H-1 to Site A	BS8_D6D Site H-1 to Site Z	BS8_28E Site H-1 to Site Z-1	8A2_DED Site F to Site I	8A2_C45 Site F to Site H	8A2_EE8 Site F to Site G	8A2_2A5 Site F to Site D	8A2_BS8 Site F to Site H-1	8A2_D49 Site F to Site E	8A2_BB1 Site F to Site C	8A2_D7C Site F to Site B	8A2_D35 Site F to Site A	8A2_D6D Site F to Site Z-1	8A2_28E Site F to Site Z	D69_DED Site E to Site I	D69_C45 Site E to Site H	D69_EE8 Site E to Site G
					9.917481019	6.009486204	3.956647186	7.388098848	9.331683906	14.46374762	15.60514654	15.88809853	16.17561232	3.734509261	3.908743328	3.218672321	2.992726284	3.956647186	4.298227004	5.195218845	9.941950932	5.078126266	15.64724128	12.14156404	5.478634858	7.209118252	6.45333365
Midnight	12:00 AM	1:00 AM		6.458633382	5.798333333	3.500666656	10.32499998	8.607843142	12.96666662	12.95595242	15.15795451	15.85138885	3.810815613	3.312201667	3.623333352	2.556041656	3.53787877	5.185416662	5.020166681	10.38796284	8.633024711	11.47514619	11.98322468	6.144444413	7.627777987		
	1:00 AM	2:00 AM		6.619444493	5.887962619	3.276333344		8.302777808	13.18333343	11.87499995	14.47129631	14.63333332	3.488888942	3.184884662	3.618518487	2.578211998	3.166019597	4.466666745	5.677777752	9.708333313	6.726422747	11.35527779	11.72253087	8.969999994	7.462500008		
	2:00 AM	3:00 AM		6.513888923	5.917241372	3.275629523	10.16555831	8.24444442	13.02916674	11.96023078	14.5052933	14.87383048	3.651249977	3.169814958	3.41718751	2.492633951	3.452380946	5.171916688	5.507838863	10.71833333	8.506764377	11.58520455	11.92598038	8.578333374		7.8666665	
	3:00 AM	4:00 AM		6.533333333	5.717021283	3.538888902	7.872916753	9.475199543	13.01666652	11.89466667	14.72442529	15.01527778	3.638666473	3.378525221	3.502083346	2.343558703	3.46935557	4.675000098	5.638461543	10.94999985	8.259372351	11.20128205	11.58957408	9.333333242	8.450000084		
	4:00 AM	5:00 AM		6.675999965	5.645614493	3.406833269	7.68888957	8.830999517	12.60000035	11.4283759	14.5403703	15.03886176	3.884401465	3.167272234	3.329761937	2.468781109	3.356929583	4.48529635	5.178496353	9.750000995	8.280231449	10.79096327	11.52833355	9.132916259	8.93071435		
	5:00 AM	6:00 AM		6.526790555	5.793749894	3.308314707	7.674166721	7.800000063	11.72666403	11.54827753	14.2356159	15.00653286	3.780493822	3.107275145	3.224558292	2.418854742	3.297631054	4.585666635	5.280952368	10.2777273	8.182231432	10.69770962	11.42722723	9.284166677	8.9437939		
	6:00 AM	7:00 AM		6.625000022	6.103867868	3.379263564	8.296666621	9.020555549	13.23861482	14.07999999	16.2259078	16.23263888	3.968953348	3.349956694	3.424603281	2.766873784	3.338574255	4.826486119	5.146332537	11.1607149	10.7108747	12.85794701	12.96918767	8.938836373	8.992777825	8.133333474	
	7:00 AM	8:00 AM		8.610027513	8.341083618	3.378364454	8.088888961	10.9919643	20.62333337	19.33769587	16.38353305	16.7314899	3.860704383	3.594026565	3.496833333	4.974799794	3.280341903	4.469691186	7.045370365	12.25401236	15.51844568	13.11004902	13.24385713	8.681182777	7.745833341		
	8:00 AM	9:00 AM		6.628769851	6.292595509	3.356369048	7.96715886	14.16041667	20.277451	13.79223865	23.55456141	23.8918889	3.737215888	3.345021655	3.537719273	2.803117456	3.435491967	4.758851088	11.17291667	16.77187469	10.01878677	19.96647059	20.48364428	6.782142872	8.112585198		
	9:00 AM	10:00 AM		6.662501522	5.939775898	3.388895188	8.311655511	10.65526538	17.08438572	11.76996374	20.62458579	21.00136209	4.004362173	3.448180167	3.668833302	2.448247133	3.625145349	4.785370382	6.801582499	12.26253787	8.352327592	16.8457925	17.64337908	8.23826952	8.308334051	8.438888835	
	10:00 AM	11:00 AM		6.633159718	5.944031533	3.92550466	7.775000072	8.961666707	15.02604166	11.9577381	17.18488727	17.64827586	4.437830676	4.018967388	4.07397438	3.460372992	4.229713962	4.852976198	5.094512206	11.29772728	8.339334866	13.55674119	14.05810397	11.05533009	10.81999993	9.41250016	
	11:00 AM	12:00 PM		6.643785319	5.855482435	3.479699538	11.28333332	8.719117688	13.63452777	11.88922876	18.79384588	17.37978297	5.539729736	5.89756968	5.271428589	2.409339478	6.035561957	5.118518539	5.170833326	10.03045841	8.184575318	13.27399987	13.60891289	14.52564104	13.66452382		
Noon	12:00 PM	1:00 PM		6.65574029	5.914354433	3.456625671	8.008333368	8.662499974	13.23008768	11.86866667	16.09409729	16.45139993	7.668525931	4.73449927	7.466245149	2.454297694	4.908243724	5.077564166	5.149494755	10.82777777	8.309667323	12.43899208	13.09265873	17.65709127	14.2733332		
	1:00 PM	2:00 PM		6.69316667	5.825399753	3.449806112	9.119444378	8.825000009	13.40952394	11.80536273	14.91970165	15.45404646	6.38956894	5.362713529	5.885236166	2.419564677	5.559798986	4.913791657	5.21027777	10.08290599	8.191034745	11.44443215	11.95864019	22.50384615	24.32000002	32.70833345	
	2:00 PM	3:00 PM		6.646621644	5.956889647	3.422395838	8.733333348	8.28916257	13.62566557	11.80404761	15.11509649	15.5499575	7.176851834	5.51146028	6.849281602	2.512772338	5.73885327	4.777777786	4.8688889	9.886538468	8.384467911	11.61802884	12.09153398	27.43154761	24.13333328		
	3:00 PM	4:00 PM		6.666681858	6.024690279	3.503892931	9.075000063	8.566145796	14.05219294	12.9365659	16.35494999	16.89307715	8.111790108	6.414453539	6.60059301	2.929811113	6.576188079	5.026999975	5.061342604	10.5057232	8.143339695	12.92110068	13.56344248	27.29875002	24.8944442	23.73333339	
	4:00 PM	5:00 PM		6.668188974	5.907586207	3.954259258	10.80833333	9.831770835	14.42502084	15.25455655	19.89287678	20.49176992	8.423169246	7.533587313	6.401992758	3.400455061	7.719406914	5.926833373	5.538583306	10.9716668	9.484678643	15.68491983	16.08853054	30.43409993	25.81145833	23.93333346	
	5:00 PM	6:00 PM		6.694074094	10.66344449	5.983429758	14.09166668	11.99648149	18.9531783	17.01681419	21.20453707	21.56215277	11.7047715	5.147498534	8.692498337	3.800952563	5.370124122	5.774974029	6.088333304	11.34508547	10.13108849	15.8977907	16.01180999	24.21666668	19.78333322	20.86666664	
	6:00 PM	7:00 PM		6.676288114	5.961492242	6.494195847	7.733333297	14.01969794	19.37333335	12.27457166	22.04525745	22.49438848	7.492763193	3.882036303	6.529938877	2.526500008	4.143959073	4.818181775	6.590788485	11.81429	8.739459137	14.8564024	15.42983356	14.99166662	10.4052833	20.90833342	
	7:00 PM	8:00 PM		6.673223224	5.851111112	3.445497156	8.408333324	9.077564113	14.49555553	11.7573332	15.25118149	15.69657526	5.383333332	3.337885149	4.908814735	2.413249995	3.550936816	4.783333286	5.536389027	10.78845327	8.313969681	11.74133334	12.12383016	8.334523782	8.494166659	8.833333213	
	8:00 PM	9:00 PM		6.616666564	5.730158743	3.448364485	7.998111101	8.399999988	13.72499994	11.58369998	14.39111111	14.69616427	4.134907408	3.332448375	3.916666972	2.415938068	3.518157169	4.750000053	5.041379331	10.01215277	8.2099877	10.92832098	11.24798178	9.479166688	8.691666797	8.725000113	
	9:00 PM	10:00 PM		6.631439174	5.749754888	3.361788607	8.291666618	8.182541686	13.55984652	11.60001007	14.12122207	14.3757622	4.07933333	3.268398256	3.883083336	2.397222206	3.499101078	4.829999954	4.873287444	10.4794717	8.2853473	10.82361112	11.11321416	9.443333292	8.292500059	9.091666899	
	10:00 PM	11:00 PM		6.644202874	5.689474181	3.404504513	9.375000113	8.3416667	13.64722198	11.43124998	14.44439165	14.5677031	4.004116468	3.17453704	3.766145846	2.411358453	3.401935752	4.979666659	4.892939412	10.3701388	8.204576502	10.88658737	11.16394551	9.138888912	8.573333368		
Midnight	11:00 PM	12:00 AM		6.680902364	5.626388909	3.314153438	8.416666674	8.187500023	13.87187499	11.28400022	14.0505999	14.2812499	3.882762577	3.149828188	3.629238897	2.398222214	3.372503322	4.587291667	4.953645808	10.409375	8.227021843	10.84998737	11.14587379	9.076515208	8.0274999		

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 14-Dec-13
Day of Week: Saturday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D69_2A5 Site E to Site D 3.7139786744	D69_BS8 Site E to Site H1 7.3980089454	D69_9A2 Site E to Site F 4.2800927588	D69_BB1 Site E to Site C 4.1827342127	D69_D7C Site E to Site B 3.8952777451	D69_D35 Site E to Site A 7.6648644887	D69_D6D Site E to Site Z-1 10.4029990	D69_2BE Site E to Site Z 10.7078923	BB1_DED Site C to Site I 8.0293144520	BB1_C45 Site C to Site H 3.1041804901	BB1_EE8 Site C to Site G 4.3953920958	BB1_2A5 Site C to Site D 2.2301939291	BB1_BS8 Site C to Site H1 3.1914553788	BB1_9A2 Site C to Site F 5.1952185	BB1_D69 Site C to Site E 4.3677214307	BB1_D7C Site C to Site B 5.5958499134	BB1_D35 Site C to Site A 3.9810564977	BB1_D6D Site C to Site Z-1 6.8736990	BB1_2BE Site C to Site Z 7.2239125142	D7C_DED Site B to Site I 11.7822405	D7C_C45 Site B to Site H 12.4593727	D7C_EE8 Site B to Site G 11.8672824	D7C_2A5 Site B to Site D 6.8758313457
Midnight	12:00 AM	1:00 AM			4.292857516	7.899999983	4.680709209	5.595583924	11.65000000	10.14047627	12.36388803	12.62222216	8.753125629	8.104891398	8.828374618	2.035244971	8.214682529	5.037139482	6.883333331	5.816666633	3.637833309	6.555272990	6.912209283	20.62500013		13.72500006	8.188333327
	1:00 AM	2:00 AM			3.711111308	7.649999997	4.848533296	7.133333366		10.06249998	12.95139954	13.3154762	8.564583273	8.459469723	8.821666611	2.077131776	8.684313767	5.121396409	7.411888998	5.976833300	3.738250004	6.625000029	7.014912294	14.75983363	13.19166653	14.92500006	8.3541667
	2:00 AM	3:00 AM			4.035714297		4.700000022	5.891666729	12.09666656	10.41250032	12.55416663	13.32708329	8.704166697	8.423611121	8.765944456	2.072839489	8.651851853	5.180833345		5.741666794	3.875694447	7.011666638	7.465833364		13.43749995		7.496999958
	3:00 AM	4:00 AM			4.466666732	8.310000031	5.204999965	6.805555523	12.7083333	11.14666658	13.58083335	13.95249999	8.370833318	8.542277807	8.7033333	1.987500002	8.88547624	5.09166666	6.825000029		3.787777771	6.890523783	7.238309525				7.337499931
	4:00 AM	5:00 AM			3.912222336	8.022222208	5.147619029	7.338102394	10.37499999	10.09791999	13.27187499	13.38452999	9.243055515	8.810416993	9.018749993	2.020952176	8.579999993	5.109374975	6.166666576	4.858333398	3.736332225	6.582738898	8.923184412		11.38333349		7.428703737
	5:00 AM	6:00 AM			3.737826006	8.183333319	4.764919935	7.237833377	11.33583337	9.837775835	13.1984375	13.69548861	8.583333125	7.945249992	8.863275363	1.902833811	8.142936987	4.955321477	6.809574139		3.758403389	6.768263887	8.179472248	14.12916647	12.69166673	13.89166668	7.428703737
	6:00 AM	7:00 AM			3.338029412	9.050000068	4.933853869	6.440740780	12.2611111	11.53708338	12.9147859	13.42444449	8.781111107	8.078785761	8.873333341	1.963780961	8.194535237	4.885721765	6.966666642	5.094444318	3.654411749	6.509935878	8.717499972	14.8166669	13.75575753	13.59166647	7.409803362
	7:00 AM	8:00 AM			5.114499729	7.940277768	4.712152798	9.185185315	13.89537036	14.97833334	13.9288703	14.0270642	9.112777803	7.908333328	8.49666667	1.857051299	8.155128198	4.926296297	7.041666698	5.818518533	3.92962962	6.379461892	6.739451991	16.44166697	13.5761666	14.09722208	7.381464205
	8:00 AM	9:00 AM			3.932465297	8.324444465	4.772378558	11.48194444	16.10763892	11.15022522	19.2826556	19.5682071	8.877586184	8.248837307	8.675757533	2.004098547	8.648883659	5.17304678	7.099999998	5.876923116	3.7756249	7.423095237	8.083095245	15.63888889	13.71979166	13.55256411	7.761089759
	9:00 AM	10:00 AM			3.754578204	8.583333353	5.022321435	7.260953356	12.1133547	9.585494275	17.8567284	18.0183571	9.012387398	8.087241385	8.479387334	1.966554059	8.233474588	4.80533984	6.948529438	5.177500019	3.827053651	10.03431173	10.63455881	13.46250007	13.483775	14.04999955	7.614484172
	10:00 AM	11:00 AM			3.857870372	10.92708328	5.190972195	6.270833393	10.91944453	9.63202886	14.6952778	14.8064393	9.638020833	8.409487161	8.85364588	1.99955127	8.682475489	5.039417988	7.039538439	6.523511073	3.576470898	9.135632188	9.825574693	15.44583335	15.31249998	14.79444448	8.022348466
	11:00 AM	12:00 PM			3.745555507	13.8975135	5.427430563	6.225000331	11.62916673	9.511959754	15.18888886	15.73722223	10.57258052	9.188929472	10.0329861	2.045753324	9.385956733	5.170304218	7.966666708	5.290277773	3.678921353	9.579494538	9.714999957	15.18166669	14.44639452	15.52738095	7.379815435
Noon	12:00 PM	1:00 PM			4.163596468	14.46499998	10.2995906	6.227777712	10.83611107	10.09555552	13.68541667	14.1387684	13.41006946	12.36251128	13.44987303	1.994427998	12.54690998	6.394038458	6.872222356	5.190000026	3.526041468	6.077020212	8.774218752	10.89583328	18.2958375	19.19166667	7.4265766
	1:00 PM	2:00 PM			6.213492057	24.36388889	15.63803033	6.679166649	11.53333333	11.79583339	13.36947916	13.96779833	13.28302899	11.86022725	12.96340404	2.031382591	12.00452999	7.285333306	7.475000034	5.398958323	3.699356849	6.805247226	7.595512803	21.17361107	18.23666663	19.91422666	7.971654619
	2:00 PM	3:00 PM			8.466228064	24.28518515	18.50402298	8.964583282	14.32777774	14.70277777	14.93409089	15.58333332	15.82053571	14.23143274	15.52456141	2.378437691	14.59876502	9.257481758	7.583333373	5.127083352	3.46822911	6.799404726	7.467559516	22.08547618	19.08893056	24.44242424	8.007026142
	3:00 PM	4:00 PM			7.809609064	25.06666666	18.09858057	9.799666666	15.90590242	13.97638892	19.24015149	19.63333333	21.23433431	18.6001804	19.90045293	3.218497108	18.80169938	13.6170045	11.88833333	5.805555568	3.514226091	7.890675788	8.657936502	29.71166673	23.94847915	27.93703701	8.431375506
	4:00 PM	5:00 PM			6.971759228	25.7675002	16.81149833	10.65595237	15.46145829	13.83333333	20.32924076	20.84583333	21.30395833	18.73866966	19.92303923	3.155225228	19.19218108	12.78971735	10.33083336	5.333333295	3.783564824	10.76380952	11.63235295	27.31547617	25.61111108	26.50138888	8.629457356
	5:00 PM	6:00 PM			5.404829455	19.96666665	14.93416667	9.983333267	15.83541665	13.59166657	19.77037031	20.26229165	24.82645834	21.09209482	22.35588179	3.573170143	21.19409729	13.86932234	11.11666672	5.886666698	3.785448742	10.41875002	11.17137981	30.46270834	27.18569038	31.20002776	9.970999202
	6:00 PM	7:00 PM			4.262746301	10.58958333	6.133983272	7.661111131	13.9166667	10.69166665	16.14958976	16.53000024	20.43897531	16.8964445	18.71182798	2.609099865	17.17335108	11.1085294	9.879751845	5.128295154	3.46222224	8.620806392	9.349679485	28.77916666	23.93037035	25.05600063	8.979096461
	7:00 PM	8:00 PM			3.972083313	8.561666698	5.093333342	7.525000322	12.30833328	9.850770794	13.5388364	13.985	16.33851451	13.29869408	15.41652563	2.048464486	9.532361133	5.222552717	7.388555539	5.177777783	3.599277767	6.468854539	6.86999247	18.76249998	15.95083337	23.66833339	7.877243899
	8:00 PM	9:00 PM			3.888111113	9.166666735	5.132222226	6.576388932	11.96666672	10.15000033	12.5786458	12.83277775	9.319827575	8.405492436	9.272807004	2.072432428	8.708854182	5.212499533	7.058333438	5.119444445	3.571999981	6.295153823	6.597666948	14.24999999	14.14166664	14.39374998	7.858944453
	9:00 PM	10:00 PM			3.833333353	8.466874993	5.156666642	6.501249964	11.3958333	9.552777818	12.665	12.77499998	9.356699572	8.45416666	9.301041674	2.089110046	8.632926713	5.243712124	7.466666652	5.056666639	3.49791665	6.147548501	6.46994127	14.07291667	13.38194446	16.76666663	7.7207381
	10:00 PM	11:00 PM			3.990000002	8.800000045	5.126333336	6.524999898		9.988888944	11.7583326	12.17500001	9.152777746	8.566493918	9.910284137	2.082180887	8.701666957	5.24240199		4.616666688	3.51999996	6.199666642	6.499537056	15.73214285	14.23055554	14.3011905	7.926070169
Midnight	11:00 PM	12:00 AM			3.873333313	8.266666657	4.949691358	6.766666677		9.780238343	12.74722226	13.29999994	8.999052681	8.298760661	8.516666663	2.044318186	8.398061498	5.142171713	6.885416691	5.825000017	3.471111149	6.179444498	6.525555577	14.21041674	13.96428572	13.7250001	7.954018547

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 14-Dec-13
Day of Week: Saturday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	D7C_BS8 Site B to Site H-1 Length (miles) 17.46374753	D7C_9A2 Site B to Site F 8.664959604	D7C_D69 Site B to Site E 9.689277748	D7C_BB1 Site B to Site C 5.506918011	D7C_D35 Site B to Site A 3.245899707	D7C_D6D Site B to Site Z-1 8.168825269	D7C_2BE Site B to Site Z 6.198187507	D3S_D6D Site A to Site I 12.69862938	D3S_C45 Site A to Site H 19.88534286	D3S_EE8 Site A to Site G 12.27659457	D3S_2A5 Site A to Site D 8.109816038	D3S_BS8 Site A to Site H-1 13.9323456	D3S_9A2 Site A to Site F 9.078375488	D3S_D69 Site A to Site E 7.466964488	D3S_BB1 Site A to Site C 8.88254677	D3S_D7C Site A to Site B 5.429685027	D3S_D6D Site A to Site Z-1 3.963169242	D3S_2BE Site A to Site Z 3.278531109	D6D_DED Site Z-1 to Site I 15.58988211	D6D_C45 Site Z-1 to Site H 15.84172691	D6D_EE8 Site Z-1 to Site G 13.75178219	D6D_2A5 Site Z-1 to Site D 9.990189164	D6D_BS8 Site Z-1 to Site H- 15.9959582
Midnight	12:00 AM	1:00 AM			11.18095237		5.861668724				12.3433333	12.6584127	12.82023886	5.871092699	12.8973998	8.971387508	10.15994442	3.772536036		2.850609774	3.3036722	14.97587723	14.25043868	16.18722221	8.488555648	14.4539357
	1:00 AM	2:00 AM		13.3583333	8.849999863		5.249398853				12.16951851	12.2814814	12.95530301	5.624358849	12.4888888	8.86968634	11.54999999	3.831182788		2.703205121	3.089434758	14.96333334	15.2897473	15.36944445	8.602777781	15.41481463
	2:00 AM	3:00 AM		13.70833333	10.10555556	12.33746997	5.719444451				12.39791664	12.9726389	13.09444444	5.760962136	12.25654103	8.767777774	10.95833335	3.785256402	7.974999994	2.792156851	3.113847221	14.93541653	15.08553031	15.37575757	8.663095121	15.35428295
	3:00 AM	4:00 AM				5.549999804					12.59351849	12.9611109	11.89015149	5.769318918	12.39953706	8.898504262	11.07083336	3.758527788		2.734727824	3.080208329	15.23333333	15.05833334	16.00277781	8.503686247	15.78944449
	4:00 AM	5:00 AM			9.791666959	11.73333343		6.600308276			12.8995279	11.4958402	12.72132336	5.838673174	13.1770139	8.687713869	9.826111125	3.82821454		2.892540218	2.967558607	14.9864481	14.98020659	14.49666672	8.388808489	14.81491229
	5:00 AM	6:00 AM		12.84999987	10.24999998		5.018756918	6.783333309			12.1695852	11.9252529	12.38699986	5.818685573	11.4085786	8.339457802	10.47500002	3.633246529	6.941666566	2.892405688	2.978743729	14.83135166	14.85307161	15.61376812	8.370959998	14.6453257
	6:00 AM	7:00 AM		13.83558743	10.43809523	12.45833336	5.539358977	6.416666731	9.469444379	9.65277778	12.35269855	11.4678128	12.08895492	5.469235597	11.45138816	8.392307738	10.74570039	3.518833507		4.294863389	4.617455628	15.39803923	13.99366993	15.60729168	8.285416664	14.2963672
	7:00 AM	8:00 AM		13.6498718	10.5972144	13.6483336	5.188888885	6.270833353			12.2107143	11.7537604	12.1444444	5.542352634	11.9654104	8.607166336	10.81666665	3.541666645	6.477777776	2.637403307	2.946719635	15.19601451	14.3681218	14.55416668	8.12749858	14.4799501
	8:00 AM	9:00 AM		13.56666667	10.63766669	12.26875003	5.972685209		11.34166667	11.80000003	12.44023438	11.9019953	12.07222222	5.48178839	11.82511105	8.495297948	10.46916665	3.576721007		4.09781.9003	4.353880721	14.90435803	14.2228889	14.84010712	8.14073464	14.45573916
	9:00 AM	10:00 AM		13.60041655	10.30592105	12.3652776	5.505452761	6.685416657			13.0154514?	12.0118913?	12.47499273	5.519851126	12.23652402	8.664857708	10.53779531	3.512941.08	6.685333362	6.307565176	5.458901482	15.10926945	14.37905302	15.53562598	8.19035691?	14.5692307?
	10:00 AM	11:00 AM		14.87149121	11.14811109		5.776811584	6.875000093	12.1750001	12.71250001	14.28770492	12.7198412?	14.17395833	5.656977354	12.97185275	8.747981098	10.43333333	3.939627451	7.100000004	5.449277213	5.95411358	15.67157737	14.72060388	15.11250002	8.12348128	14.91001774
	11:00 AM	12:00 PM		14.87788454	10.53316665	13.23333323	5.191666903	6.365666567			17.03304509	15.1897592	16.8159533	5.41623711	15.2814732	9.686259503	13.975	3.995323099		5.56666445	5.458345072	17.22366657	16.85242297	17.45287358	8.539214695	15.95814177
Noon	12:00 PM	1:00 PM		18.47083334	12.27500832		5.296410044	6.437499998	17.99166664		16.8525753?	15.5332293	16.9136.1112	6.952435889	15.66845699	10.96564924	10.23888855	3.489090286	6.935834111	4.492703357	4.812275134	19.23115278	18.16372588	19.83966252	8.927488164	18.3992436
	1:00 PM	2:00 PM		16.46718747	13.74368707	12.72708343	5.715885466	6.541666669			20.3695502?	18.7573045?	20.3391.3041	6.852031253	18.87752598	13.80585549	11.84999961	4.165109899	7.197222132	3.135804989	3.648680113	16.98183673	16.05603854	19.41284723	8.678848848	18.2497685
	2:00 PM	3:00 PM		19.27466667	14.82170544		5.538095242	7.866666662	9.474999905	9.866666826	24.71209677	22.1020627?	23.72976191	7.043526797	22.53350691	17.0816119	12.23749992	4.659627835	6.433333308	3.471023242	3.90954549	23.41423809	21.41872299	23.20166664	9.545789471	21.5069254
	3:00 PM	4:00 PM		24.44406479	19.97212643	17.13333327	5.855555951	6.601666647	11.9194166	12.38333329	28.7525.169	24.8486656	25.4146253	9.287729935	24.89899833	19.4847577	14.7104444	4.361425114	6.783333321	4.787679312	5.398894298	27.0323654	24.63756333	25.4345238	9.694088016	25.3415824
	4:00 PM	5:00 PM		25.52412277	19.26375061		6.252388918	6.783333305	12.86111108	13.31250001	29.47246377	25.9345833?	26.9206517.5	8.183414638	26.13583333	18.7639664?	15.47916665	4.5484543	6.570833316	6.997200347	7.448921251	29.36231884	27.23796397	28.78291667	11.8414753	27.44732703
	5:00 PM	6:00 PM		27.38437501	20.20563064		6.410677076	6.395555556	13.345	13.57777778	23.53350302	20.5619805	21.81276042	6.452383645	20.84401402	14.59864639	15.82333323	4.77532851	7.044444457	6.84499535	7.372191677	32.17611112	28.56466467	29.66477775	11.02280509	28.85151516
	6:00 PM	7:00 PM		24.15795454	18.1108718	11.48333343	6.162121253	6.497222185	11.34999996	11.72499994	14.34569999	12.5111.983	13.86421587	5.831176469	12.74925315	8.736268348	14.23833332	3.910975746	9.785666833	4.846388168	5.269319624	25.83191489	23.4039834	24.82296522	9.161134366	23.60813736
	7:00 PM	8:00 PM		15.58666655	12.12766334	12.74166662	5.345454553	7.612500033			13.29562033	12.1855976	12.92731476	5.878486973	12.34753935	8.774800469	11.81666669	3.639625849	6.516666698	2.851323642	3.2287787	16.84133333	15.2561953	16.83611111	8.305145259	15.63390865
	8:00 PM	9:00 PM		14.35520828	10.57037034		5.596296303		8.716666693		12.86178863	12.1516393?	12.97789857	5.780150474	12.31097222	8.908695457	9.966666754	3.674777773		2.658979938	2.957948727	15.74913193	14.98156567	15.57055554	8.36114843?	15.0637681
	9:00 PM	10:00 PM		13.67175461	10.75633334	15.26666667	5.83333313				12.7505951?	12.1668918	12.85439394	5.826232297	12.3684166	8.850833333	10.66333331	3.697014478	6.829166673	2.652414341	2.952192691	15.52270832	14.81614583	15.73968056	8.526009933	14.9695857
	10:00 PM	11:00 PM		14.31916672	11.2845238		5.637500033	7.395833284			12.7123962	11.7999997	12.31944445	5.637737122	11.99045686	8.745124851		3.736708846		2.656166672	2.965100673	15.3509595	14.9591991	15.78333334	8.511231888	15.1214139
Midnight	11:00 PM	12:00 AM		14.16145838	11.24920635	12.22500008	5.341666697	8.508333284	10.66666669		12.31145833	11.7972585	12.06041667	5.557027033	12.01764707	8.527989128	10.79305552	3.629932308		2.630564191	2.925709218	15.31435187	14.35879788	14.83246112	8.381806611	14.64771504

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 14-Dec-13
Day of Week: Saturday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	Length (miles)	D6D_9A2 Site Z-1 to Site F	D6D_D69 Site Z-1 to Site E	D6D_BB1 Site Z-1 to Site C	D6D_D7C Site Z-1 to Site B	D6D_D35 Site Z-1 to Site A	D6D_28E Site Z-1 to Site Z	28E_DED Site Z to Site I	28E_C45 Site Z to Site H	28E_EE8 Site Z to Site G	28E_2A5 Site Z to Site D	28E_B58 Site Z to Site H-1	28E_9A2 Site Z to Site F	28E_D69 Site Z to Site E	28E_BB1 Site Z to Site C	28E_D7C Site Z to Site B	28E_D35 Site Z to Site A	28E_D6D Site Z to Site Z-1
					14.6412124	10.4598609	6.4739619	6.1684329	3.2461954	9.2797223	15.7745104	15.1280814	15.4583257	9.2647484	19.1782753	12.6419498	10.7078224	7.4299154	6.5912876	3.2780183	9.2797223
Midnight	12:00 AM	1:00 AM			11.4295977	12.7428571	6.4183734		2.8513052	6.3353532	15.4696666	14.5132765	15.9083338	8.7255208	14.6753191	11.5944444	13.3009725	6.6743463			2.9170103	6.2770182
	1:00 AM	2:00 AM			11.6823161	14.3458338	6.5891667		2.7496527	6.3377118	14.9464869	15.5234693	16.2308331	8.8973611	15.7098214	11.7759434	14.3541664	6.8382986			2.8980972	6.2713786
	2:00 AM	3:00 AM			11.5833681	15.8416667	6.6881782	10.67916667	2.8296389	6.3351955	15.0184236	15.7246764	15.3066667	8.8643175	15.6139404	11.6948333	15.2666667	6.9478611	11.158333	3.1225694	6.3196153
	3:00 AM	4:00 AM			11.5841668	18.6722225	6.6363636		2.7207075	6.3377.8097	15.2926782	15.5413726	16.0047618	8.7648148	15.7068275	11.7671296	19.0666666	6.8791667			2.9967826	6.2786854
	4:00 AM	5:00 AM			11.5899.4467	13.7380952	6.6387500		2.7704.8.36	6.3180.96.14	15.3678571	15.1139.994	14.5476389	8.8081.9.167	15.0686.9.63	11.5863.9.45	14.0749999	6.8990.0.54			3.0772.0.269	6.3129.6.199
	5:00 AM	6:00 AM			11.3385757	13.4222222	6.3380.36.06	9.3999999.6	2.7.704.8.32	6.3880.0.0.06	14.5.9.6.7.63	14.1.479.619	15.0.6.0.6.6.0	8.7.0.0.8.3.24	14.4.9.7.9.6.8.3	11.5.8.9.8.9.42	13.7.8.3.3.3.32	6.6.8.4.7.6.1.9.9	9.4.6.6.4.6.6.9.5.8		3.0.1.0.2.4.1.5.9.5	6.3.9.0.5.7.9.7.9.3
	6:00 AM	7:00 AM			11.1212.0.2.5.3	13.4216.9.6.6.7	6.2.3.0.0.3.8.7.6.1		2.6.9.7.6.3.3.3.4.2	6.3.0.0.7.6.0.3.2.2	15.5.8.2.5.6.8.8.9	14.1.4.5.0.3.9.6.9	15.4.0.2.5.6.0.3.1	8.5.2.6.0.5.9.6.6.3	14.3.5.4.9.3.3.1.9.7	11.2.6.9.9.9.9.8.6	13.4.8.6.8.0.3.9.9	6.4.6.6.9.6.6.6.1			2.9.5.9.3.5.7.5.7.3	6.2.9.6.4.1.9.4.2
	7:00 AM	8:00 AM			11.0.2.7.4.6.4.7	13.6.9.7.9.1.6.7	6.2.5.1.1.4.5.4.8		2.6.7.3.8.9.9.7.2.4	6.3.0.8.6.0.0.0.3.5	15.3.7.0.6.7.9	14.5.3.8.1.1.1.3	14.9.4.4.5.1.2.1.8	8.4.4.2.9.4.6.7.6.8	14.6.2.0.7.8.6.5.1	11.3.2.7.9.7.8.7.6	13.9.2.4.2.4.3.4.4	6.5.4.1.9.5.1.9.4.5			2.9.6.9.5.1.9.0.4.6	6.2.6.3.6.8.8.7.7.5
	8:00 AM	9:00 AM			11.2.9.1.7.6.5.8	13.0.1.3.8.8.8.9.3	6.2.0.1.3.8.8.7.7.2		2.6.4.4.0.2.7.7.7.3	6.4.7.5.5.4.7.8.7.1	15.1.1.9.0.2.3.5.2	14.5.2.1.7.8.0.3.1.1	15.2.4.1.6.6.6.9.9.2	8.4.9.7.3.0.5.4.5	14.7.0.9.6.2.9.6.5.5	11.5.2.0.7.3.1.7	13.6.2.5.5.5.5.5.3	6.5.3.2.6.0.3.7.3.8			2.9.2.9.4.8.3.1.4.6	6.2.7.3.6.7.7.1.8
	9:00 AM	10:00 AM			11.1.3.5.8.5.7.5.5	13.4.0.1.1.1.1.1	6.2.2.6.5.1.2.3.6		2.6.8.3.8.9.1.7.5.2	6.5.2.1.1.0.8.3.6	15.3.5.3.9.0.9.8.7	14.3.8.9.2.5.6.3.3	15.3.0.6.1.3.5.3.4	8.3.8.4.2.8.7.9.0	14.7.1.3.0.4.8.1.1	11.2.8.6.9.8.5.5.6	13.4.3.2.0.8.3.3.9	6.4.5.9.7.4.3.6.8			2.9.2.9.3.7.5.9.2.6	6.2.7.0.9.6.0.4.5.1
	10:00 AM	11:00 AM			11.1.7.2.6.9.9.6.6	13.2.2.6.9.6.0.8	6.2.7.6.5.6.0.1.7.3	10.1.2.0.8.3.3.3.4	2.6.4.9.4.6.3.3.4	6.5.1.7.4.0.3.1.7	15.8.6.5.4.1.2.1	14.8.8.9.6.2.2.6.3	15.7.1.6.8.8.0.3.8	8.3.9.6.4.2.8.5.7.1	15.0.5.4.9.5.6.0.7	11.4.0.4.3.7.4.2	13.6.8.6.0.1.8.5.3	6.5.3.3.6.7.8.0.4	10.1.5.8.3.3.3.3.8	3.8.1.7.8.6.4.0.2.5	6.2.7.2.8.5.4.5.1
	11:00 AM	12:00 PM			11.6.5.2.2.8.9.3.7.7	13.8.3.7.5.5.0.3.5	6.5.8.5.2.3.1.9.6.7	28.9.4.1.6.8.9.7.2	2.8.7.4.2.2.8.5	6.4.7.8.1.8.7.0.8	17.4.3.4.5.0.5.2.1	15.7.0.3.1.9.4.3.5	17.8.8.1.3.3.0.9.8	8.7.5.7.1.3.3.5.9.6	15.9.6.3.9.2.1.4	11.7.9.1.5.2.7.9	14.1.7.9.1.6.5.7	6.8.0.7.2.4.3.0.2	9.3.1.6.6.6.6.8.5.3	3.8.9.6.8.3.3.8.4.9	6.2.7.6.0.4.1.6.8.5
Noon	12:00 PM	1:00 PM			12.3.8.4.0.3.2.9	12.8.6.1.1.1.0.8	6.1.2.1.2.0.9.2.6	10.0.3.3.3.3.3.4.2	2.6.2.5.3.2.3.9.2.7	6.4.9.8.3.1.4.2.7	19.9.6.6.1.4.6.6.2	18.0.7.4.7.4.9.9.9	20.0.7.4.3.0.9.5.6	8.3.1.0.2.6.2.5.9.6	18.1.7.2.8.0.2	12.6.5.6.8.7.6.6	12.7.4.6.8.3.3.9.6	6.3.5.8.3.9.8.7.4	10.2.8.1.6.6.6.6.2	2.8.8.3.5.3.2.6.9.8	6.2.8.6.5.4.2.8.6.1
	1:00 PM	2:00 PM			13.6.9.5.2.6	14.5.9.7.2.2.2.1.7	6.9.4.6.5.6.2.4.8.5	11.7.4.9.9.6.9.9.7	2.6.2.1.4.9.7.5.8.3	6.4.8.7.2.9.8.7.9.8	19.7.7.3.7.3.7.9.8	18.4.4.9.7.9.4.7.7	20.1.8.6.8.6.9.9.6	8.9.7.9.4.9.4.8.5.4	18.5.7.9.8.5.9.9.6	13.9.3.0.6.0.9.8.1	15.0.8.5.5.5.5.1.3	7.1.5.6.3.6.7.9.1.6			2.9.1.4.2.9.9.6.9.9	6.2.9.0.8.5.4.1.8
	2:00 PM	3:00 PM			16.2.8.3.9.8.7.5	15.2.4.9.9.9.9.9.7	7.3.9.1.9.8.4.1.2.1	9.3.2.5.0.0.0.9.4.8	2.6.1.7.3.3.8.4.6.9	6.4.9.9.8.2.5.6.0.5	23.5.3.9.4.4.4.6.3	21.8.0.9.6.9.4.6.8	23.3.8.1.1.9.9.4.7	9.8.6.2.4.4.6.3.5.4	21.9.3.9.9.0.5.1.5	16.7.8.4.2.4.9.9.0	15.5.9.9.5.8.3.3.5	7.6.5.6.3.9.2.0.4.7	9.2.3.3.3.3.3.2.9.6	2.8.8.7.2.3.1.8.4	6.2.8.2.3.6.9.9.2.1
	3:00 PM	4:00 PM			19.7.0.6.6.9.7.8.1	15.7.3.3.3.3.3.4.1	7.0.0.9.8.9.5.1.1.9	16.4.8.3.1.2.3.2.6	2.6.2.4.9.7.3.4.5	6.5.0.7.3.9.9.1.2	27.5.0.2.3.7.6.5	25.3.3.9.8.4.9.2	28.8.8.2.2.4.9.9	10.9.8.3.0.2.2.3.9	25.9.0.3.8.9.5.9.6	20.1.0.6.9.0.5.7.5	17.7.1.6.6.6.9.9.8	7.3.1.9.9.8.1.5.9			2.9.1.0.3.6.3.0.3	6.2.7.3.9.4.2.9.7.6
	4:00 PM	5:00 PM			21.0.7.9.7.2.3.4	18.8.1.2.4.9.9.9.7	9.3.2.7.4.8.9.3.8.5		2.7.9.6.0.4.5.4.6	6.2.4.8.2.5.9.9.2	30.1.4.3.7.2.5.5	27.8.5.4.2.9.8.9.4	28.1.7.6.5.1.8.9	12.3.9.1.4.9.5.7.1	29.1.3.6.7.3.9.6.6	21.6.7.7.9.5.1.5.2	18.6.7.5	9.9.3.3.4.6.9.5.6	10.8.7.0.8.3.3.2.5	3.1.0.8.3.9.7.1.9.2	6.2.8.9.3.6.1.1.4.8
	5:00 PM	6:00 PM			21.4.4.4.5.8.9.9.9	18.5.8.8.8.8.8.9.7	7.8.0.0.9.6.6.6.4.8	9.8.3.6.1.1.1.1.8	2.8.2.4.7.7.6.9.6	6.5.1.3.2.3.8.9.9.6	32.7.7.9.7.9.5.7	28.9.5.9.2.9.7.5.2	30.1.2.3.4.7.4.9	11.4.0.1.7.7.6.9	29.2.9.6.6.6.6.5.7	21.8.7.7.9.7.7.1	18.9.3.9.5.5.5.5.3	6.6.0.6.3.4.0.1.4	10.6.8.3.8.8.9.9	3.6.8.1.9.7.1.4.3	6.2.7.7.9.5.8.7.1
	6:00 PM	7:00 PM			17.2.8.4.7.4.3.5.6	16.5.7.2.2.2.2.2.2	6.6.1.2.2.7.4.1.2	9.4.8.3.3.2.3.1.8.3	2.7.5.9.7.5.7.5.2	6.5.1.4.3.3.9.4.3	28.4.9.5.8.7.6.4	23.5.5.7.6.2.1.0.8	25.9.6.0.2.8.3.9.8	9.4.9.6.5.0.1.9.7	23.9.0.9.5.7.4.4.9	17.7.0.1.8.9.6.5	17.0.3.8.3.2.3.3.8	6.9.5.8.5.4.4.2.7.5	10.1.7.4.9.9.9.8.1	3.0.1.3.1.4.3.9.4.7	6.2.8.7.5.9.8.8.7
	7:00 PM	8:00 PM			11.4.3.7.3.7.8.5.3	14.7.9.1.6.6.9.9.9	6.3.7.1.5.4.8.2.1	9.4.0.4.1.9.9.5.2	2.7.3.5.8.2.0.9.8	6.3.7.8.8.9.1.0.7	27.9.8.0.4.9.6.8.8	15.5.3.8.4.5.5.9	18..9.3.9.4.7.3	8.6.4.5.2.8.4.5.6	15.8.5.7.9.7.9.9	11.7.8.4.8.5.5.1	15.2.0.4.1.6.5.7.6	6.4.7.0.5.3.9.2.7.1	9.3.8.3.3.3.3.3.5.4	3.0.1.7.9.2.2.7.3	6.2.8.6.7.5.9.8.7
	8:00 PM	9:00 PM			11.4.9.2.3.7.4.7.4		6.4.2.9.3.1.2.4.7		2.7.1.8.9.6.5.9.2.1	6.3.0.8.5.7.5.9.2	16.3.3.5.0.5.2.9	15.2.3.1.2.4.9	15.7.9.0.3.5.7.1	8.6.9.0.7.0.3.1.9	15.3.3.8.3.3.3.3	11.7.6.2.8.9.2.9		6.8.9.1.4.9.6.2.4.2			2.9.9.7.6.5.0.3.7	6.2.7.7.0.1.4.7.9
	9:00 PM	10:00 PM			11.5.2.4.9.8.7.4.7	13.4.4.2.7.5.9.9.9	6.4.3.4.5.6.1.3.5	17.8.9.1.6.9.9.9.9	2.7.1.6.2.1.5.2.2	6.3.0.6.1.3.2.7.5.2	15.9.9.1.6.9.9.7	15.0.8.1.9.4.4.4.4	15.8.9.5.0.5.7.2	8.8.9.8.2.6.2.5.1	15.2.5.2.7.1.3.8	11.9.7.2.0.9.7.0.2	13.7.9.7.9.1.6.9.8	6.7.5.2.7.1.1.0.5			2.9.2.9.7.7.5.3	6.2.7.7.2.1.7.1.9
	10:00 PM	11:00 PM			11.6.8.3.0.8.7.2.4		6.4.4.7.9.5.7.7.1		2.8.8.9.6.7.0.5.6	6.3.0.6.3.2.4.7.4	15.9.0.3.5.8.5.1	15.2.4.0.1.7.4.4.6	16.2.9.2.3.8.7.3.8	8.8.3.5.7.5.8.7	15.4.7.8.2.3.9.9.8	12.0.0.7.6.5.2.2.5		6.8.9.1.1.2.9.0.3.6			2.9.9.6.4.3.7.7.3.7	6.2.8.8.9.1.5.8.1
Midnight	11:00 PM	12:00 AM			11.4.6.1.9.5.8.5.1	13.6.0.9.9.9.9.9.7	6.3.4.7.0.0.0.0.2.2	9.6.9.0.0.0.1.1.2.9	2.7.2.1.5.8.2.9.0.7	6.2.9.9.2.9.6.3.0.4	15.6.7.7.6.4.2.2.9	14.7.3.1.7.2.5.9.5	15.1.2.8.9.1.9.4.8	8.6.9.3.7.5.6.9.8.1	14.9.5.7.2.9.1.6.9.8	11.7.4.9.4.9.5.3.1	13.8.7.4.9.9.9.9.8	6.8.1.7.9.4.0.5.6	9.3.6.6.6.6.7.9.4	3.0.0.2.0.9.6.4.8	6.2.4.6.6.1.6.4.7

TRAVEL TIME DATA

1 HOUR CORRIDOR STATISTICAL SUMMARIES

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 15-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	DED_C45	DED_EE8	DED_2A5	DED_B58	DED_9A2	DED_D69	DED_BB1	DED_D7C	DED_D35	DED_D6D	DED_2BE	C45_DED	C45_EE8	C45_2A5	C45_B58	C45_9A2	C45_D69	C45_BB1	C45_D7C	C45_D35	C45_D6D	C45_2BE	EEB_DED
			Site I to Site H	Site I to Site G	Site I to Site D	Site I to Site H-1	Site I to Site F	Site I to Site E	Site I to Site C	Site I to Site B	Site I to Site A	Site I to Site Z-1	Site I to Site Z	Site H to Site I	Site H to Site G	Site H to Site D	Site H to Site H-1	Site H to Site F	Site H to Site E	Site H to Site C	Site H to Site B	Site H to Site A	Site H to Site Z-1	Site H to Site Z	Site C to Site I
			Length (miles)	1.001	1.473	6.666	9.083	3.702	7.085	8.800	11.750	13.698	15.369	15.775	1.000	0.859	6.851	0.000	3.909	7.709999634	9.104999542	15.43542725	12.98529053	15.59472656	14.13989258	1.474199986
Midnight	12:00 AM	1:00 AM		1.181	1.214	6.320	1.358	4.200	8.065	9.350	14.667	12.073	15.369	15.494	1.187	0.846	5.850	0.185	3.459	8.277777775	8.075000038	13.95833328	11.57888889	14.3854167	14.67083335	1.395833305
	1:00 AM	2:00 AM		1.061	1.238	6.475	1.268	4.130	9.064	8.560	15.450	12.116	14.724	14.867	1.296	0.785	5.800	0.237	3.547	8.783333302	8.683333257	12.51666659	11.16944153	14.41666666	14.62388888	1.41874996
	2:00 AM	3:00 AM		1.085	1.256	6.446	1.246	4.171	10.196	9.211	15.187	12.280	14.901	15.153	1.392	0.852	5.967	0.213	3.568		8.834166642	13.89375004	11.86743429	14.28125	14.90486999	1.437925541
	3:00 AM	4:00 AM		1.083	1.212	6.316	1.400	4.261	8.725	8.851	14.283	12.048	15.020	14.929	1.079	1.004	5.761	0.214	3.596		8.546166548		11.63958332	14.77812502	15.10694445	1.351666659
	4:00 AM	5:00 AM		1.059	1.222	6.258	1.273	4.137		8.869		11.932	14.906	15.340	1.333	0.870	6.138	0.233	3.508		8.145454549	12.69166683	11.79842102	14.42333324	15.27249999	1.399999974
	5:00 AM	6:00 AM		1.000	1.211	6.168	1.152	4.065		8.559		12.012	14.937	15.706	1.300	0.869	5.670	0.259	3.540	8.175000083	8.640190453	12.95	11.85952398	14.64166664	15.08833328	1.446553945
	6:00 AM	7:00 AM		1.091	1.244		1.380	4.002		8.803	14.250		14.761	15.262	1.090	0.788	5.722	0.228	3.441		8.508333302	13.08	11.29730764	14.61756952	14.68866658	1.426851845
	7:00 AM	8:00 AM														0.712				3.339		7.491666758	16.15833336		14.11999998	14.2213212	
	8:00 AM	9:00 AM																								
	9:00 AM	10:00 AM																								
	10:00 AM	11:00 AM																								
	11:00 AM	12:00 PM																								
Noon	12:00 PM	1:00 PM																								
	1:00 PM	2:00 PM																								
	2:00 PM	3:00 PM																								
	3:00 PM	4:00 PM																								
	4:00 PM	5:00 PM																								
	5:00 PM	6:00 PM																								
	6:00 PM	7:00 PM																								
	7:00 PM	8:00 PM																								
	8:00 PM	9:00 PM																								
	9:00 PM	10:00 PM																								
	10:00 PM	11:00 PM																								
Midnight	11:00 PM	12:00 AM																								

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 15-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

Time			Segment Label	EEB_C45	EEB_2A5	EEB_B58	EEB_9A2	EEB_D69	EEB_BB1	EEB_D7C	EEB_D35	EEB_D6D	EEB_2BE	2A5_DED	2A5_C45	2A5_EE8	2A5_B58	2A5_9A2	2A5_D69	2A5_BB1	2A5_D7C	2A5_D35	2A5_D6D	2A5_2BE	B58_DED	B58_C45
			Site G to Site H	Site G to Site D	Site G to Site H-1	Site G to Site F	Site G to Site E	Site G to Site C	Site G to Site B	Site G to Site A	Site G to Site Z-1	Site G to Site Z	Site D to Site I	Site D to Site H	Site D to Site C	Site D to Site H-1	Site D to Site F	Site D to Site E	Site D to Site C	Site D to Site B	Site D to Site A	Site D to Site Z-1	Site D to Site Z	Site H-1 to Site I	Site H-1 to Site H
			Length (miles)	9.958138954	6.315338097	5.617948109	3.152667257	6.45323906	9.295926099	11.86787904	12.27880457	15.2563675	15.4526357	6.665248617	6.881207217	6.175185304	6.629588533	2.882729284	3.278382545	2.229192251	5.873813649	5.109560039	6.696489364	6.29074589	9.96524649	6.958718896
	Midnight	12:00 AM	1:00 AM	1.447722196	6.2156000318	1.628124999	4.0842982801		9.769444484	13.51250005	12.57916667	15.16764709	15.72202381	6.600000024	6.051282666	6.598039179	6.278205133	3.013854455	5.387499988	2.496212888	8.038333298	5.78888782857	8.638453814	8.948333317	7.540476218
		1:00 AM	2:00 AM	1.473148149	6.700378783	1.742361116	3.8961111898		9.519446443	13.46833398	13.30885416	14.7375	15.07166672	6.435833294	5.753571378	6.583333312	6.046296246	2.802698596	5.341666695	2.54166886	7.95416669	5.38599538	8.604464288	8.857037052	1.111904762	19.39166659
		2:00 AM	3:00 AM	1.468133151	6.547727243	1.704166643	4.172619038		9.983538953	15.15208328	12.53803134	16.41794707	14.9125	6.229166656	6.572222248	6.56999987	6.613988923	3.086681627	5.375000119	2.638462389	8.545454504	5.968713451	8.790756028	9.22900956	1.183333369	12.85166655
		3:00 AM	4:00 AM	1.436666653	5.556666703	1.783333342	3.831547638		9.700000029		11.42166673	15.40416668	15.7725	6.8777778	6.220238078	6.284722193	6.431666628	3.075220598		2.570572903	8.761666757	5.79218751	8.741266833	9.029992661	1.204166673	11.44166659
		4:00 AM	5:00 AM	1.477002368	6.301666653	1.681250059	3.539583373		8.204166756	13.21666773	11.78666804	14.35500002	14.33000002	6.860740767	6.027976209	7.142187443	6.526785751	3.1813465	4.77083444	2.417292937	7.449833438	5.823041775	8.573702031	9.925606569	1.095000057	0.958499983
		5:00 AM	6:00 AM	1.308333389	6.231666631	1.581249973	3.833333302		8.023333454	14.43333332	11.92400556	14.43055551	14.7333332	6.493722243	5.890777782	6.132936512	6.117751104	2.925120725	5.147916686	2.438462584	7.985416431	6.095833237	8.923574791	8.923574955	0.954999983	0.483333319
		6:00 AM	7:00 AM	1.378633316	5.853571434	1.626333319	3.892948888		10.47916657	14.39999983	11.46666668	14.72	15.05833333		6.233333386	6.208333319	2.906345777	5.756333448	2.535952383	8.157051219	5.95926618	8.701389864	8.822260272	0.788333282	15.02177779
		7:00 AM	8:00 AM				3.708333308		7.758333329			13.81250001	14.02619048						2.449999969	8.390111113	5.502904415	8.216803538	8.483643139		14.21666687
		8:00 AM	9:00 AM																2.449999983	9.206666589		7.974166683	8.373529394		
		9:00 AM	10:00 AM																						
		10:00 AM	11:00 AM																						
		11:00 AM	12:00 PM																						
	Noon	12:00 PM	1:00 PM																						
		1:00 PM	2:00 PM																						
		2:00 PM	3:00 PM																						
		3:00 PM	4:00 PM																						
		4:00 PM	5:00 PM																						
		5:00 PM	6:00 PM																						
		6:00 PM	7:00 PM																						
		7:00 PM	8:00 PM																						
		8:00 PM	9:00 PM																						
		9:00 PM	10:00 PM																						
		10:00 PM	11:00 PM																						
	Midnight	11:00 PM	12:00 AM																						

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 15-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	BS8_EE8	BS8_2A5	BS8_9A2	BS8_D69	BS8_BB1	BS8_D7C	BS8_D35	BS8_D6D	BS8_2BE	9A2_DED	9A2_C45	9A2_EE8	9A2_2A5	9A2_BS8	9A2_D49	9A2_BB1	9A2_D7C	9A2_D35	9A2_D6D	9A2_2BE	D69_DED	D69_C45	D69_EE8
			Site H-1 to Site G	Site H-1 to Site D	Site H-1 to Site F	Site H-1 to Site E	Site H-1 to Site C	Site H-1 to Site B	Site H-1 to Site A	Site H-1 to Site Z	Site H-1 to Site J	Site H-1 to Site I	Site F to Site I	Site F to Site H	Site F to Site G	Site F to Site D	Site F to Site H-1	Site F to Site E	Site F to Site C	Site F to Site B	Site F to Site A	Site F to Site Z-1	Site F to Site Z	Site E to Site I	Site E to Site H	Site E to Site G
			Length (miles)	9.917481818	6.609488636	3.956547186	7.388068182	8.351655303	15.49374762	15.80261458	15.88895952	16.17501429	3.731609091	3.908743182	3.231667727	2.983726364	3.956547186	4.359272636	5.195218864	9.944909091	8.078872636	15.54742197	12.24156061	5.479631667	7.328318182	6.49333636
Midnight	12:00 AM	1:00 AM		0.662820449	5.680555556	3.312500033	7.800000021	7.954333306	13.80000003	11.39877794	13.99351856	14.297	3.809849581	3.060128659	3.580729193	2.353166668	3.546280431	4.678851798	5.006481466	10.30694442	8.196846838	10.99555555	11.41574072	8.161666688	8.18555568	9.366666656
	1:00 AM	2:00 AM		0.479166666	5.680964539	3.351562541		9.358333368	12.30833329	11.54399815	14.24607845	14.30527777	3.529166665	3.05137857	3.566269816	2.438357841	3.291203678	4.749999996	4.910185169	10.22750984	8.463095248	10.96103904	11.16975468	8.908333406	29.61666662	
	2:00 AM	3:00 AM		0.497916732	5.813363641	3.459627482		9.052500024	13.59999998	11.75000002	14.3337963	14.80833336	3.489999998	3.116666649	3.227500042	2.403431359	3.372364411	5.357916743	5.228448276	11.01666673	8.358444434	11.36394188	11.79329711			
	3:00 AM	4:00 AM		0.716666635	5.510984851	3.427314823		8.337878764		11.3263889	14.72301589	14.99950981	3.476388864	3.133854172	3.345296289	2.243154734	3.221862739	4.854166498	4.998814908	10.10833341	8.13263888	11.08241496	11.3606108			
	4:00 AM	5:00 AM		0.594375036	5.81515153	3.27733338		7.97916666	12.40166668	11.46944441	13.98429237	14.50666277	3.536666662	2.958854169	3.263333343	2.380750979	3.325902791		4.739595169	9.833333365	8.133333436	10.91383333	11.26666652	7.716666553	10.26666664	
	5:00 AM	6:00 AM		0.591666515	5.510983778	3.337499985	8.016666977	8.3852586772	12.78750004	11.65703124	14.2725293	14.64259297	3.372916566	2.963895519	3.243999946	2.293955368	3.179951164	5.12083347	4.849599819	10.07222283	8.203199548	10.7833292	11.19149553			
	6:00 AM	7:00 AM		0.545370363		3.287195129		8.361904717	12.45208335	10.93166662	14.01799974	14.65333335	3.352569305	3.035416673	3.181699769	2.239102559		4.69208335	5.075000006	10.52499997	7.947844839	10.80025253	11.00583393			
	7:00 AM	8:00 AM									14.63945834	14.9736111			3.223618002				4.636942068	9.585475179			10.55177185	10.73757863		
	8:00 AM	9:00 AM																								
	9:00 AM	10:00 AM																								
	10:00 AM	11:00 AM																								
	11:00 AM	12:00 PM																								
Noon	12:00 PM	1:00 PM																								
	1:00 PM	2:00 PM																								
	2:00 PM	3:00 PM																								
	3:00 PM	4:00 PM																								
	4:00 PM	5:00 PM																								
	5:00 PM	6:00 PM																								
	6:00 PM	7:00 PM																								
	7:00 PM	8:00 PM																								
	8:00 PM	9:00 PM																								
	9:00 PM	10:00 PM																								
	10:00 PM	11:00 PM																								
Midnight	11:00 PM	12:00 AM																								

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 15-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	D69_2A5	D69_BS8	D69_9A2	D69_BB1	D69_D7C	D69_D35	D69_D6D	D69_2BE	BB1_D6D	BB1_C45	BB1_EE8	BB1_2A5	BB1_BS8	BB1_9A2	BB1_D69	BB1_D7C	BB1_D35	BB1_D6D	BB1_2BE	D7C_D6D	D7C_C45	D7C_EE8	D7C_2A5
			Site E to Site D	Site E to Site H-1	Site E to Site F	Site E to Site C	Site E to Site B	Site E to Site A	Site E to Site Z-1	Site E to Site Z	Site C to Site I	Site C to Site H	Site C to Site G	Site C to Site D	Site C to Site H-1	Site C to Site F	Site C to Site E	Site C to Site B	Site C to Site A	Site C to Site Z-1	Site C to Site Z	Site B to Site I	Site B to Site H	Site B to Site G	Site B to Site D
		Length (miles)	3.378286244	7.366008649	4.280007568	4.567762162	8.886277243	7.464864865	10.46081982	10.70789219	8.629834422	3.104189489	8.395202932	2.240193826	9.191450398	5.1952356	4.367724324	5.556918919	3.882064477	6.873692699	7.672902164	11.78219454	12.42527236	11.80787454	8.879813645
Midnight	12:00 AM	1:00 AM		4.130566559	8.411111428	4.800595245	7.333333333	11.67083333	9.591666666	12.34880942	13.07777777	8.779487183	8.138793111	8.321666524	1.963224492	8.314444456	4.933333328	6.888111032		3.543333343	6.498809595	6.883333359	15.73333316	13.59999998	14.73333327	7.77
	1:00 AM	2:00 AM		3.73749997		4.941666727	8.008333147		10.8333333	12.46666661	12.77499994	8.240000032	7.855072452	8.320833377	1.843287946	8.240520369	4.856756746	6.875000093	5.545833344	3.547222385	6.381250008	6.729166713	22.86666668		14.23333341	7.438888869
	2:00 AM	3:00 AM		4.477777786			6.194444429	11.52500002	11.30500031	13.97499997	14.34444427	8.506944431	7.832916606	7.583333446	1.880505581	8.004583261	4.788888912	6.916666702	5.363888564	3.737962985	6.763869051	7.054791921			7.250000031
	3:00 AM	4:00 AM		3.697222285		4.674999958	7.499999888		9.445833396	14.64166664	15.12083329	7.908333287	8.308333308	2.004166681	8.526388938	4.885264425	7.033333238	7.283333391	3.513536803	6.366563202	6.743840468		12.35833336	13.90000084	7.108333419
	4:00 AM	5:00 AM	10.32499999	4.259722166		5.056666518	8.13750017		11.09833386	12.06944453	12.44166674	9.395555549	8.388333255	1.858629539	8.618888907	5.001754405		5.204166586	3.432500069	6.229951009	6.556227566		13.38333339		7.733333297
	5:00 AM	6:00 AM		3.394722164		4.544444382	7.650000093		10.84305596	14.35000009	15.66666672	8.712833548	7.975041825	1.940166653	8.39166672	5.054012496	6.499999926	4.97083337	3.449800343	6.101388939	6.90416565			13.66666698	7.126666707
	6:00 AM	7:00 AM		3.672222309		4.314583318	6.041666754	10.94999999	10.67916673	13.05416665	13.54904761	7.961111089	7.794791665	7.943181873	1.785458333	8.014444458	4.746171185	6.277083323	5.166666631	3.543750681	6.040151539	6.337037049	14.15800003	13.64761902	13.19537039	7.164583322
	7:00 AM	8:00 AM					6.658333344	12.57500002		11.76166675	12.13333324		8.112499919	8.141666599	1.768055836		4.647042989	7.818666681	7.177777793	3.371388892	5.920997698	6.24061729		13.43333336	6.781250022
	8:00 AM	9:00 AM													1.620833343				6.195833336	3.429166698	5.991666648	6.485199087			
	9:00 AM	10:00 AM																	4.891666521							
	10:00 AM	11:00 AM																								
	11:00 AM	12:00 PM																								
Noon	12:00 PM	1:00 PM																								
	1:00 PM	2:00 PM																								
	2:00 PM	3:00 PM																								
	3:00 PM	4:00 PM																								
	4:00 PM	5:00 PM																								
	5:00 PM	6:00 PM																								
	6:00 PM	7:00 PM																								
	7:00 PM	8:00 PM																								
	8:00 PM	9:00 PM																								
	9:00 PM	10:00 PM																								
	10:00 PM	11:00 PM																								
Midnight	11:00 PM	12:00 AM																								

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 15-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

Time	Begin Time	End Time	Segment Label	D7C_B58	D7C_9A2	D7C_D69	D7C_BB1	D7C_D35	D7C_D6D	D7C_2BE	D35_D6D	D35_C45	D35_EE8	D35_2A5	D35_B58	D35_9A2	D35_D69	D35_BB1	D35_D7C	D35_D6D	D35_2BE	D6D_D6D	D6D_C45	D6D_EE8	D6D_2A5	D6D_B58
			Site B to Site H-1	Site B to Site F	Site B to Site E	Site B to Site C	Site B to Site A	Site A to Site Z-1	Site B to Site Z	Site A to Site I	Site A to Site H	Site A to Site G	Site A to Site D	Site A to Site H-1	Site A to Site F	Site A to Site E	Site A to Site C	Site A to Site B	Site A to Site Z-3	Site A to Site Z	Site Z-1 to Site I	Site Z-1 to Site H	Site Z-1 to Site G	Site Z-1 to Site D	Site Z-1 to Site H-1
			Length (miles)	12.46374762	8.9449599027	9.6892777431	5.5997490511	5.3456999027	6.1698382569	6.1981978761	12.6389254589	10.8853410959	12.2160640871	6.1008010239	13.6325.9456	9.0781254.68	7.4649641489	8.3825.46777	5.4568980827	3.0461904421	3.2783.0139	15.5898892.1	15.5417.28051	15.2567.82.79	9.0961.881647	15.3995.9582
Midnight	12:00 AM	1:00 AM		13.887.49994	11.12023.8828	14.383333348	5.5874.99825		10.533333136	11.61666659	11.963888889	11.42935556	12.3475	5.4268333229	11.627.03334	8.4200866355	10.4805557	3.5513.15.725	10.19999985	2.7619.68889	3.0639.87004	14.867.66665	14.527.52.977	14.83.3.94442	8.2739.68283	14.7.102.4583
	1:00 AM	2:00 AM			10.35833398		5.3166.67.47				11.739583332	11.07291666	10.34166656	5.3342.10586	11.353.12486	8.0750.00.398	11.358.33325	3.6327.77.797		2.7.75.00.9084	3.0625.92.607	14.3055556	14.134.84868	14.9902.77.76	8.0276.92.315	14.39.763.459
	2:00 AM	3:00 AM					5.4000.00.947				11.254999907	10.88749995	12.7916666	5.5891.30433	12.033.33333	8.3888.88894	11.408.33.348	3.4955.12.842		2.8505.34.193	3.1136.34.998	14.247.59.257	13.9880.0953	13.8.25.00.0.03	7.9625.00.012	14.5825
	3:00 AM	4:00 AM	12.45000012		8.5000.00.104		4.9666.66.719				12.397916664	11.561.11.111	11.03166668	5.2.56.33.315	12.016.25.666	8.4465.27.778	10.583.33.326	3.757.14.2.898		2.8379.48.885	3.1177.06.228	13.6.38.88.92	14.7.09.1.667	16.3.39.583.3	8.3429.48.745	14.8902.7.783
	4:00 AM	5:00 AM	13.533333319	10.51666643	10.816666684						12.432.14.2.89	11.25.20.83.09	13.525.75.753	5.5.69.39.972.4	11.629.23.598	8.8523.85.203		3.477.14.8.27		2.7.3.87.9.975	3.018.81.2.647	15.347.22.24	14.3.44.64.766	14.0.18.13.2.04	8.0.33.32.0.45	15.0.52.76.0.92
	5:00 AM	6:00 AM	13.366666659	10.73999998		5.2.88.33.33.15	6.3499999.23				11.7.1666652	11.5410.597	11.4.80.15.152	5.3.93.58.998	12.05.78.4.15	8.3.90.80.75.2	10.0.49.99.994	3.6.69.54.3.54		2.7.9.07.2.49.9	3.0.0.97.2.63.7	14.3.90.7.6.9.22	14.1.19.0.99.13	14.3.8.2.0.3.32	9.4.38.0.0.5.45	14.8.5.2.7.7.79
	6:00 AM	7:00 AM	13.80416662	10.0.99.83.0.39		5.2.12.49.997.4	6.4749999.16	8.949999922	9.199999887			11.3.36.11.1.89	10.8.7.08.3.29.5	5.1.13.0.6.0.59		8.0.0.1.90.48.3	11.2.85.8.8.33	3.4.2.7.6.8.3.4.3		2.5.4.9.4.2.7.4.29	2.8.4.8.8.0.9.5.2.8	14.36	14.3.64.4.7.37	14.3.25.6.3.3.36	7.9.65.5.4.0.6.28	14.7.9.4.1.1.7.85
	7:00 AM	8:00 AM			8.5.1.9.0.4.7.5.96		5.0.3.8.0.9.5.2.36							5.2.9.6.9.5.6.6.17			12.4.4.1.6.6.8.57	3.3.9.2.1.3.8.3.48		2.5.9.0.3.4.2.8.0.5	2.8.6.1.3.6.3.6.38		13.3.8.4.1.6.8.6.4	13.1.2.8.0.5.5.48	7.6.6.1.3.9.3.0.38	
	8:00 AM	9:00 AM					5.4.3.9.0.0.4.7.52			10.075								3.4.9.9.5.6.1.3.9.3		2.5.7.0.5.2.4.9.8.4	2.8.3.4.9.2.2.0.4.1		7.5.2.2.2.2.2.1.3			
	9:00 AM	10:00 AM					4.8.9.9.4.4.4.6.5																			
	10:00 AM	11:00 AM																								
	11:00 AM	12:00 PM																								
Noon	12:00 PM	1:00 PM																								
	1:00 PM	2:00 PM																								
	2:00 PM	3:00 PM																								
	3:00 PM	4:00 PM																								
	4:00 PM	5:00 PM																								
	5:00 PM	6:00 PM																								
	6:00 PM	7:00 PM																								
	7:00 PM	8:00 PM																								
	8:00 PM	9:00 PM																								
	9:00 PM	10:00 PM																								
	10:00 PM	11:00 PM																								
Midnight	11:00 PM	12:00 AM																								

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 15-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

Time			Segment Label	D6D_9A2	D6D_D69	D6D_BB1	D6D_D7C	D6D_D35	D6D_28E	28E_DED	28E_C45	28E_EE8	28E_2A5	28E_B58	28E_9A2	28E_D69	28E_BB1	28E_D7C	28E_D35	28E_D6D
				Site Z-1 to Site F	Site Z-1 to Site E	Site Z-1 to Site C	Site Z-1 to Site B	Site Z-1 to Site A	Site Z-1 to Site Z	Site Z to Site I	Site Z to Site H	Site Z to Site G	Site Z to Site D	Site Z to Site H-1	Site Z to Site F	Site Z to Site E	Site Z to Site C	Site Z to Site B	Site Z to Site A	Site Z to Site Z-1
			Length (miles)	12.0472124	10.4598604	8.8736692	6.1686329	3.5461954	9.2797223	15.7745104	16.1368124	15.4583257	9.2627488	19.1736753	12.2410488	10.7078823	7.9799154	6.1981283	3.2788183	9.2797223
	Begin Time	End Time																		
Midnight	12:00 AM	1:00 AM		11.305952381	13.22499999	6.252462312		2.707312926	0.295746527	15.11153846	14.7969697	15.32830513	8.544420985	14.91900407	11.44693489	13.61388889	6.558510638	13.14999983	2.981178161	0.277114424
	1:00 AM	2:00 AM		11.04398907		6.102011502		2.619135824	0.285196009	14.75777833	14.47651514	14.95964909	8.335753419	14.89113475	11.38902964	14.29583341	6.484375037		2.912134521	0.319899575
	2:00 AM	3:00 AM		10.67828231	14.29166678	6.145831331		2.6353448	0.318339998	14.40753575	13.8156951	14.53888598	8.237851048	14.22111113	10.99493993	14.03333343	6.439705852		2.924858703	0.304559001
	3:00 AM	4:00 AM		11.33784725	13.15833331	6.538020868		2.717901282	0.294545451	13.61333286	14.6722222	15.64305556	8.682716092	14.83690475	11.3736111	13.43333329	6.826562489		3.042261898	0.331623887
	4:00 AM	5:00 AM		11.33410717		6.162491014		2.665345299	0.279901747	15.3583333	14.69807145	14.3314666	8.2965277743	15.34666664	11.82509524		6.381018834		2.93861287	0.320864287
	5:00 AM	6:00 AM		11.70353254	12.21666662	6.445454537		2.670701754	0.285626168	15.35166666	14.15997439	14.53888598	8.975874855	14.295	11.53109185	12.96666657	6.577216434		2.899311233	0.344021757
	6:00 AM	7:00 AM		10.97536054	14.91388893	6.166576919		2.55921053	0.289714722	14.40476192	14.35289658	14.51088747	8.269945472	14.73735638	11.16013513	15.29999998	6.271813728		2.872222236	0.296753351
	7:00 AM	8:00 AM		10.45583807	15.57500003	5.985798114		2.563152634	0.276562277		14.4749998	13.57291666	7.935495106		10.8201852	16.01666671	6.245463804		2.843782539	0.288803321
	8:00 AM	9:00 AM				5.989523806		2.63179828	0.269173437				8.148809533				6.366111098		2.878240738	0.282625782
	9:00 AM	10:00 AM																		
	10:00 AM	11:00 AM																		
	11:00 AM	12:00 PM																		
Noon	12:00 PM	1:00 PM																		
	1:00 PM	2:00 PM																		
	2:00 PM	3:00 PM																		
	3:00 PM	4:00 PM																		
	4:00 PM	5:00 PM																		
	5:00 PM	6:00 PM																		
	6:00 PM	7:00 PM																		
	7:00 PM	8:00 PM																		
	8:00 PM	9:00 PM																		
	9:00 PM	10:00 PM																		
	10:00 PM	11:00 PM																		
Midnight	11:00 PM	12:00 AM																		

Appendix B

VISSIM Summary of Results
Existing Conditions

Vissim Model Calibration Results (FHWA Criteria)

FHWA Performance Criteria and Measures	Calibration Acceptance Target
Individual link flows	
Flow < 700 veh/h, Within 100 veh/h	> 85% of cases
700 veh/h < Flow < 2700 veh/h, Within 15%	> 85% of cases
Flow > 2700 veh/h, Within 400 veh/h	> 85% of cases
Difference in sum of all link flows	Within 5%
GEH Statistic Value	
GEH Statistic Value < 5, for individual link flows	> 85% cases
GEH Statistic Value for Sum of All Link Flows	< 4

Freeway Volume Calibration (FHWA Link Flow Criteria)

Lane Type	Eastbound Total Links	Eastbound Calibration Results Achieved 6-7 AM	7-8 AM	8-9 AM		Westbound Total Links	Westbound Calibration Results Achieved 6-7 AM	7-8 AM	8-9 AM	
Mainline	21	100%	86%	86%		18	78%	94%	94%	
Ramps	14	100%	93%	100%		14	100%	93%	93%	
All Links	35	100%	89%	91%		32	88%	94%	94%	
Total Link Flow % Difference		-2%	3%	3%			4%	1%	3%	

Freeway Volume Calibration (GEH Criteria)

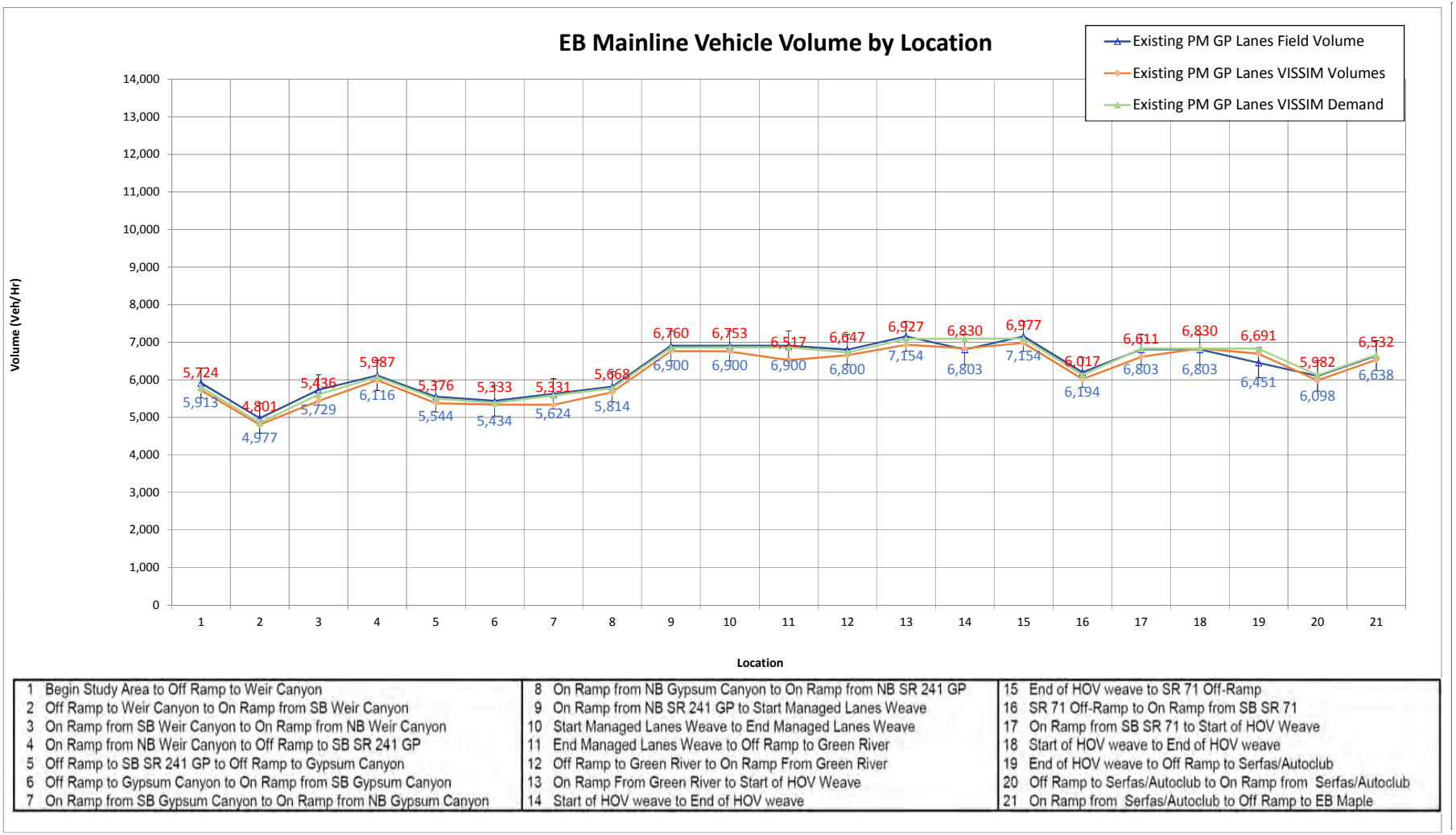
Lane Type	Eastbound Total Links	Eastbound Calibration Results Achieved 6-7 AM	7-8 AM	8-9 AM		Westbound Total Links	Westbound Calibration Results Achieved 6-7 AM	7-8 AM	8-9 AM	
Mainline	21	100%	95%	95%		18	94%	100%	100%	
Ramps	14	100%	93%	100%		14	93%	93%	86%	
All Links	35	100%	94%	97%		32	94%	97%	94%	
Total Link Flow GEH		8.3	11.3	10.6			14.9	4.2	12.9	

Network Travel Time calibration: PM Peak Period

Corridor	Field Travel Time (Minutes) 6-7 AM	7-8 AM	8-9 AM		VISSIM Travel Time (Minutes) 6-7 AM	7-8 AM	8-9 AM		Diff.% 6-7 AM	7-8 AM	8-9 AM	
Eastbound SR-91	8.8	8.8	8.9		8.6	8.7	8.7		-3%	-1%	-2%	
Westbound SR-91	14.3	12.1	11.3		11.1	11.5	10.4		-22%	-5%	-8%	

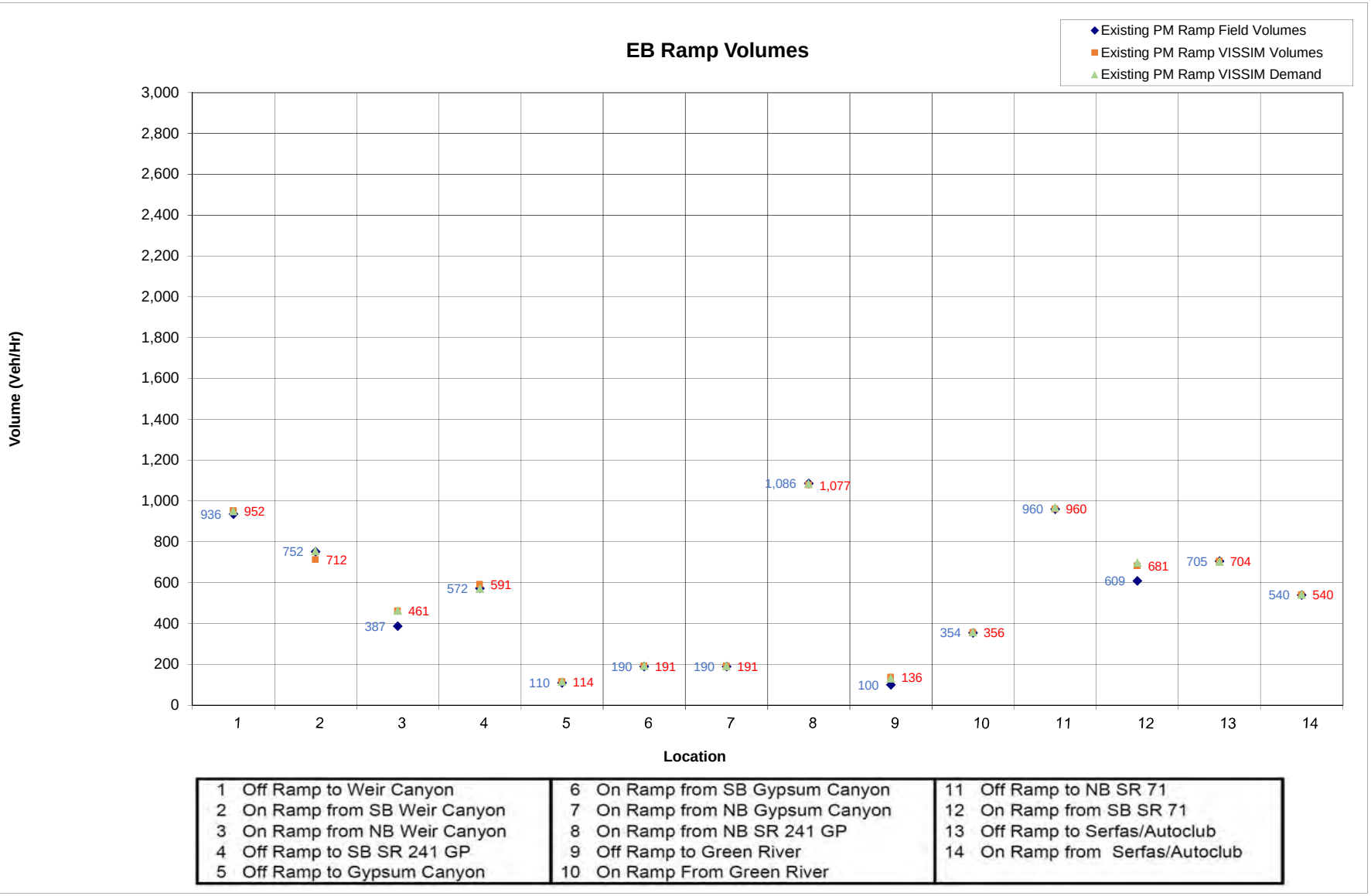
Table 5
Segment Travel Time Calibration: PM Peak Period

Corridor	Segment	Location	Distance	Field Speed 6-7 AM	7-8 AM	8-9 AM		VISSIM Speed 6-7 AM	7-8 AM	8-9 AM		Field Travel Time (Minutes) 6-7 AM	7-8 AM	8-9 AM		VISSIM Travel Time (Minutes) 6-7 AM	7-8 AM	8-9 AM		Diff.% 6-7 AM	7-8 AM	8-9 AM	
Eastbound SR-91	Site A to Site C	1002	20751	63	63	63		68	67	67		3.8	3.7	3.8		3.5	3.5	3.5		-8%	-6%	-7%	
	Site C to Site D	1003	13681	71	71	70		68	67	67		2.2	2.2	2.2		2.3	2.3	2.3		4%	6%	5%	
	Site D to Site F	1005	16332	64	65	64		67	65	65		2.9	2.9	2.9		2.8	2.8	2.8		-3%	-1%	-2%	
	Site B to Site C	1007	32177	71	72	71		63	63	63		5.1	5.1	5.1		5.8	5.8	5.8		12%	13%	12%	
	Site E to Site F	1008	28639	33	44	63		30	38	59		9.9	7.4	5.1		10.9	8.6	5.5		9%	14%	7%	
	Site A to Site B	1001	40145	63	67	68		64	64	64		7.3	6.8	6.7		7.1	7.2	7.2		-2%	5%	7%	
	Site D to Site E	1004	27065	58	58	57		61	60	60		5.3	5.3	5.4		5.0	5.1	5.1		-6%	-4%	-7%	
Westbound SR-91	Site F to Site D	1011	16460	31	39	53		38	37	45		6.0	4.8	3.5		4.9	5.1	4.2		-23%	5%	17%	
	Site D to Site C	1012	13628	36	43	38		57	52	58		4.3	3.6	4.1		2.7	3.0	2.7		-57%	-22%	-54%	
	Site C to Site A	1014	20820	60	64	64		67	67	68		4.0	3.7	3.7		3.5	3.5	3.5		-12%	-5%	-6%	
	Site E to Site D	1009	23283	25	37	64		24	31	56		10.7	7.2	4.1		10.9	8.5	4.8		1%	15%	14%	
	Site B to Site A	1006	40738	70	72	66		64	64	64		6.6	6.5	7.0		7.2	7.2	7.2		9%	11%	3%	

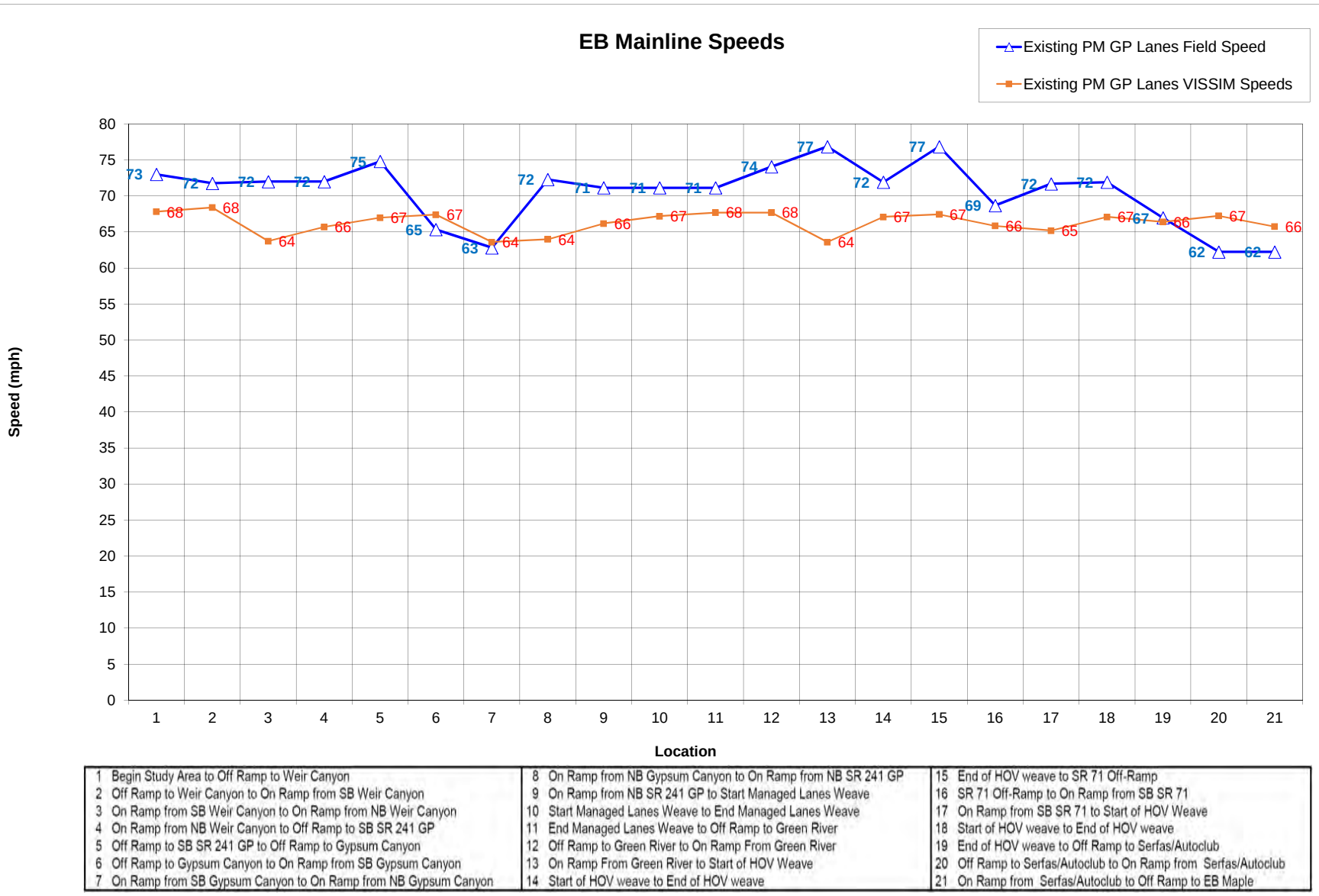


1	Begin Study Area to Off Ramp to Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15	End of HOV weave to SR 71 Off-Ramp
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16	SR 71 Off-Ramp to On Ramp from SB SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10	Start Managed Lanes Weave to End Managed Lanes Weave	17	On Ramp from SB SR 71 to Start of HOV Weave
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11	End Managed Lanes Weave to Off Ramp to Green River	18	Start of HOV weave to End of HOV weave
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	19	End of HOV weave to Off Ramp to Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13	On Ramp From Green River to Start of HOV Weave	20	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14	Start of HOV weave to End of HOV weave	21	On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

Charts 6-7 AM-Calibration

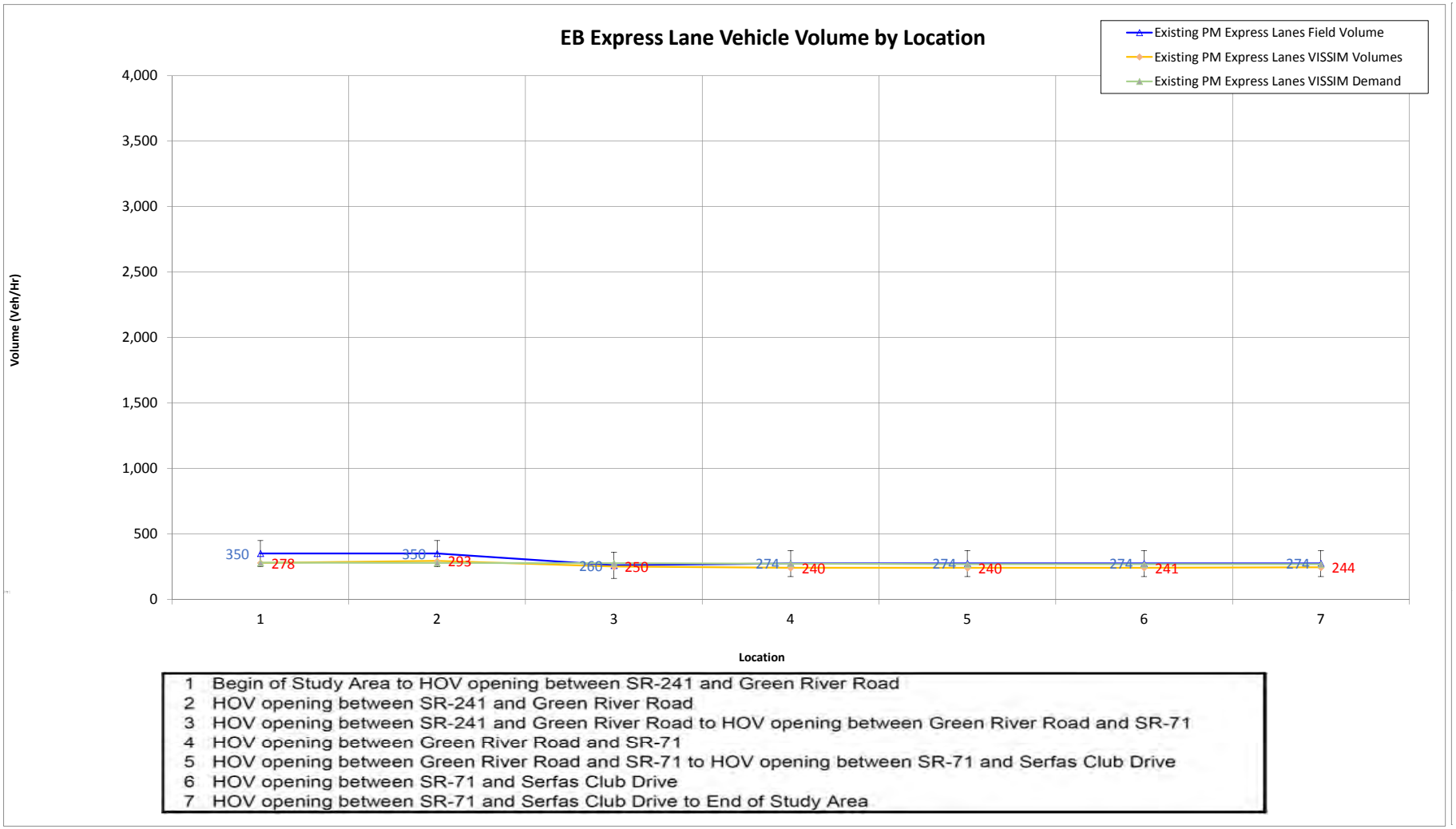


Charts 6-7 AM-Calibration

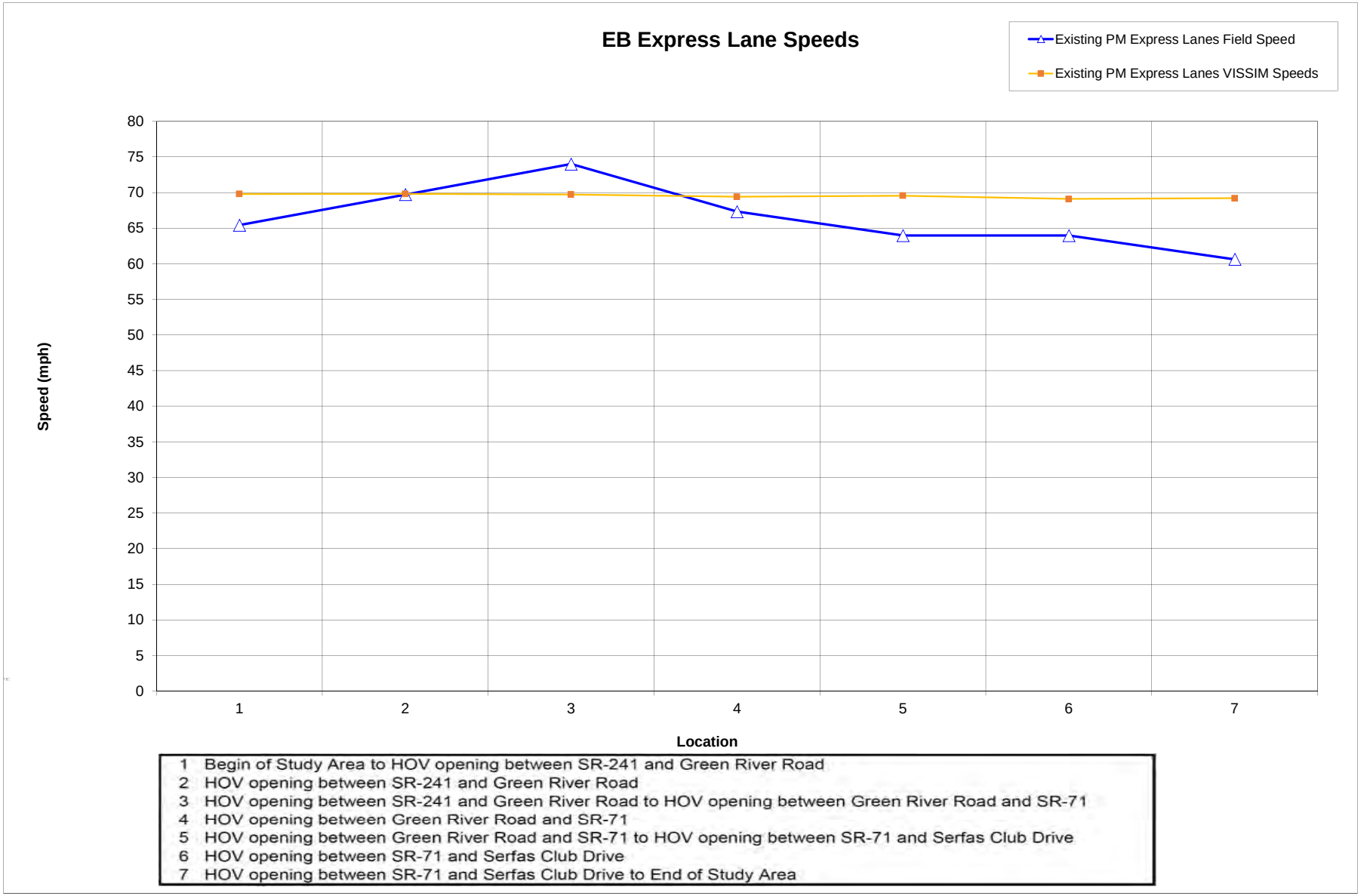


1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

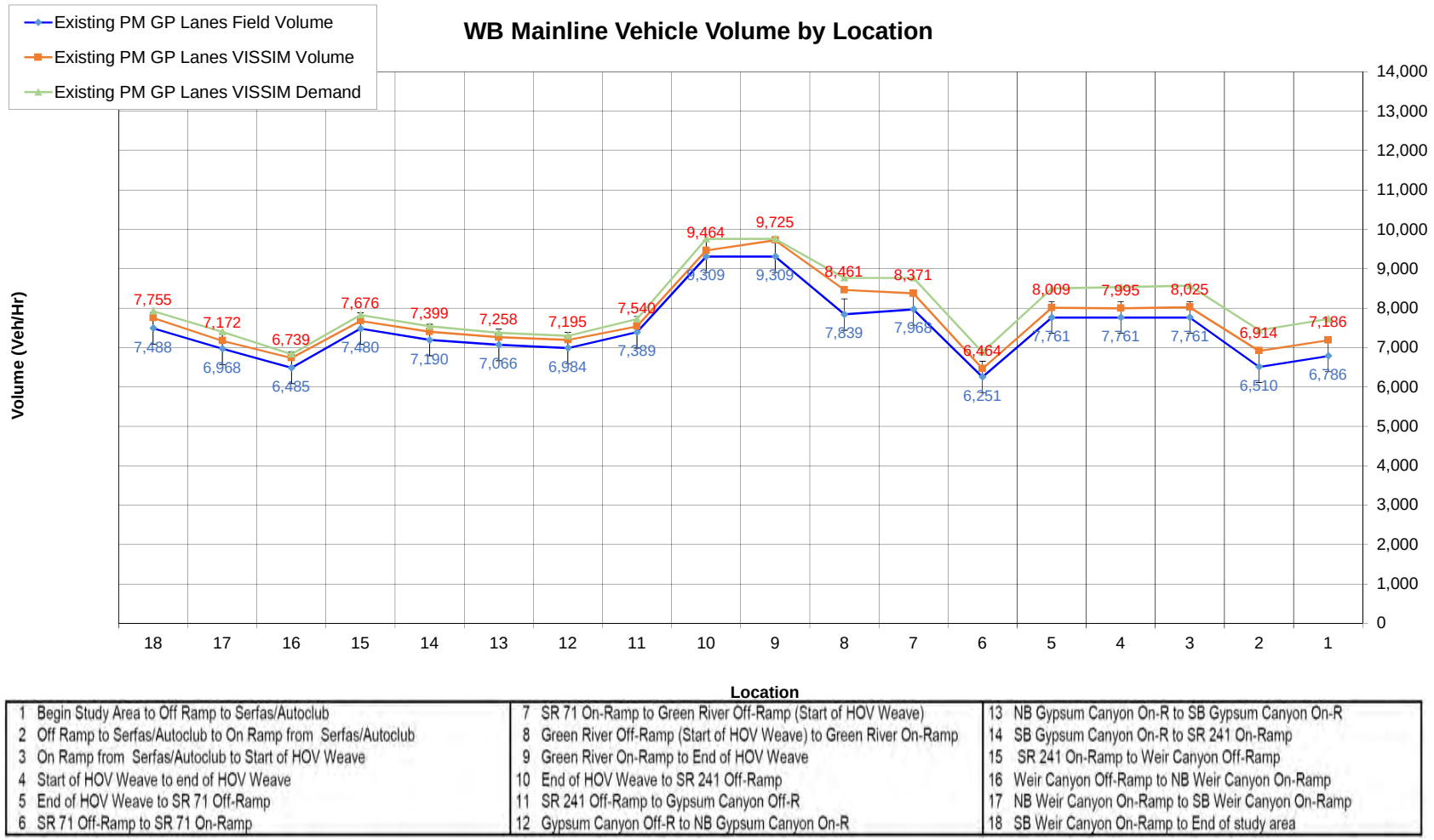
Charts 6-7 AM-Calibration



Charts 6-7 AM-Calibration

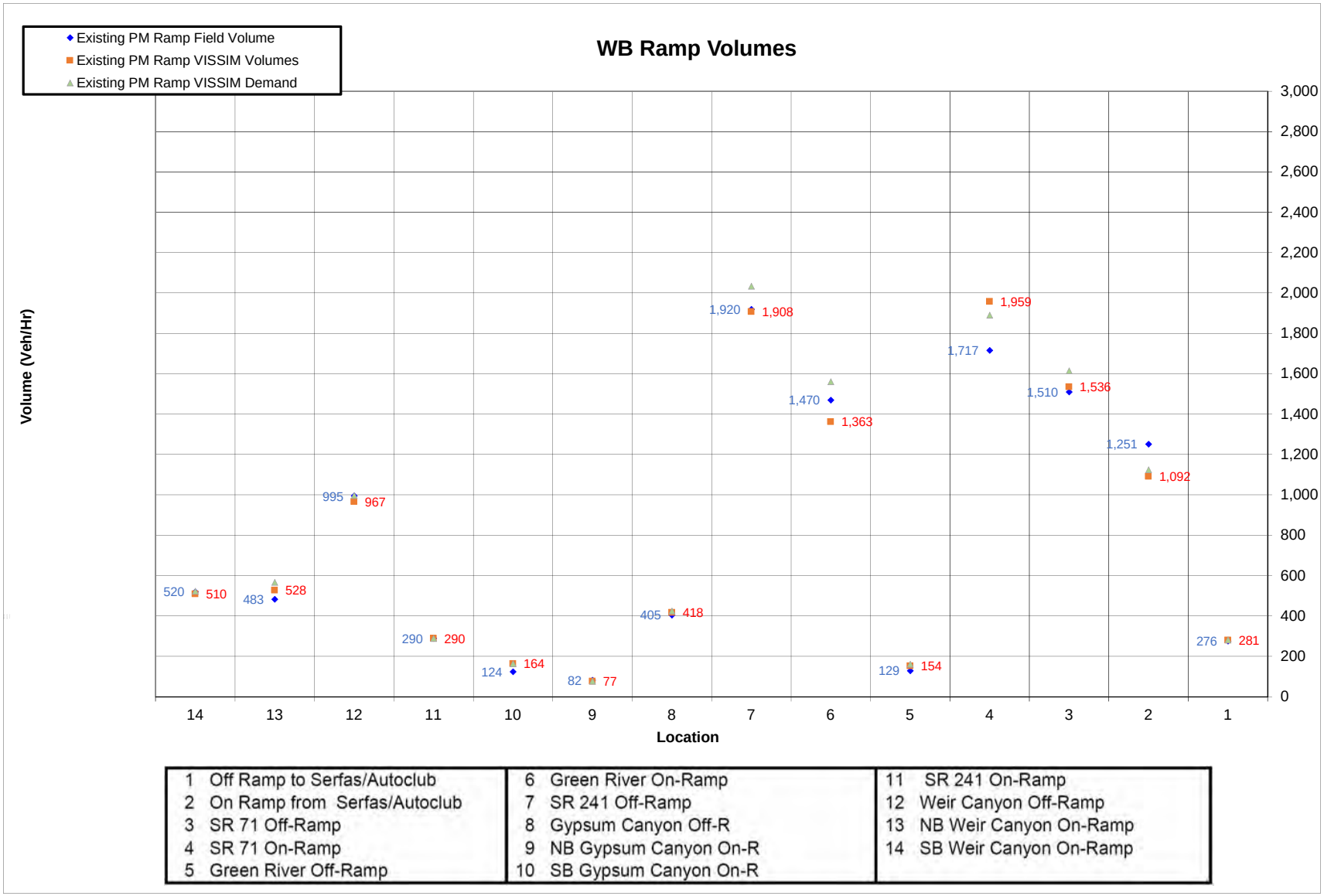


Charts 6-7 AM-Calibration



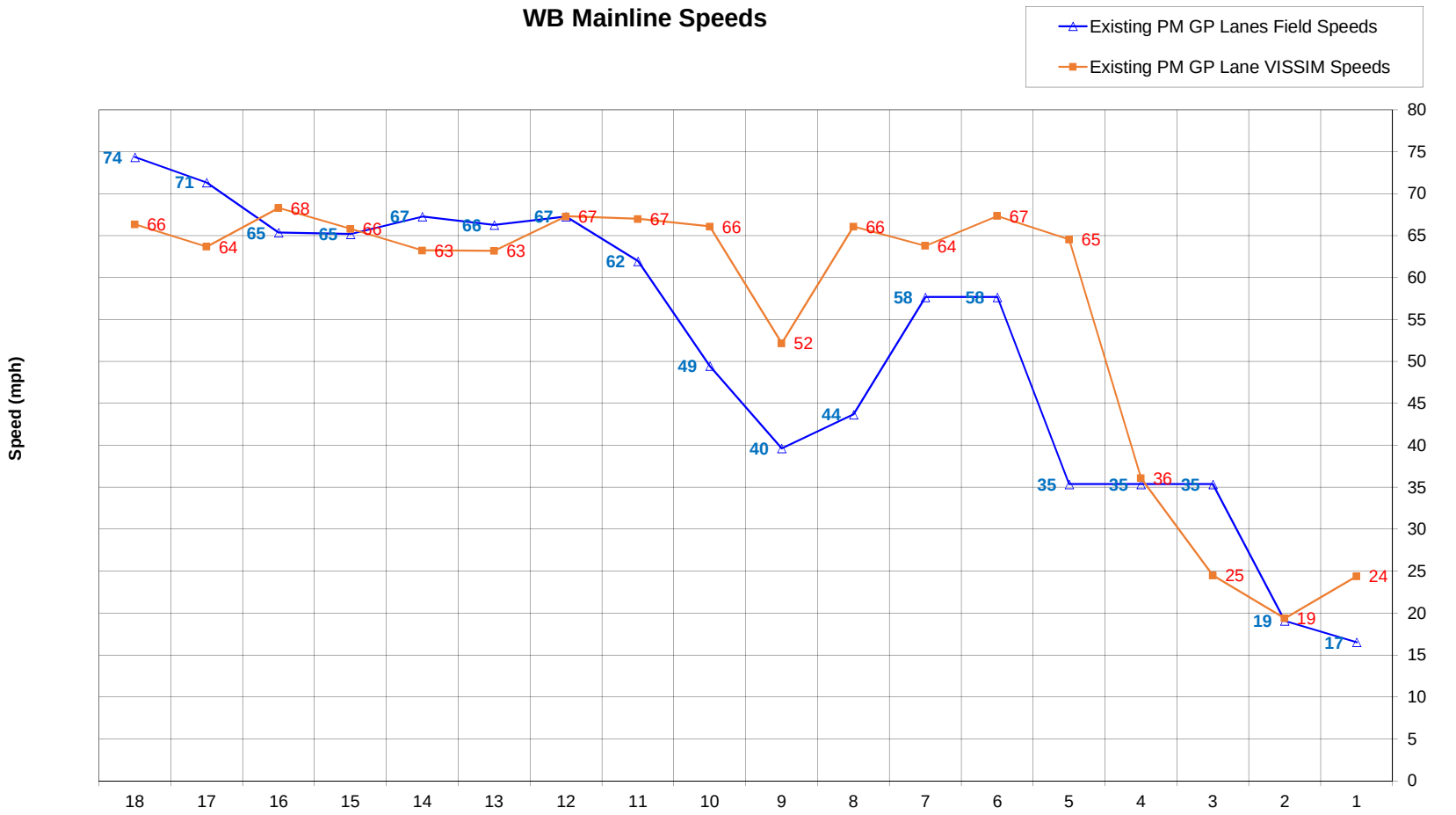
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

Charts 6-7 AM-Calibration



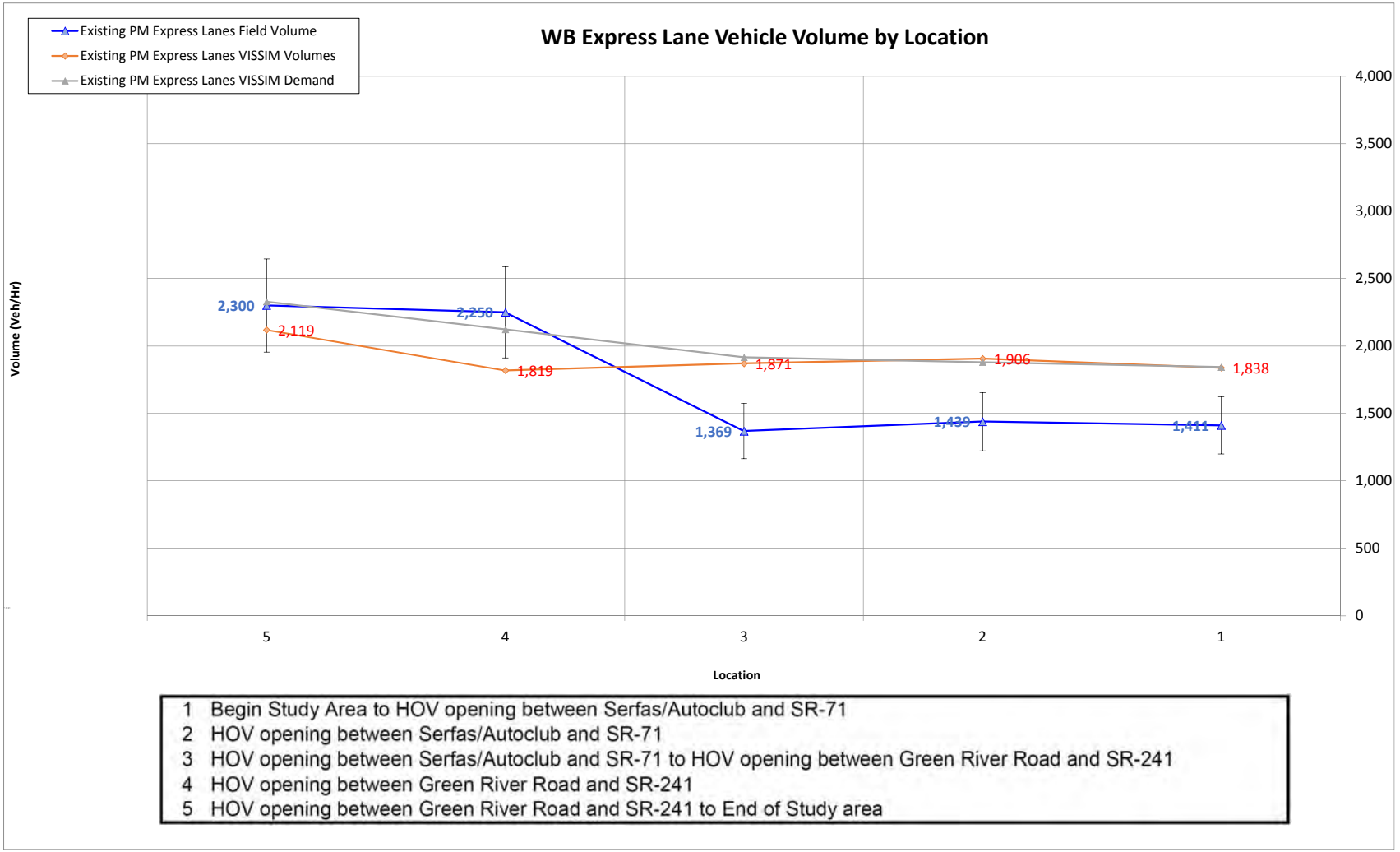
Charts 6-7 AM-Calibration

WB Mainline Speeds

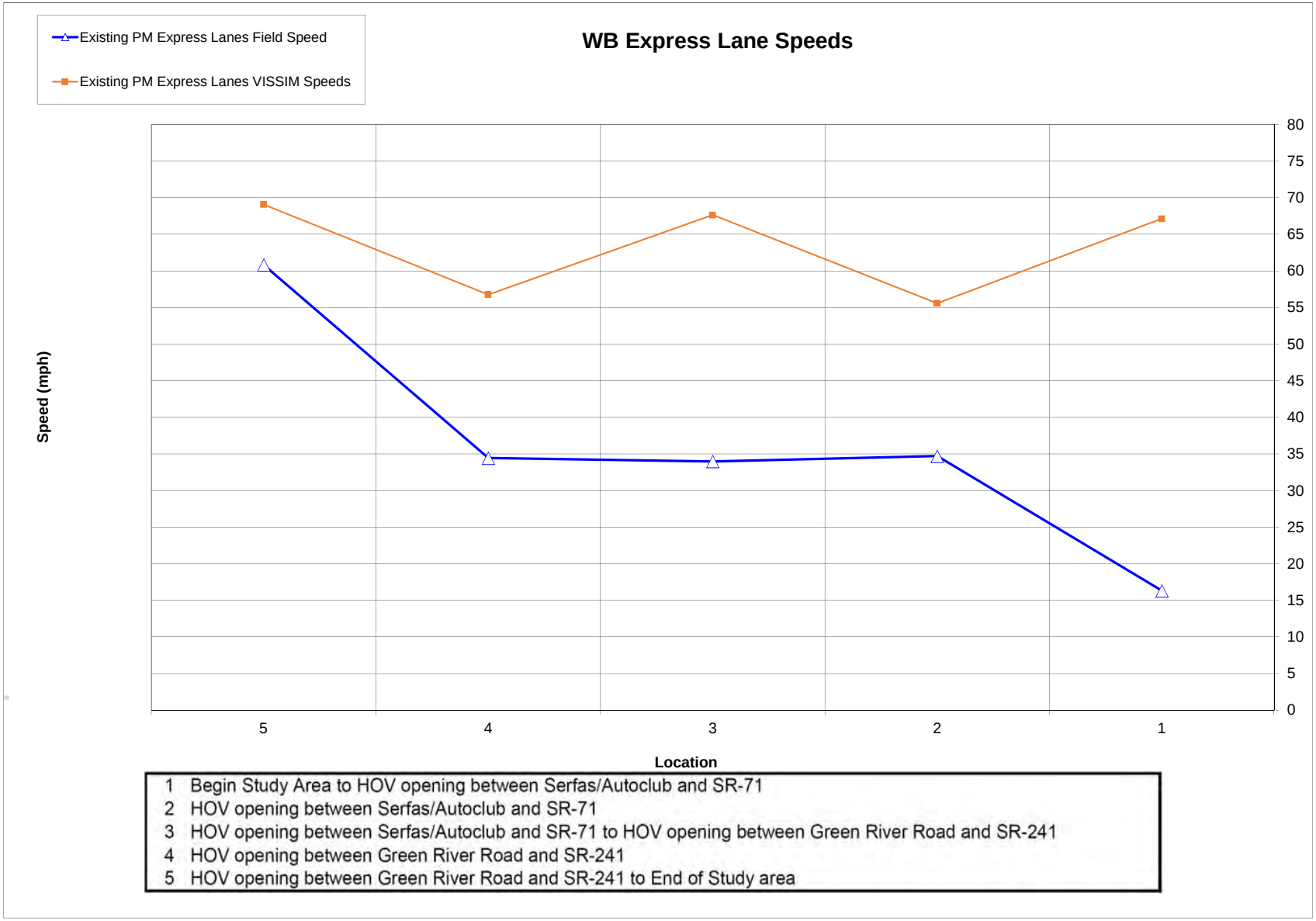


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

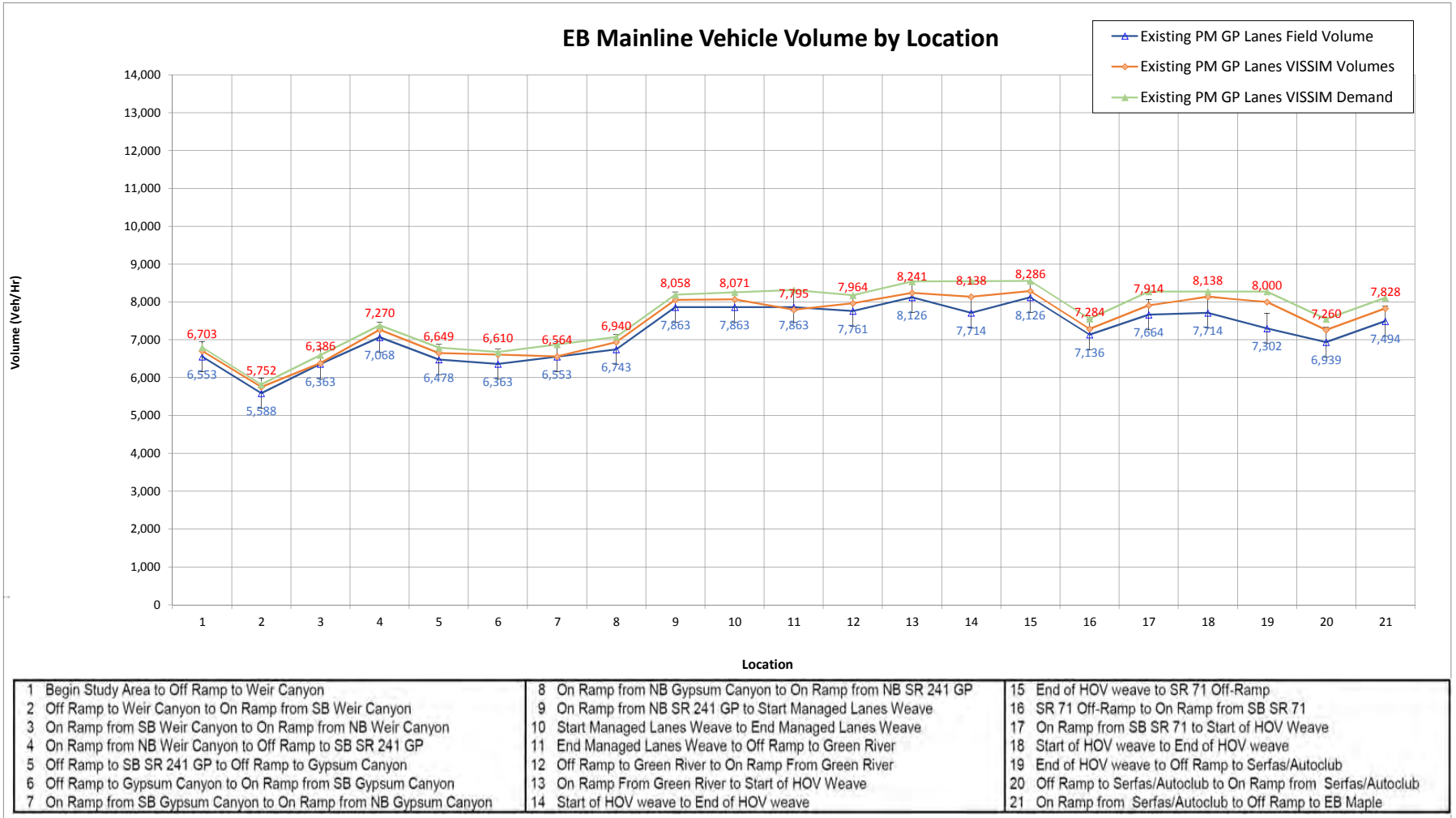
Charts 6-7 AM-Calibration



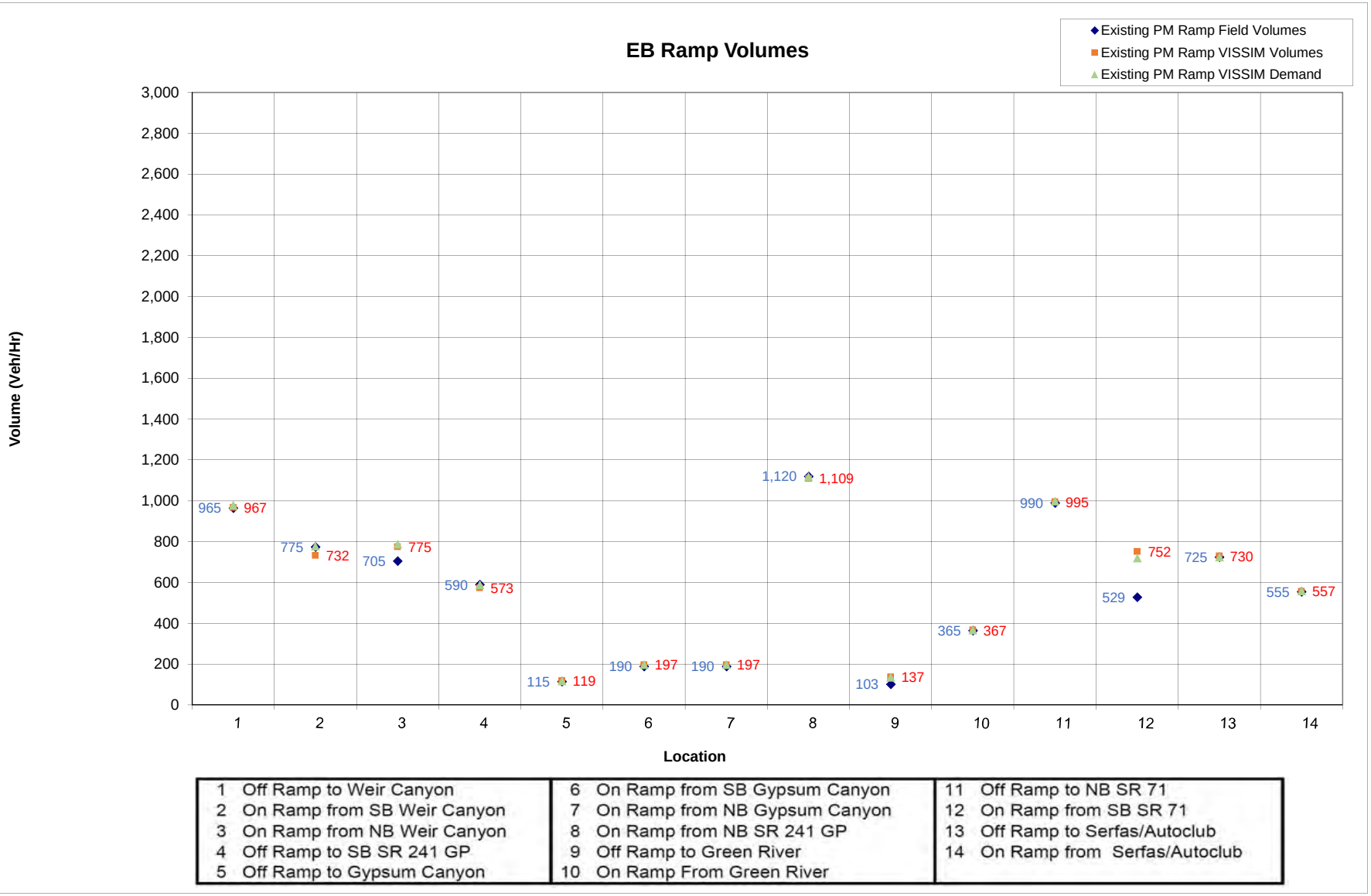
Charts 6-7 AM-Calibration



Charts 6-7 AM-Calibration

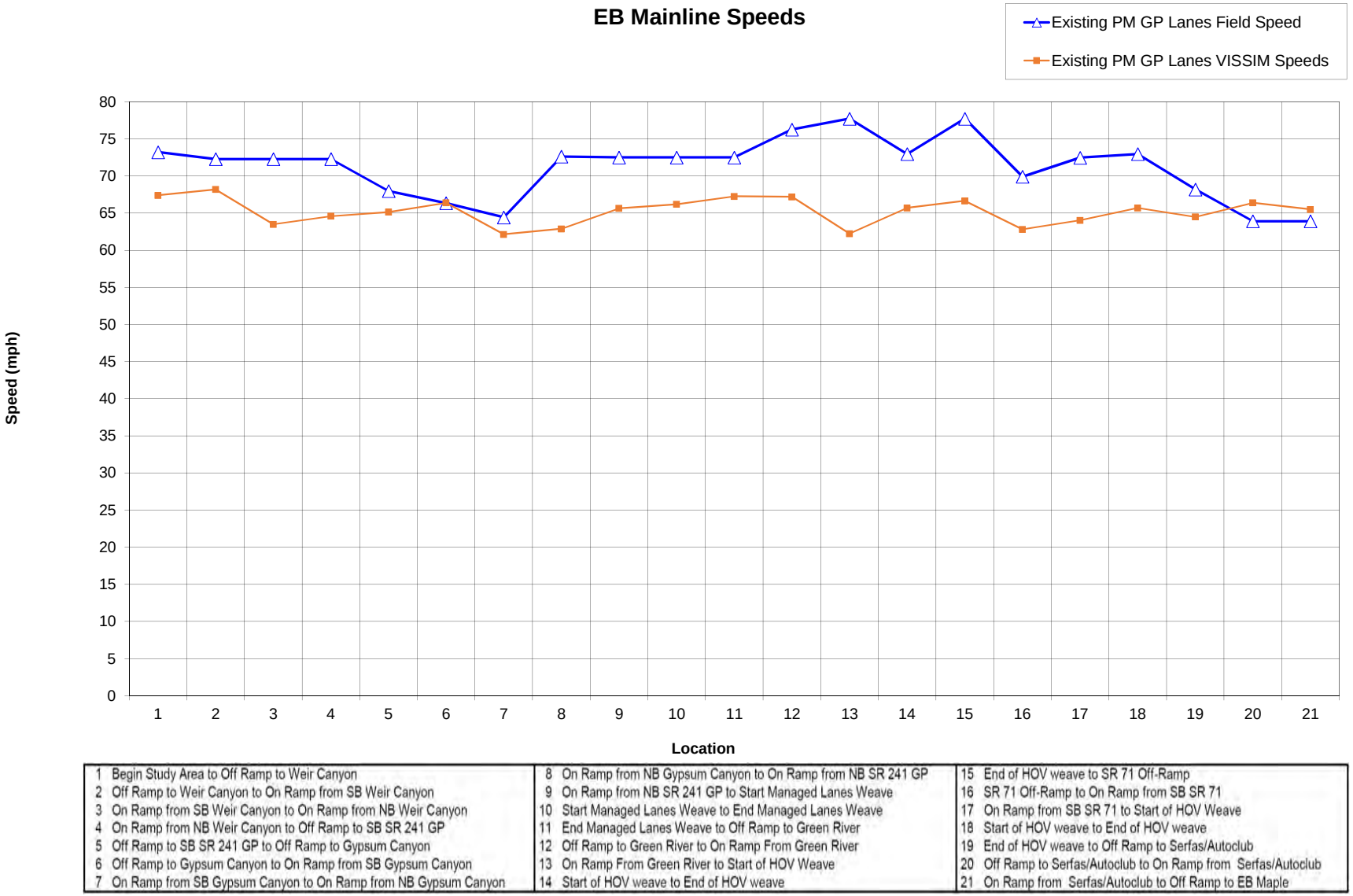


1	Begin Study Area to Off Ramp to Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15	End of HOV weave to SR 71 Off-Ramp
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16	SR 71 Off-Ramp to On Ramp from SB SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10	Start Managed Lanes Weave to End Managed Lanes Weave	17	On Ramp from SB SR 71 to Start of HOV Weave
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11	End Managed Lanes Weave to Off Ramp to Green River	18	Start of HOV weave to End of HOV weave
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	19	End of HOV weave to Off Ramp to Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13	On Ramp From Green River to Start of HOV Weave	20	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14	Start of HOV weave to End of HOV weave	21	On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

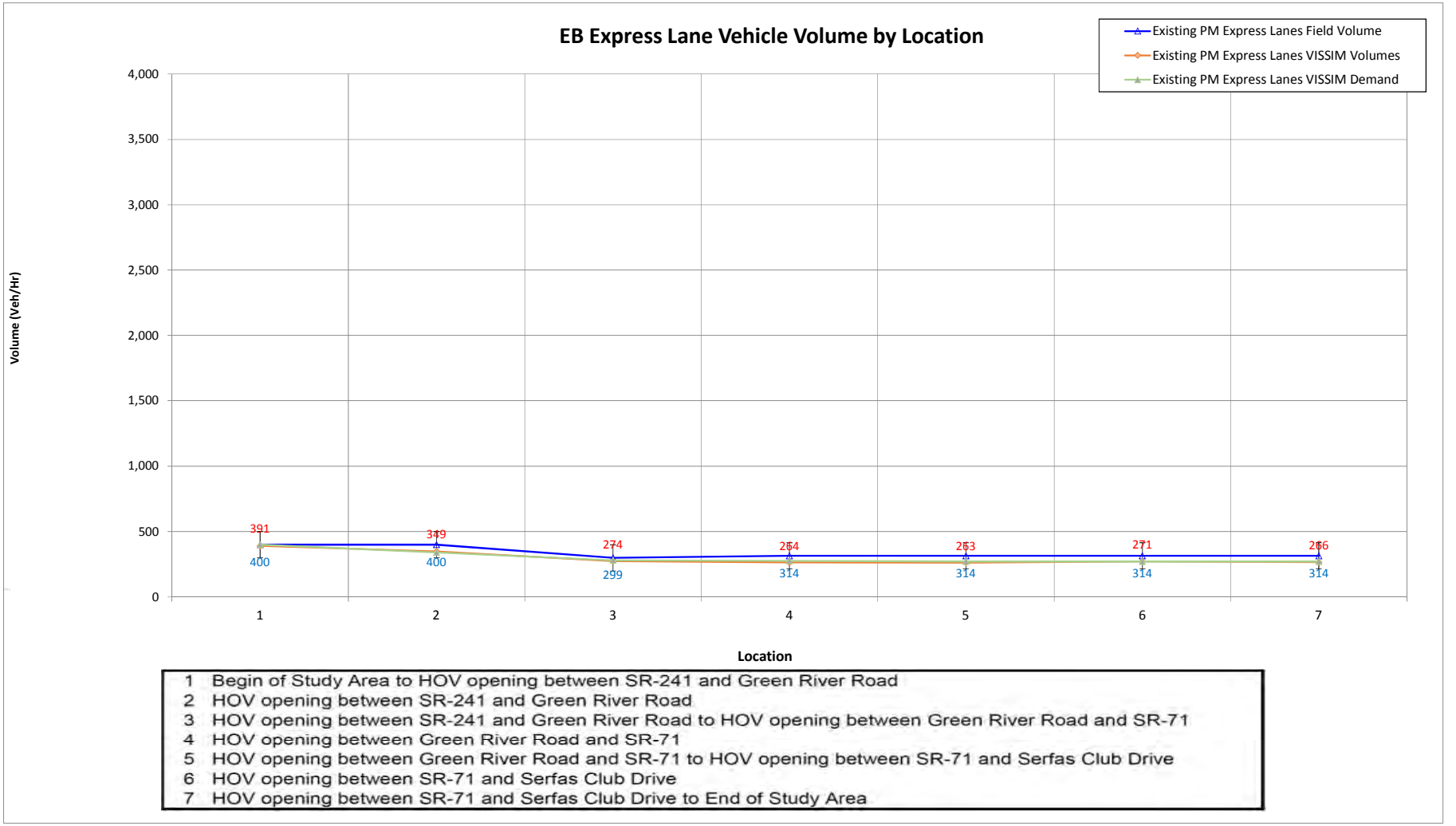


Charts 7-8 AM-Calibration

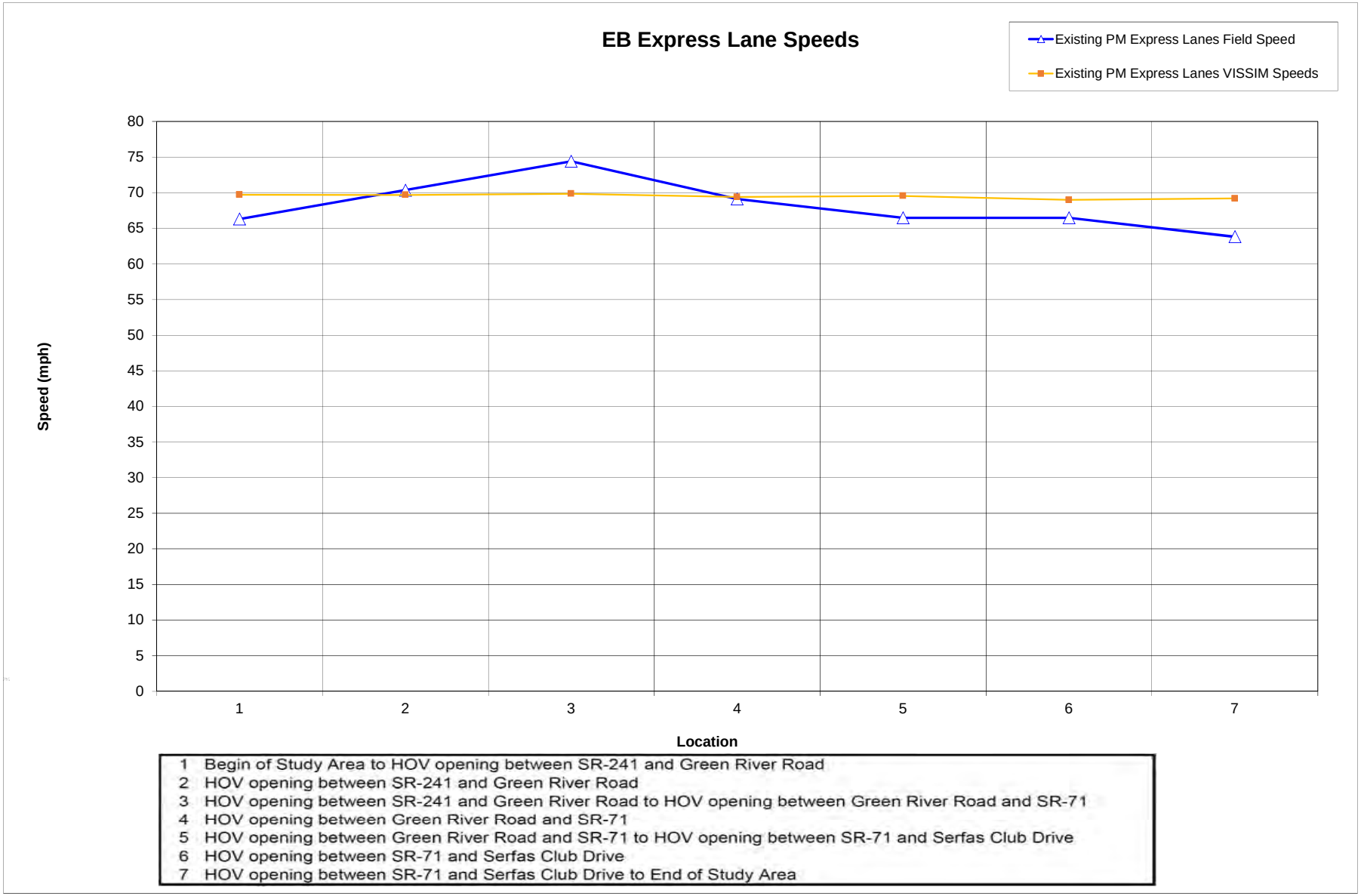
EB Mainline Speeds



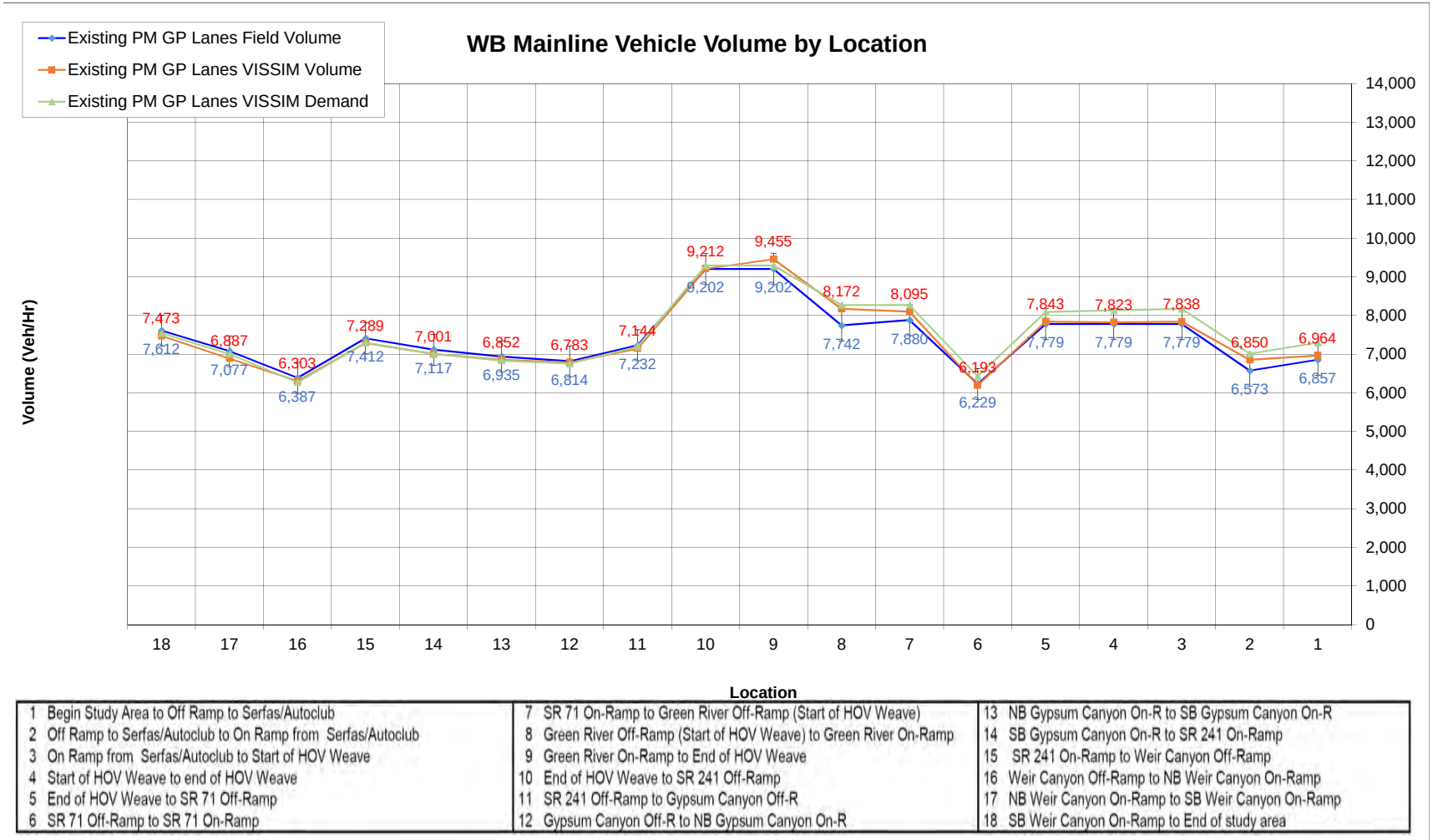
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple



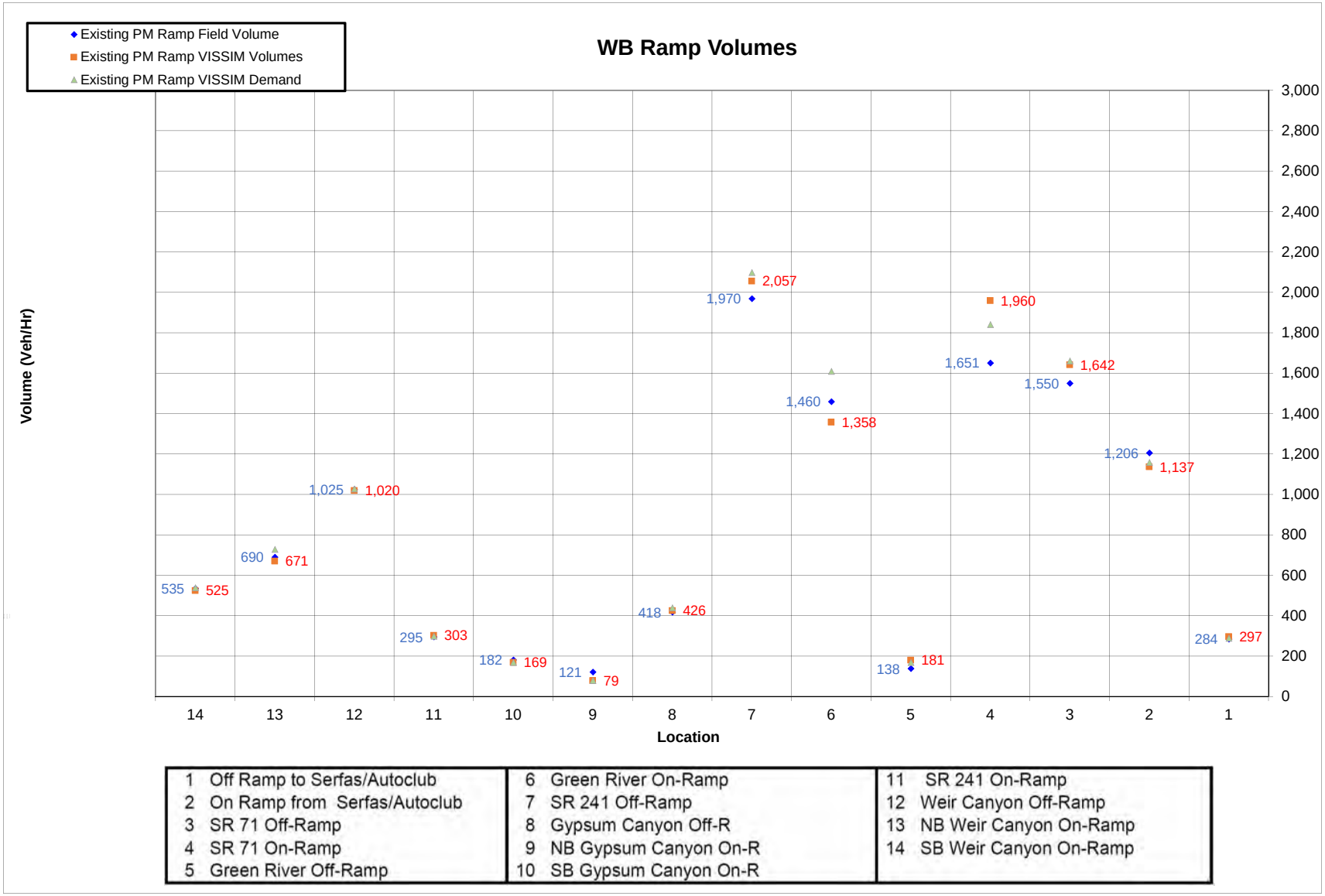
Charts 7-8 AM-Calibration



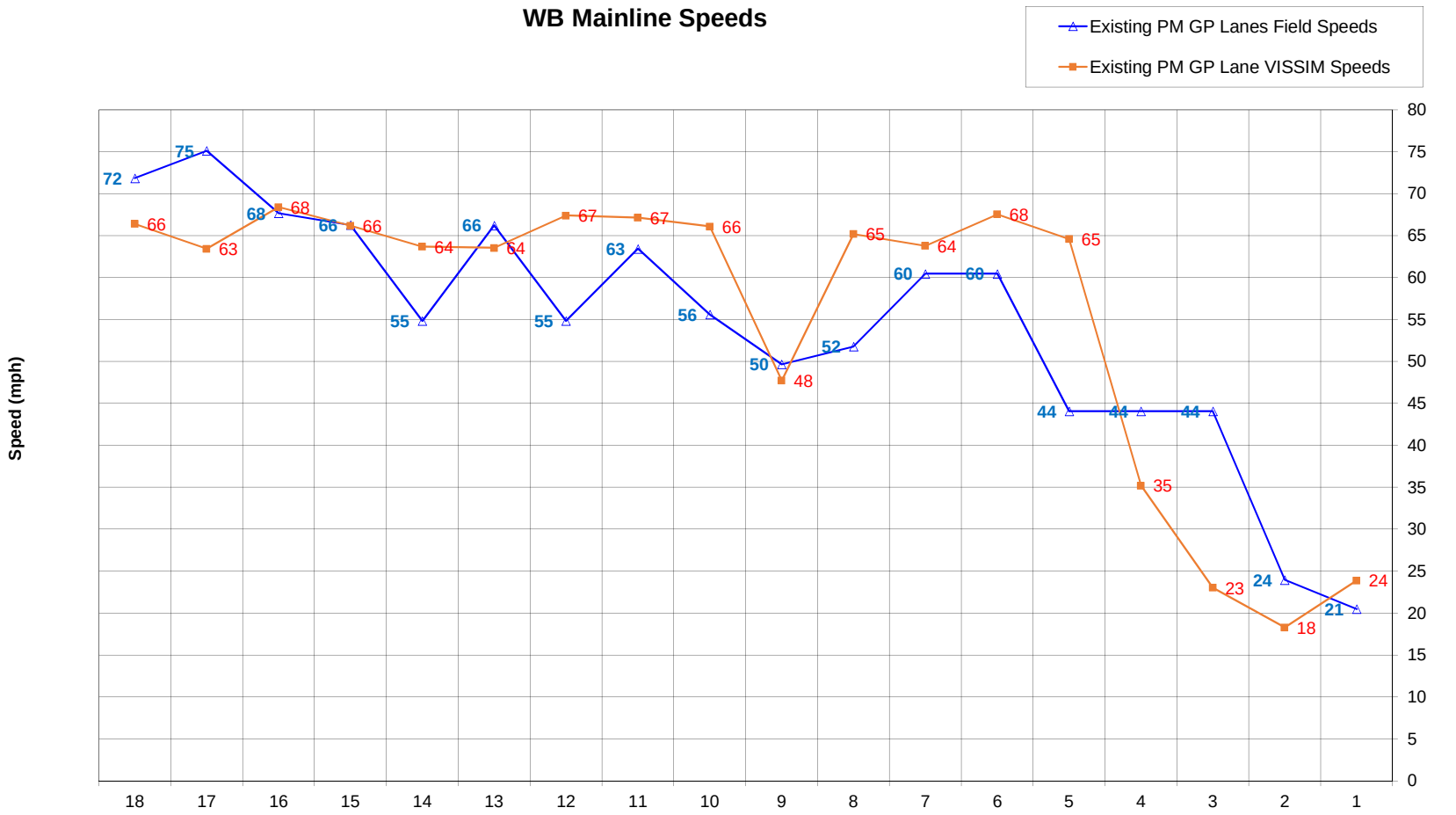
Charts 7-8 AM-Calibration



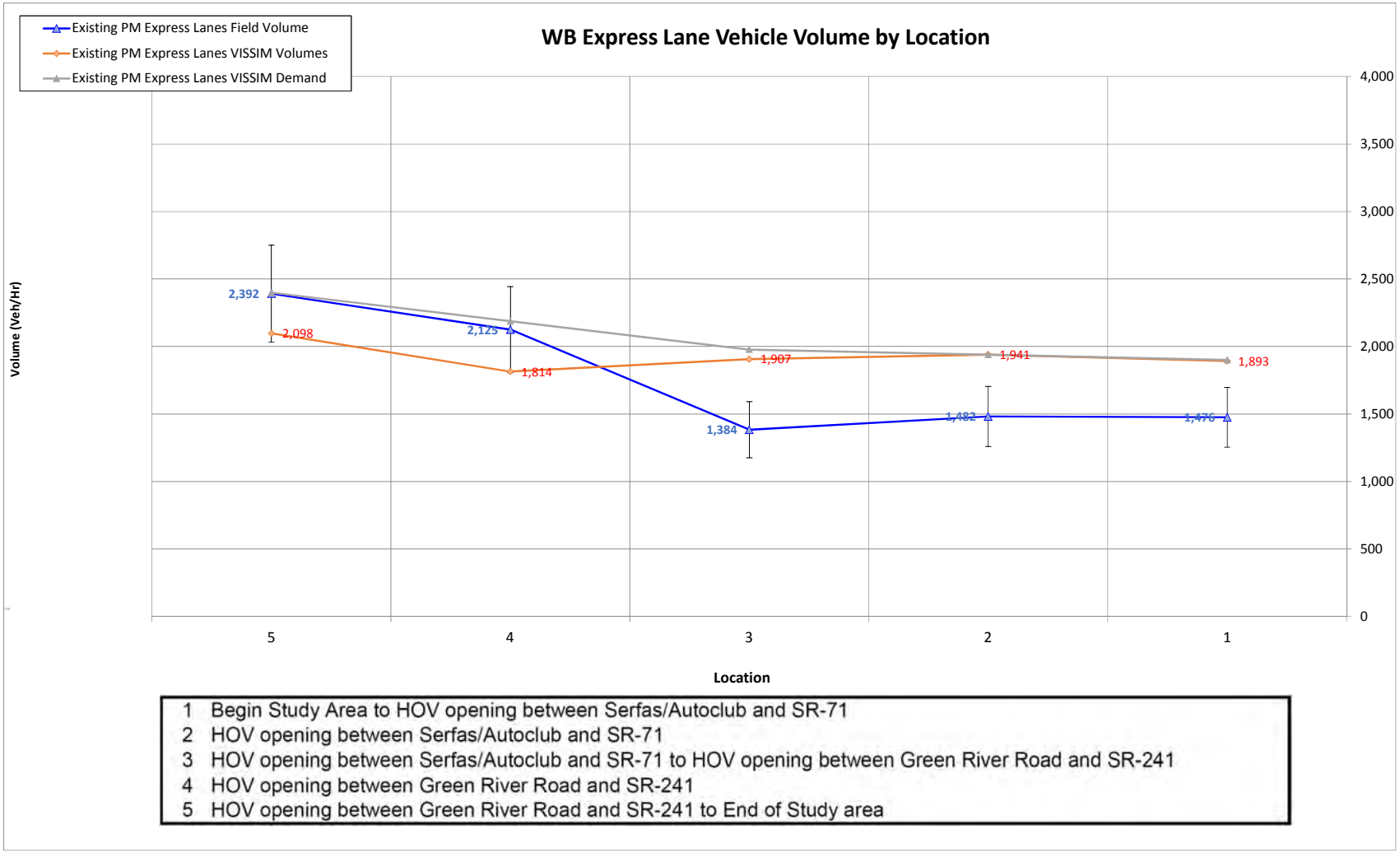
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area



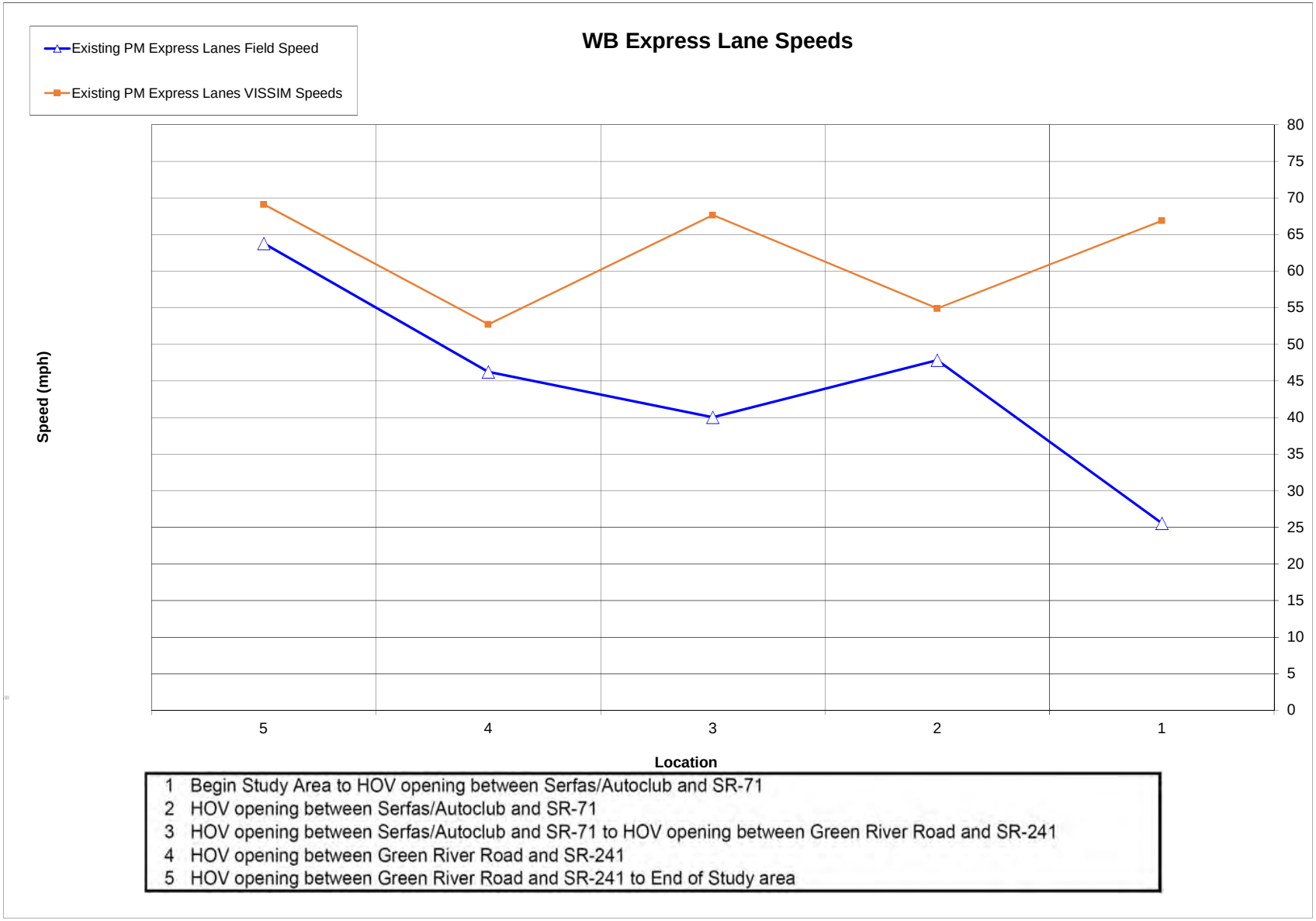
Charts 7-8 AM-Calibration



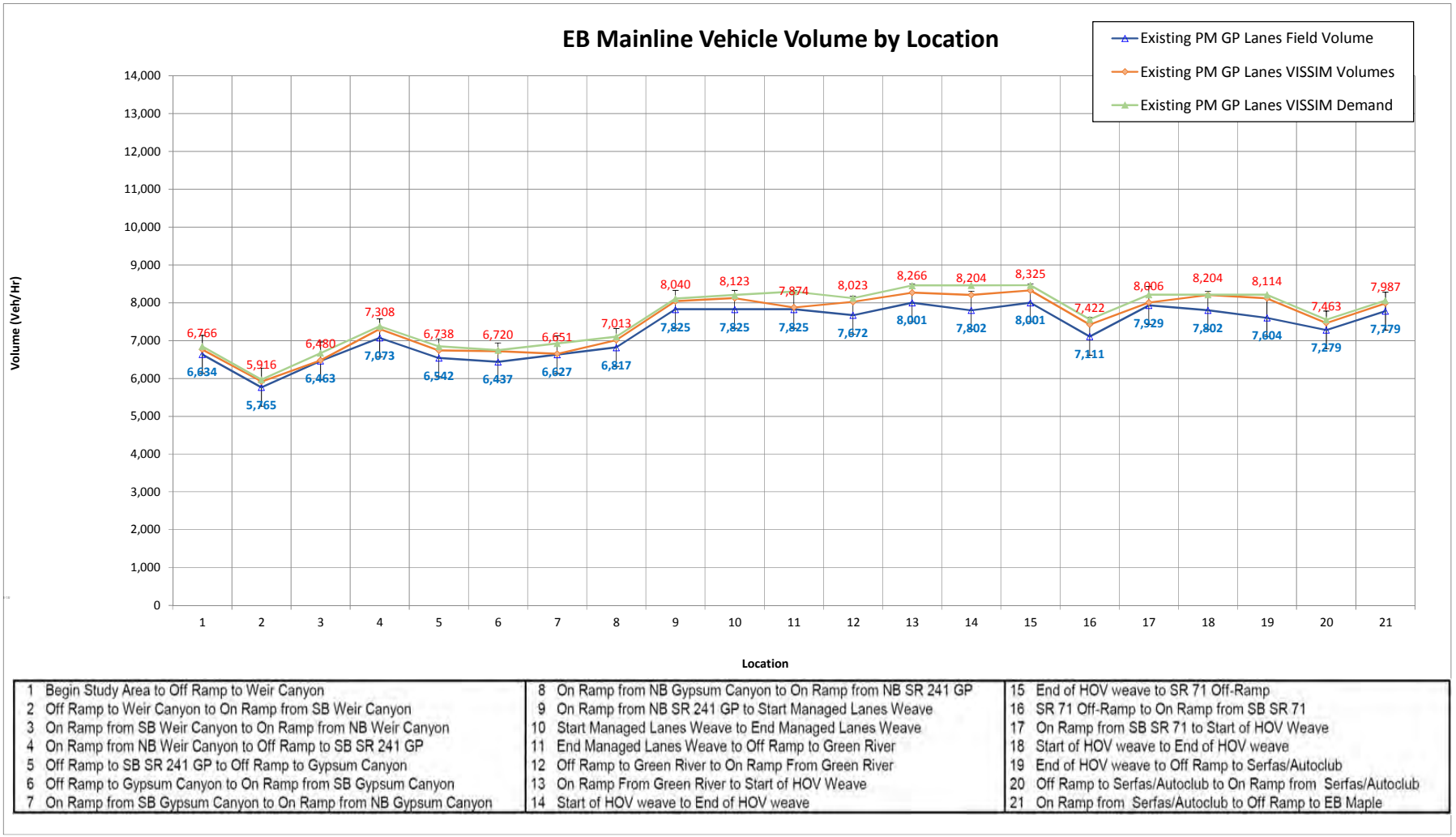
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area



Charts 7-8 AM-Calibration

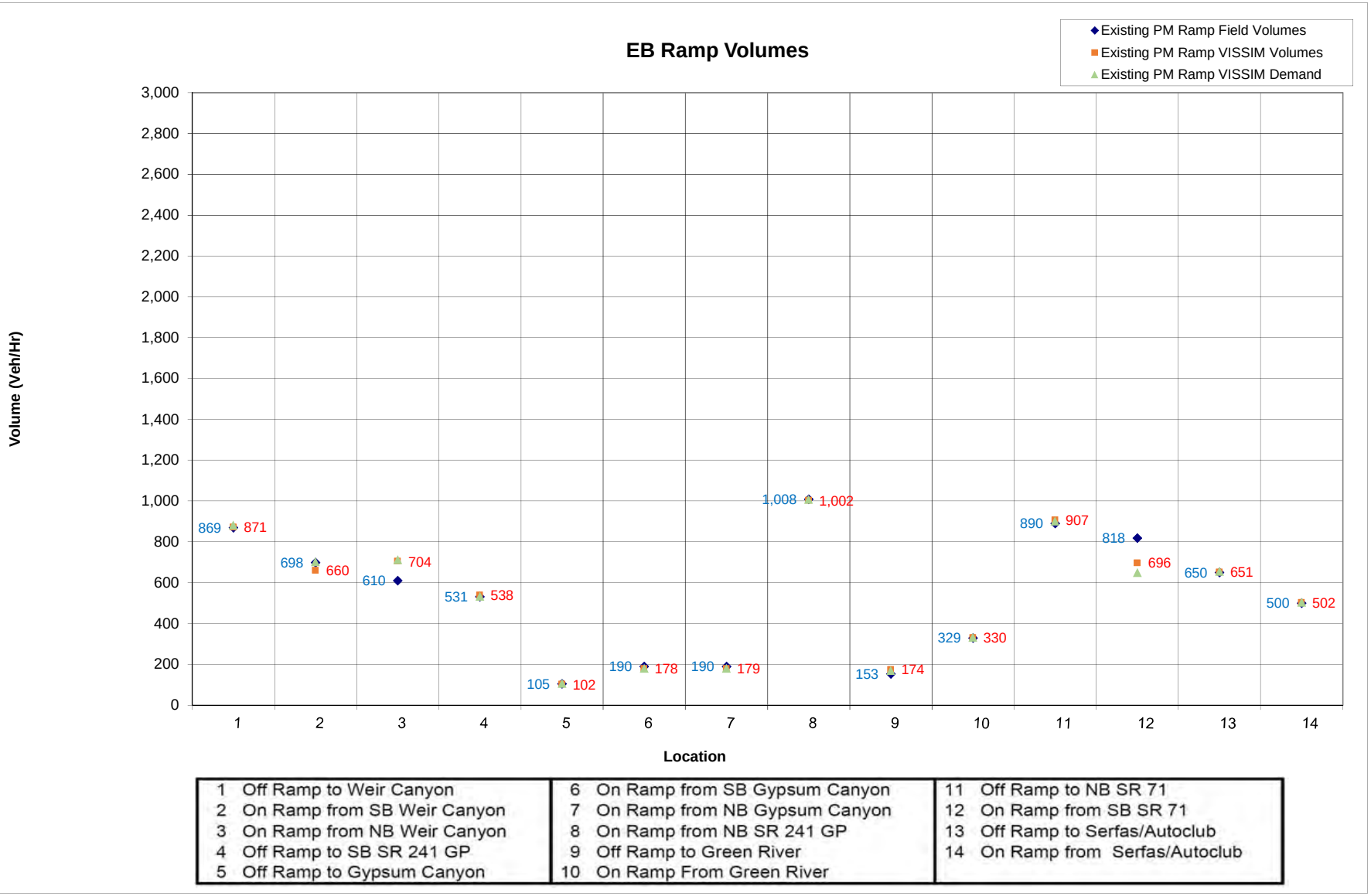


Charts 7-8 AM-Calibration



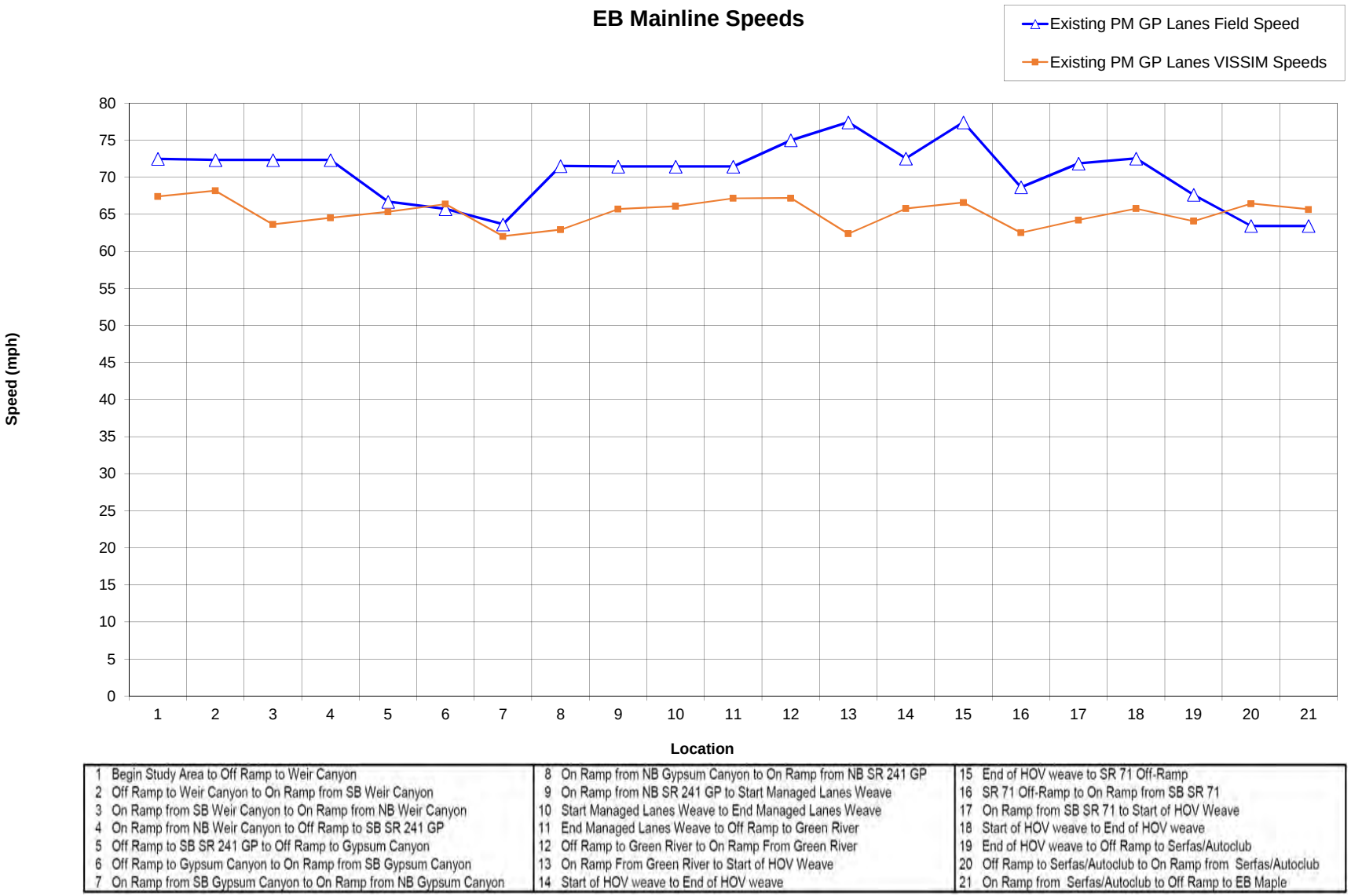
1	Begin Study Area to Off Ramp to Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15	End of HOV weave to SR 71 Off-Ramp
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16	SR 71 Off-Ramp to On Ramp from SB SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10	Start Managed Lanes Weave to End Managed Lanes Weave	17	On Ramp from SB SR 71 to Start of HOV Weave
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11	End Managed Lanes Weave to Off Ramp to Green River	18	Start of HOV weave to End of HOV weave
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	19	End of HOV weave to Off Ramp to Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13	On Ramp From Green River to Start of HOV Weave	20	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14	Start of HOV weave to End of HOV weave	21	On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

Charts 8-9 AM-Calibration

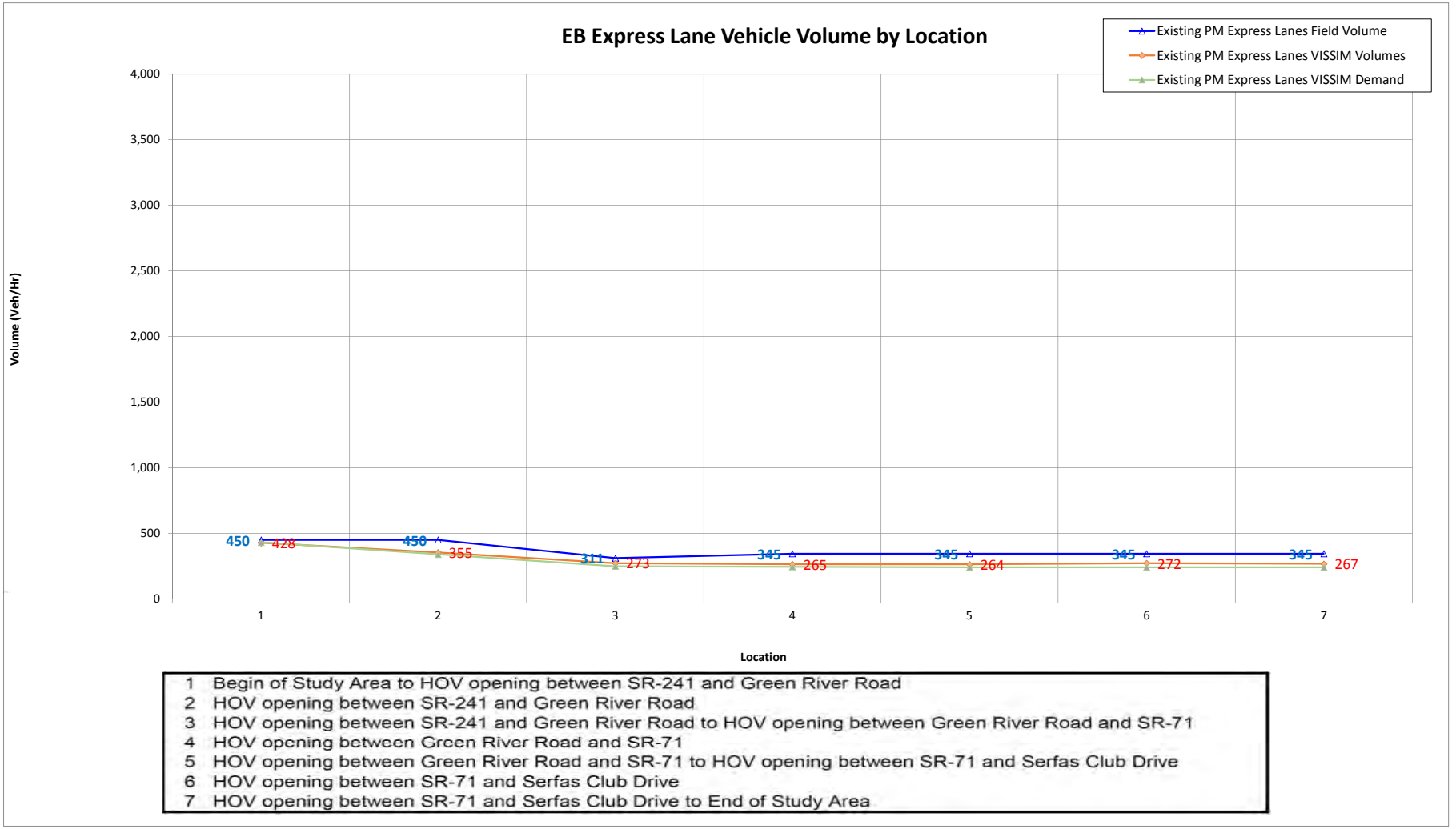


Charts 8-9 AM-Calibration

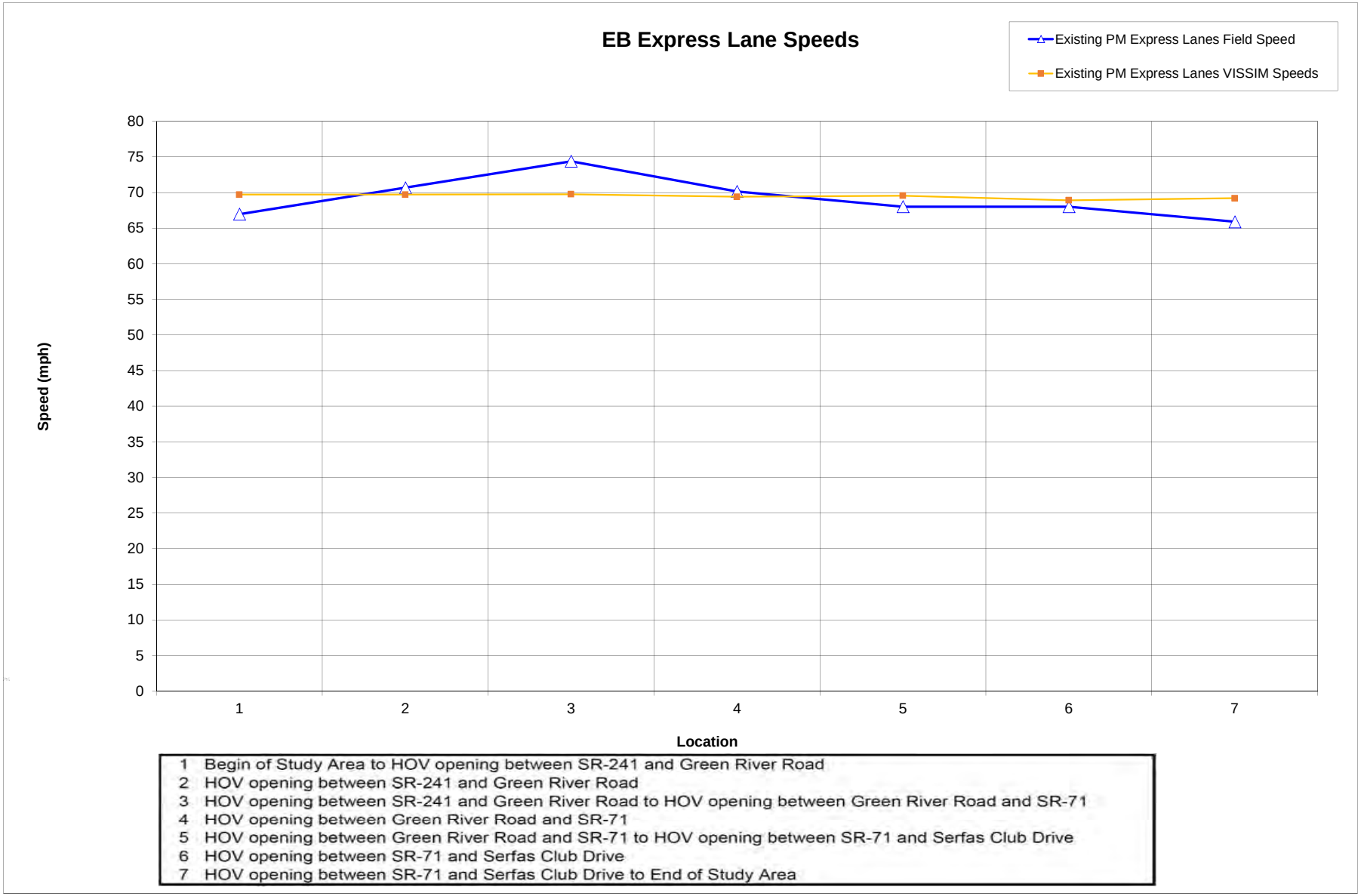
EB Mainline Speeds



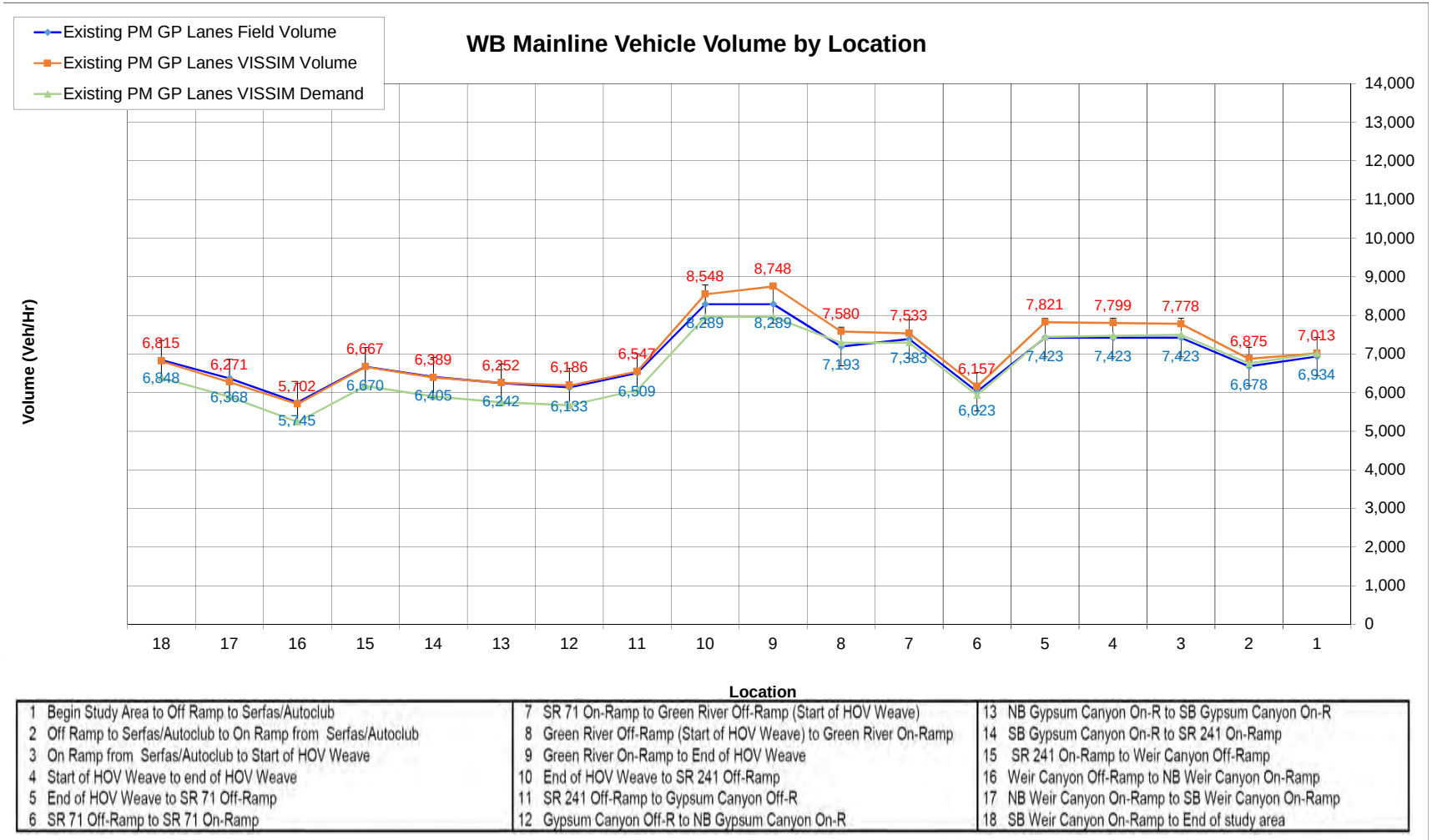
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple



Charts 8-9 AM-Calibration

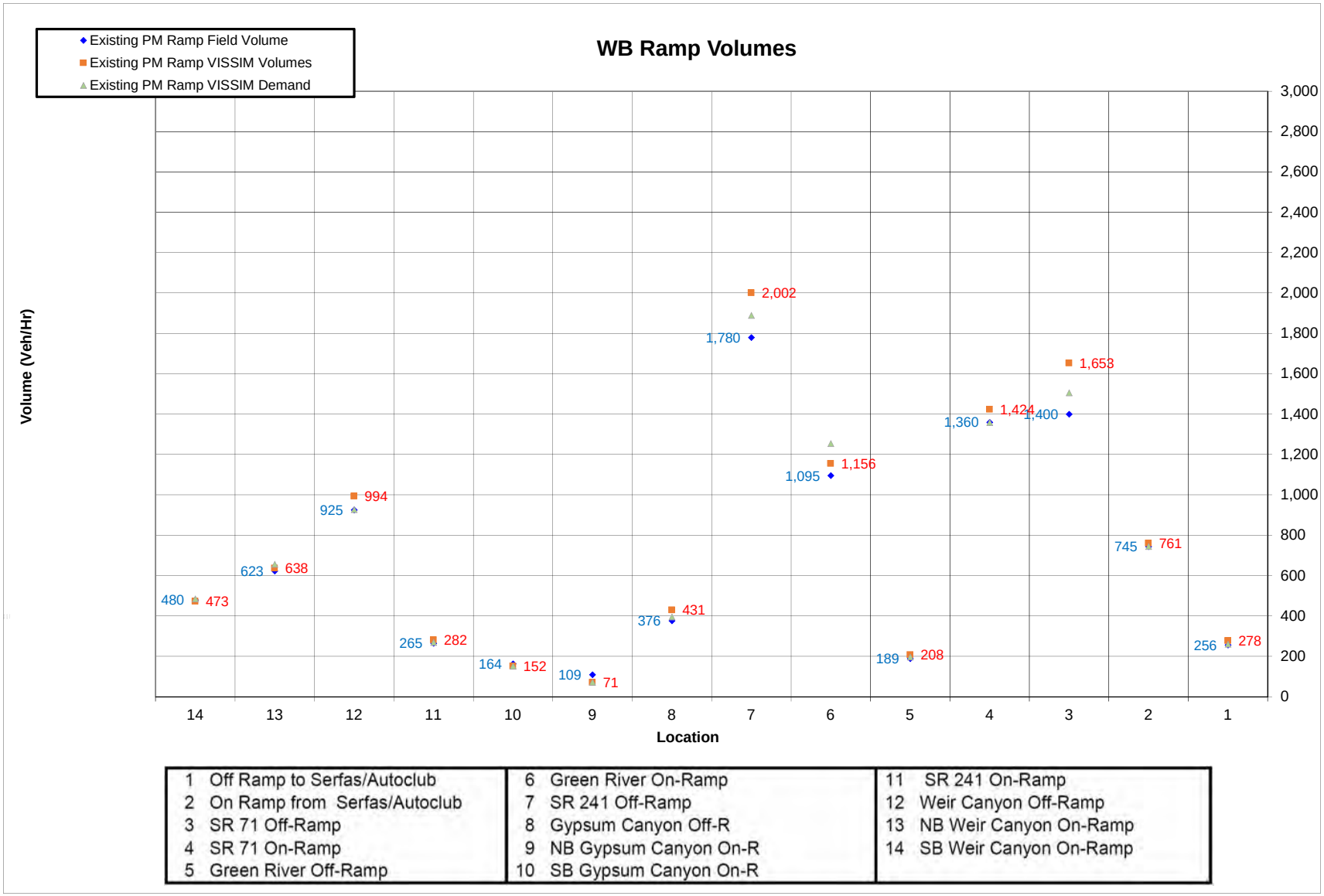


Charts 8-9 AM-Calibration



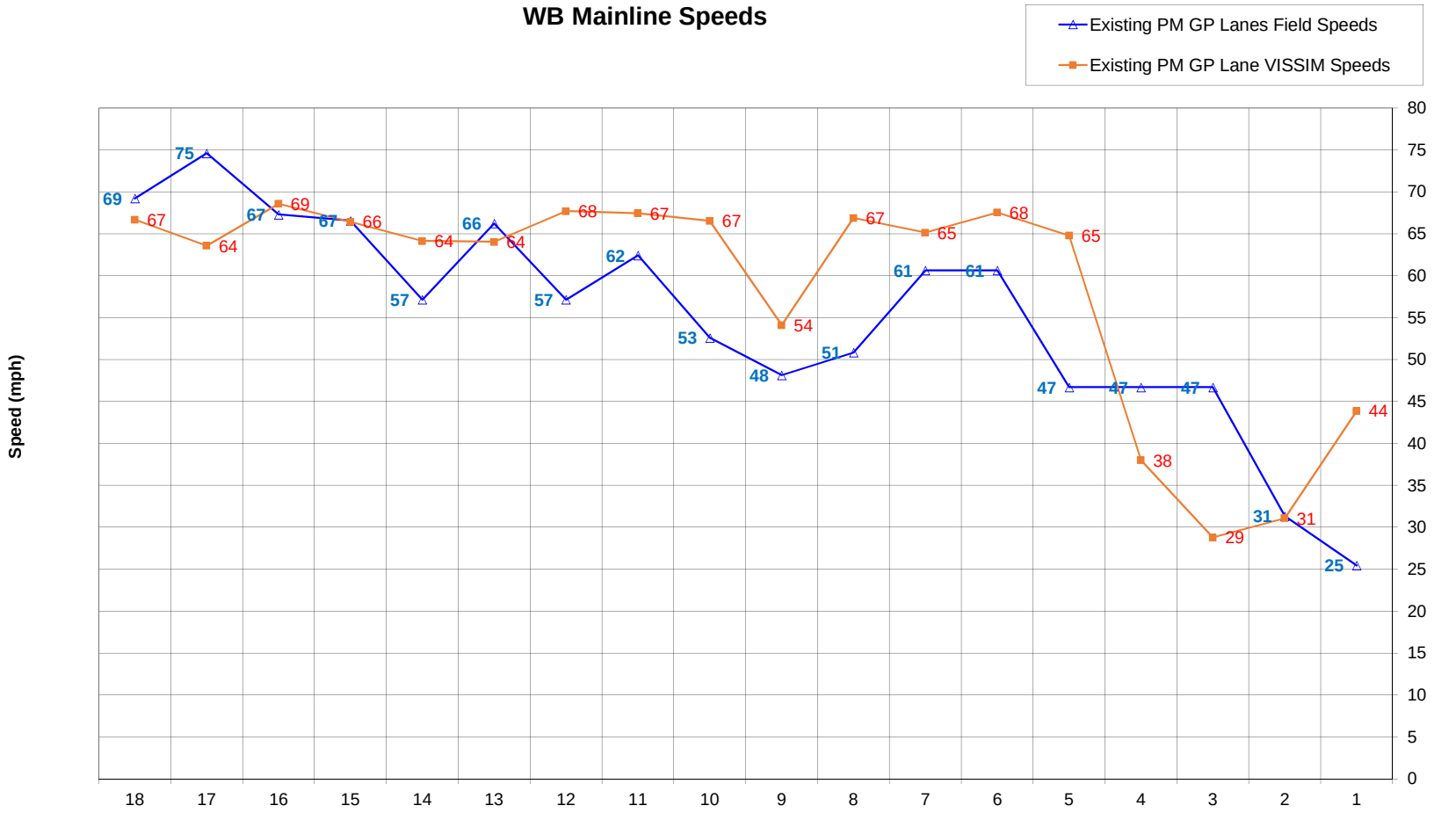
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

Charts 8-9 AM-Calibration

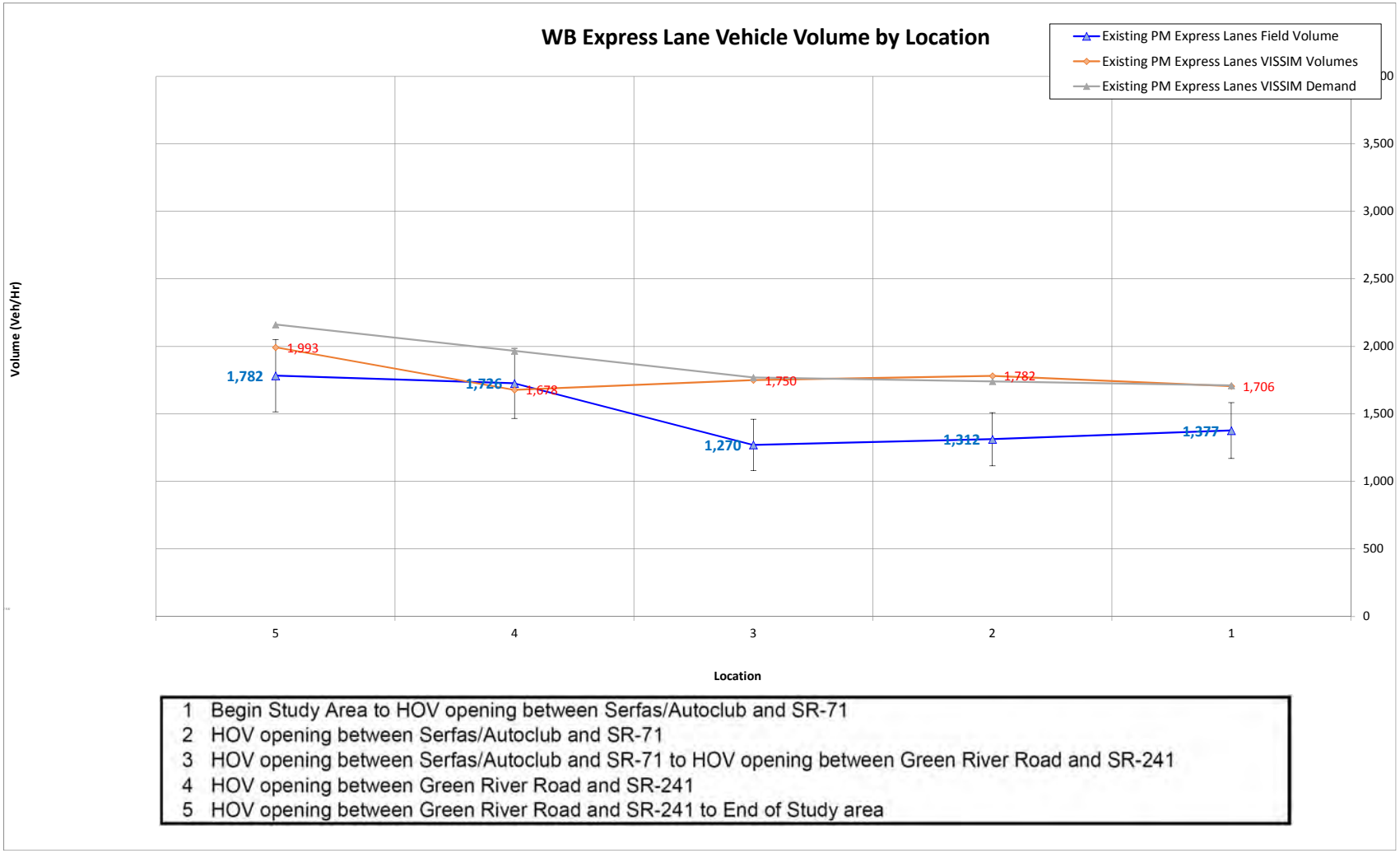


Charts 8-9 AM-Calibration

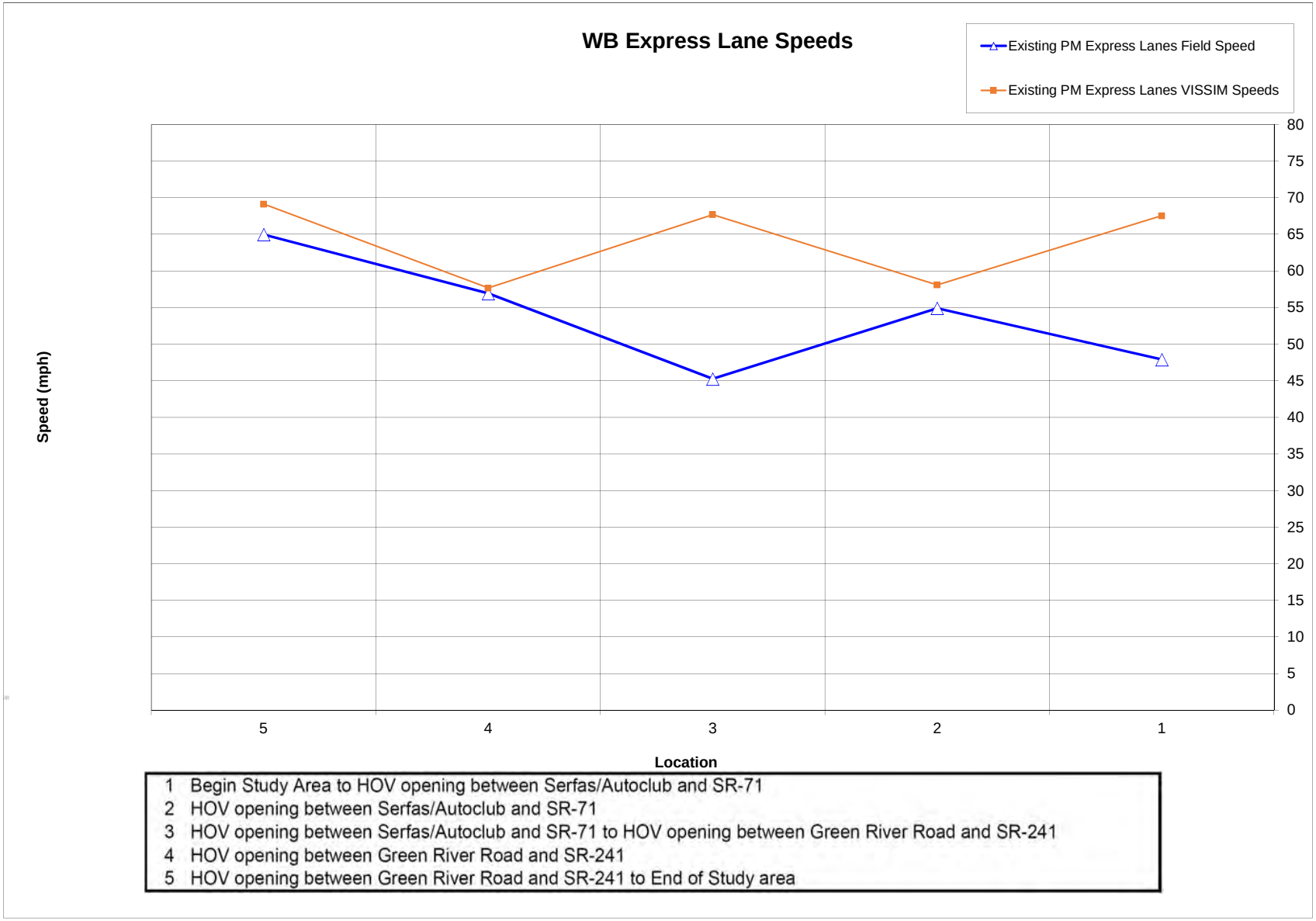
WB Mainline Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area



Charts 8-9 AM-Calibration



Charts 8-9 AM-Calibration

Vissim Model Calibration Results (FHWA Criteria)

FHWA Performance Criteria and Measures	Calibration Acceptance Target
Individual link flows	
Flow < 700 veh/h, Within 100 veh/h	> 85% of cases
700 veh/h < Flow < 2700 veh/h, Within 15%	> 85% of cases
Flow > 2700 veh/h, Within 400 veh/h	> 85% of cases
Difference in sum of all link flows	Within 5%
GEH Statistic Value	
GEH Statistic Value < 5, for individual link flows	> 85% cases
GEH Statistic Value for Sum of All Link Flows	< 4

Freeway Volume Calibration (FHWA Link Flow Criteria)

Lane Type	Eastbound					Westbound				
	Total Links	Calibration Results Achieved				Total Links	Calibration Results Achieved			
		3-4 PM	4-5 PM	5-6 PM	6-7 PM		3-4 PM	4-5 PM	5-6 PM	6-7 PM
Mainline	21	62%	81%	67%	62%	18	94%	100%	94%	100%
Ramps	14	93%	93%	100%	86%	14	93%	93%	86%	93%
All Links	35	74%	86%	80%	71%	32	94%	97%	91%	97%
Total Link Flow % Difference		-1%	2%	-2%	-2%		-2%	0%	-3%	1%

Freeway Volume Calibration (GEH Criteria)

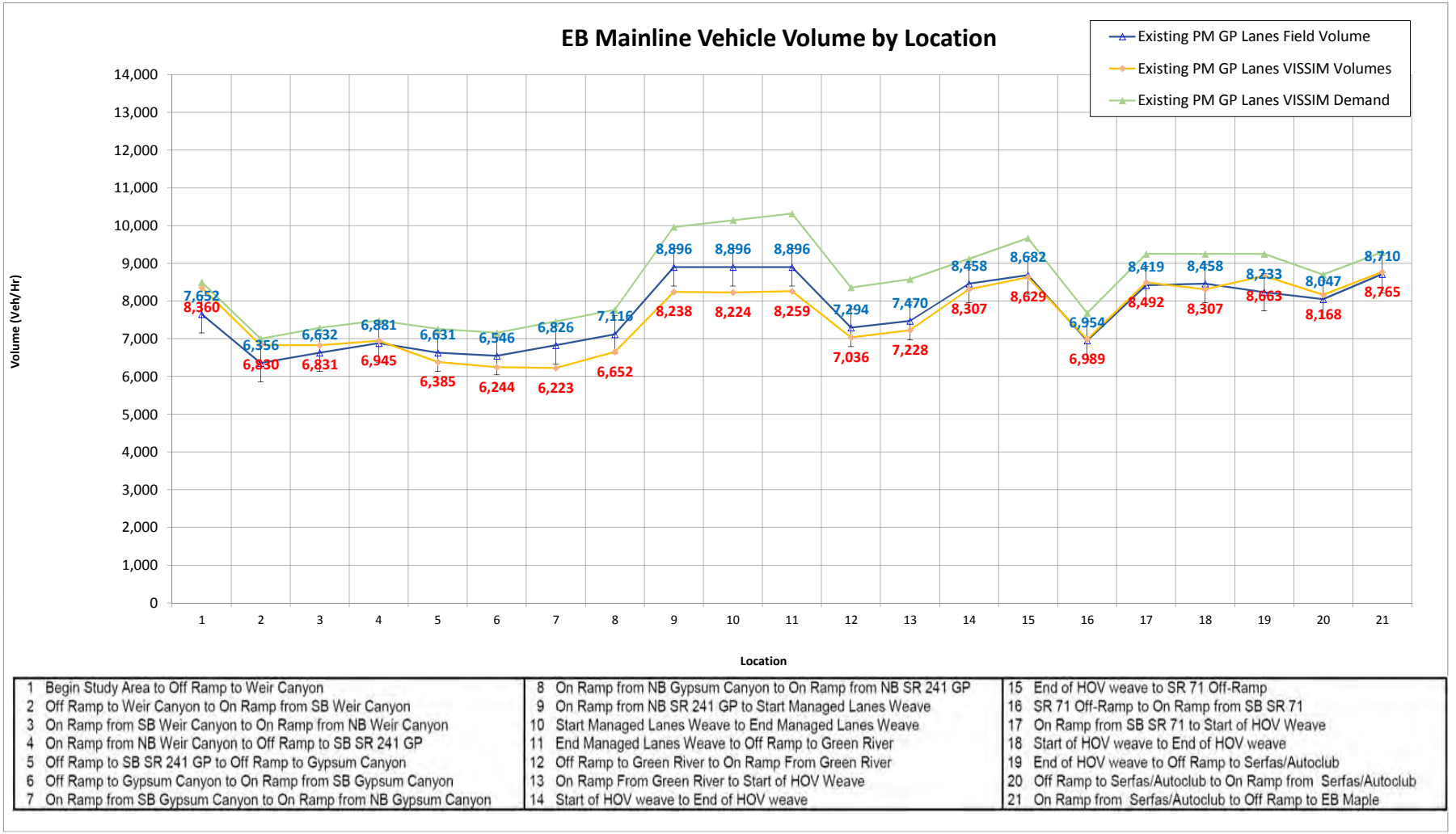
Lane Type	Eastbound					Westbound				
	Total Links	Calibration Results Achieved				Total Links	Calibration Results Achieved			
		3-4 PM	4-5 PM	5-6 PM	6-7 PM		3-4 PM	4-5 PM	5-6 PM	6-7 PM
Mainline	21	67%	86%	71%	62%	18	89%	100%	94%	100%
Ramps	14	93%	93%	93%	86%	14	93%	100%	86%	93%
All Links	35	77%	89%	80%	71%	32	91%	100%	91%	97%
Total Link Flow GEH		3.0	9.4	10.5	9.6		7.9	0.7	10.7	3.3

Network Travel Time calibration: PM Peak Period

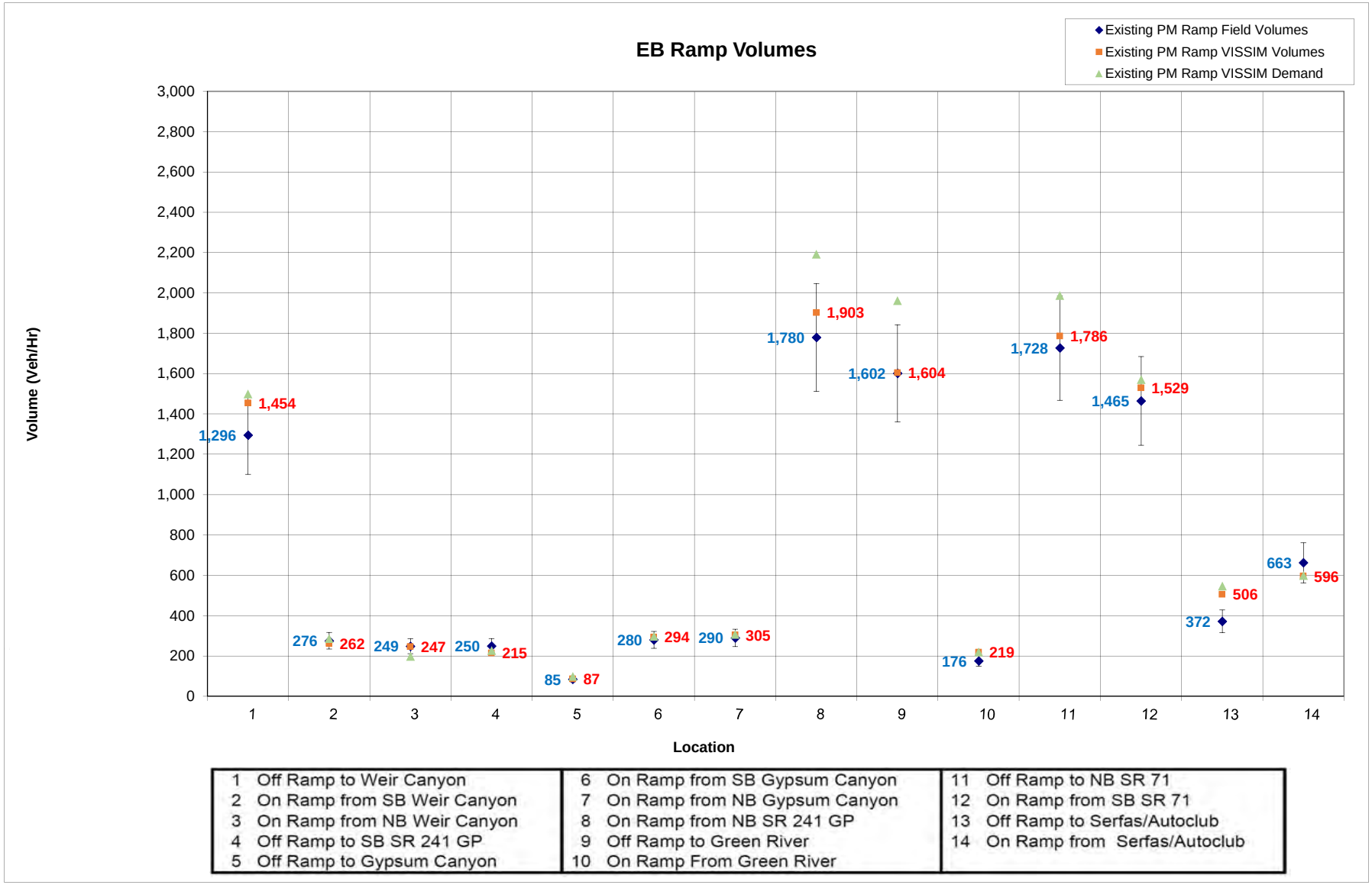
Corridor	Field Travel Time (Minutes)				VISSIM Travel Time (Minutes)				Diff.%			
	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Eastbound SR-91	24.5	35.2	34.6	35.3	27.8	31.3	35.6	31.3	13%	-11%	3%	-11%
Westbound SR-91	9.3	9.1	9.1	9.0	8.9	9.0	9.0	9.0	-3%	-2%	-2%	-1%

Table 5
Segment Travel Time Calibration: PM Peak Period

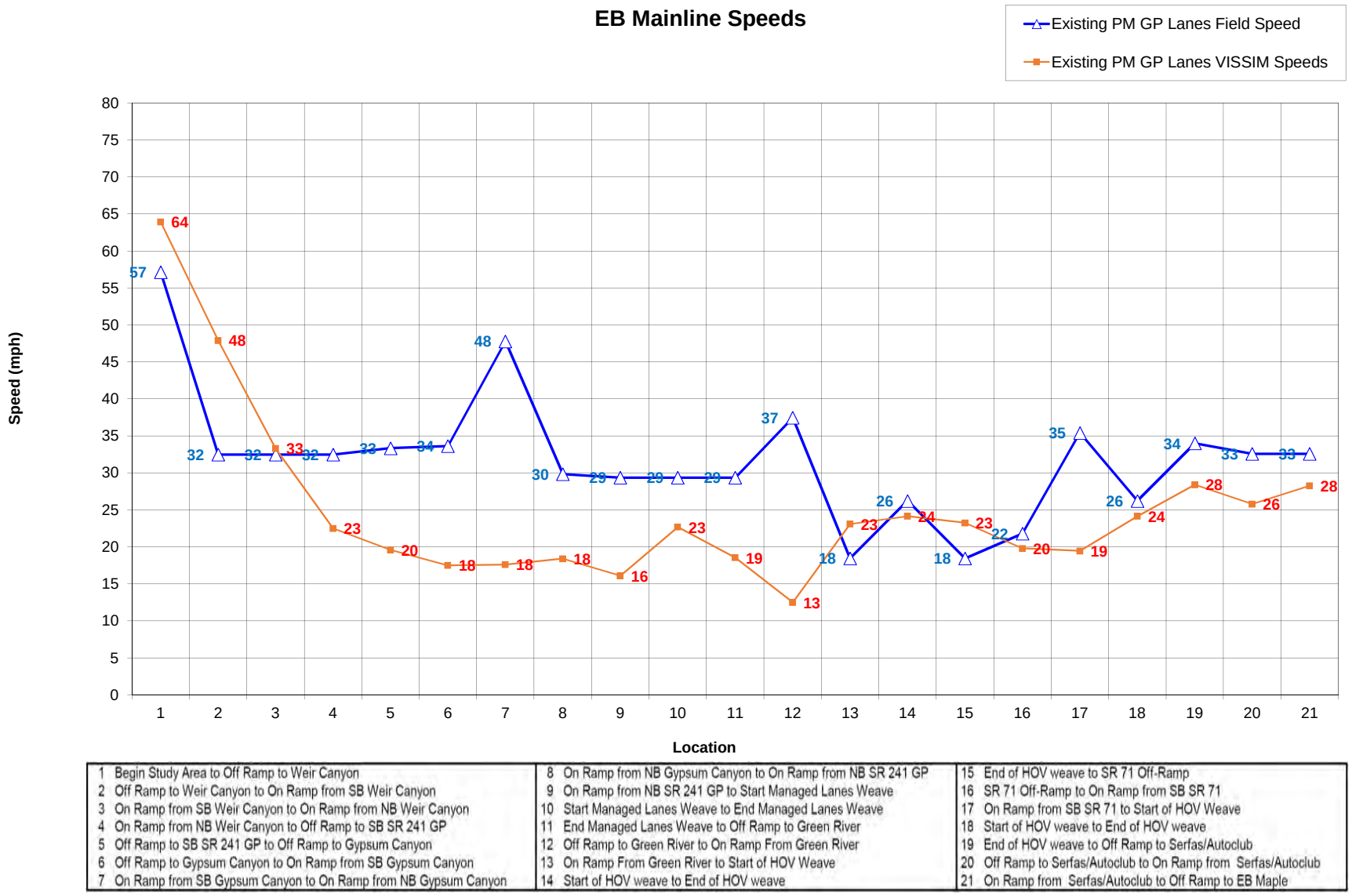
Corridor	Segment	Location	Distance	Field Speed				VISSIM Speed				Field Travel Time (Minutes)				VISSIM Travel Time (Minutes)				Diff.%			
				3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Eastbound SR-91	Site A to Site C	1002	20751	26	12	11	11	28	16	13	13	9.1	19.6	20.5	21.4	8.5	15.0	18.6	18.0	-7%	-31%	-10%	-19%
	Site C to Site D	1003	13681	25	22	23	26	18	21	20	22	6.3	7.0	6.7	6.0	8.7	7.5	7.9	7.0	28%	7%	15%	14%
	Site D to Site F	1005	16332	20	22	25	24	18	21	20	29	9.1	8.6	7.4	7.9	10.5	8.8	9.1	6.4	13%	2%	19%	-23%
	Site B to Site C	1007	32177	43	22	18	17	29	20	16	14	8.5	16.8	20.1	21.3	12.8	17.9	22.5	26.7	34%	6%	11%	20%
	Site E to Site F	1008	28639	21	20	27	37	29	27	24	34	15.7	16.4	12.2	8.9	11.3	12.1	13.6	9.4	-39%	-36%	10%	6%
	Site A to Site B	1001	40145	51	36	27	19	56	30	25	26	9.0	12.8	16.8	23.5	8.1	15.4	18.4	17.6	-11%	17%	9%	-33%
	Site D to Site E	1004	27065	31	19	26	34	29	34	32	31	9.8	16.2	11.9	9.1	10.7	9.0	9.5	9.8	8%	-80%	-25%	7%
Westbound SR-91	Site F to Site D	1011	16460	69	67	71	71	68	67	67	68	2.7	2.8	2.6	2.6	2.8	2.8	2.8	2.7	2%	-1%	5%	4%
	Site D to Site C	1012	13628	60	62	60	61	62	62	61	61	2.6	2.5	2.6	2.5	2.5	2.5	2.5	2.5	-3%	1%	-2%	0%
	Site C to Site A	1014	20820	59	61	61	61	64	65	65	64	4.0	3.9	3.9	3.9	3.7	3.7	3.7	3.7	-8%	-5%	-7%	-4%
	Site E to Site D	1009	23283	46	38	52	66	53	45	37	46	5.8	7.0	5.0	4.0	5.0	5.9	7.1	5.7	-15%	-18%	29%	30%
	Site B to Site A	1006	40738	60	57	57	69	64	60	48	36	7.7	8.2	8.1	6.7	7.2	7.7	9.7	12.9	-7%	-6%	17%	48%



1	Begin Study Area to Off Ramp to Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15	End of HOV weave to SR 71 Off-Ramp
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16	SR 71 Off-Ramp to On Ramp from SB SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10	Start Managed Lanes Weave to End Managed Lanes Weave	17	On Ramp from SB SR 71 to Start of HOV Weave
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11	End Managed Lanes Weave to Off Ramp to Green River	18	Start of HOV weave to End of HOV weave
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	19	End of HOV weave to Off Ramp to Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13	On Ramp From Green River to Start of HOV Weave	20	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14	Start of HOV weave to End of HOV weave	21	On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

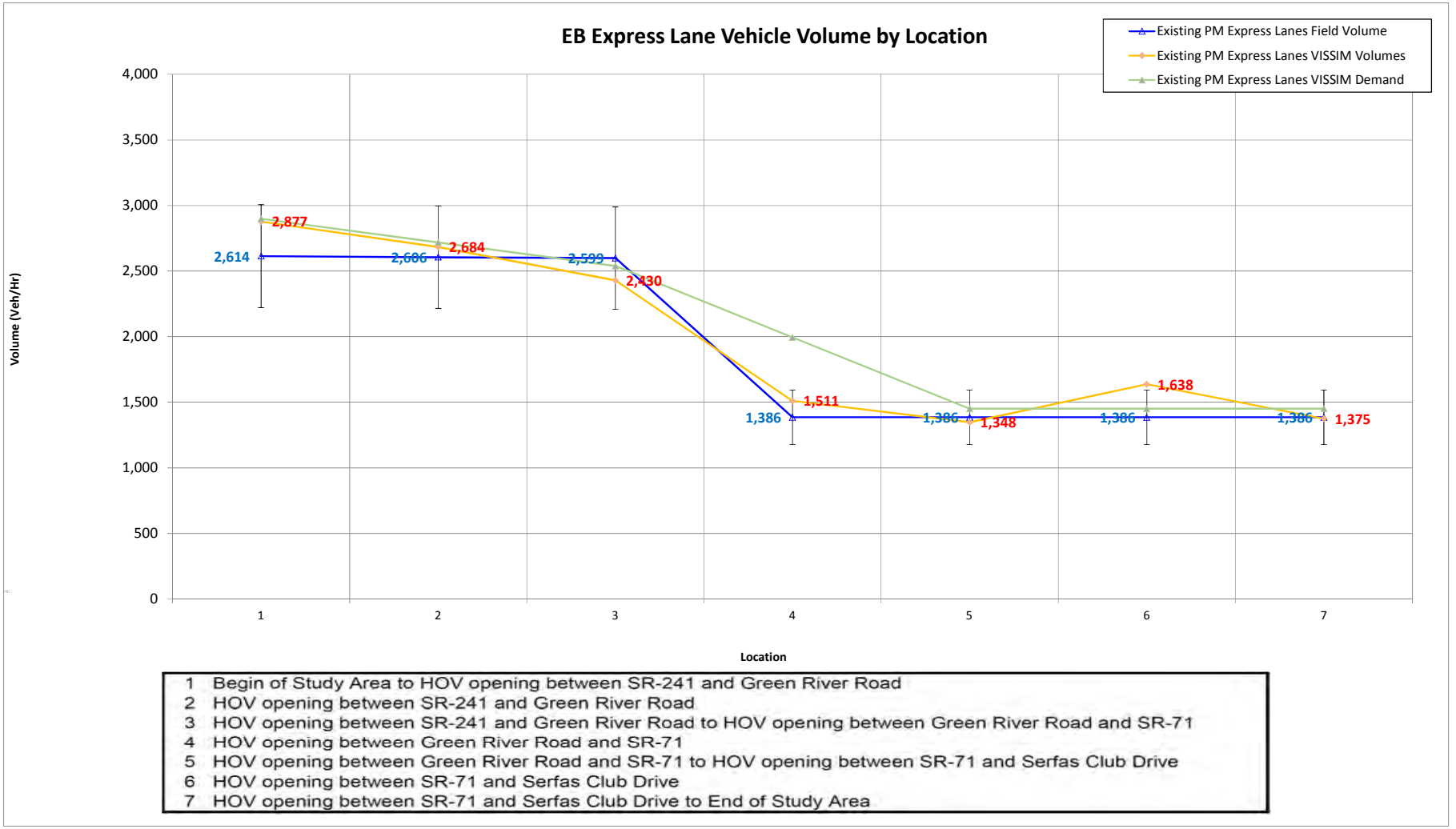


Charts 3-4 PM-Calibration

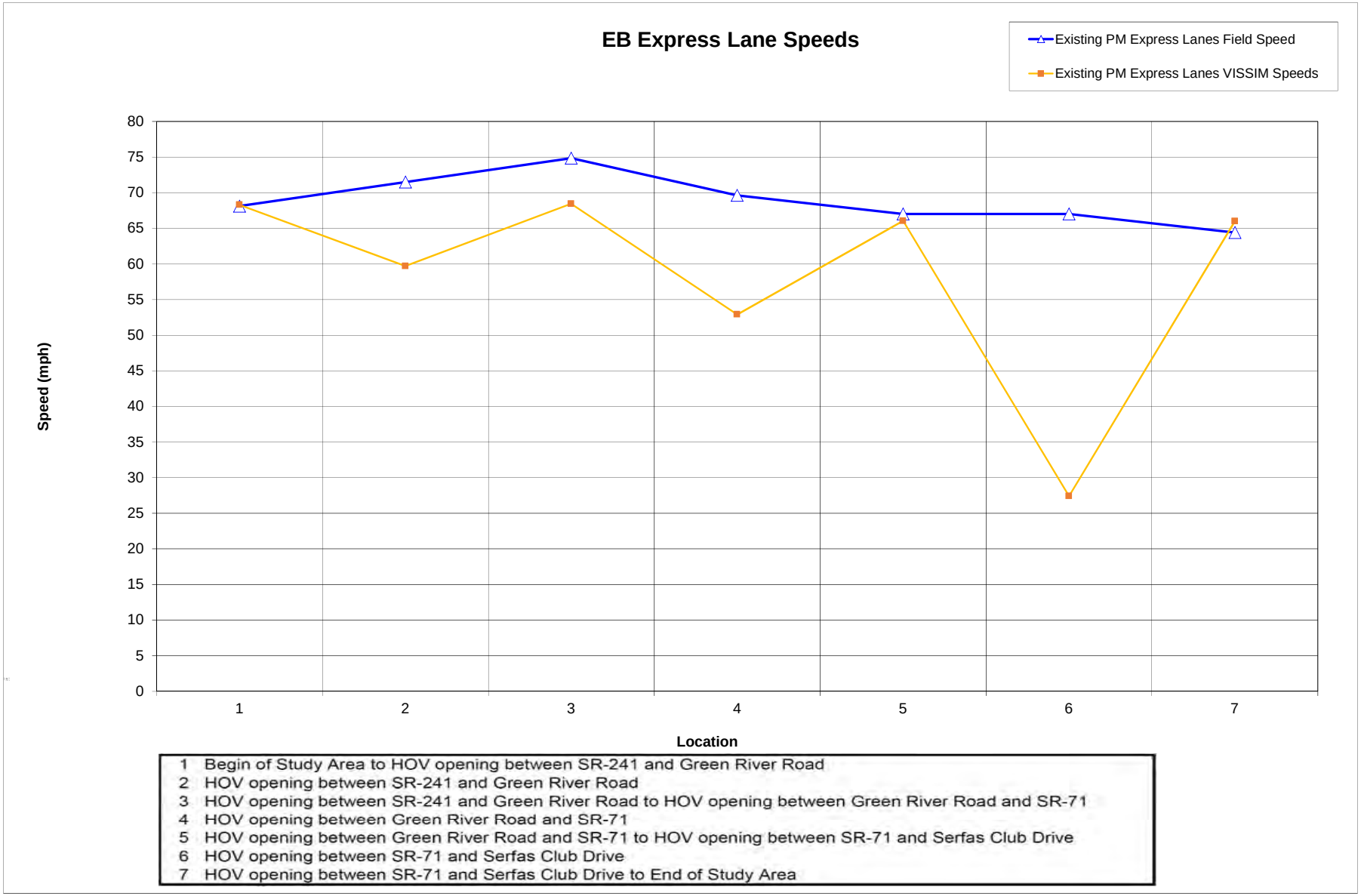


1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

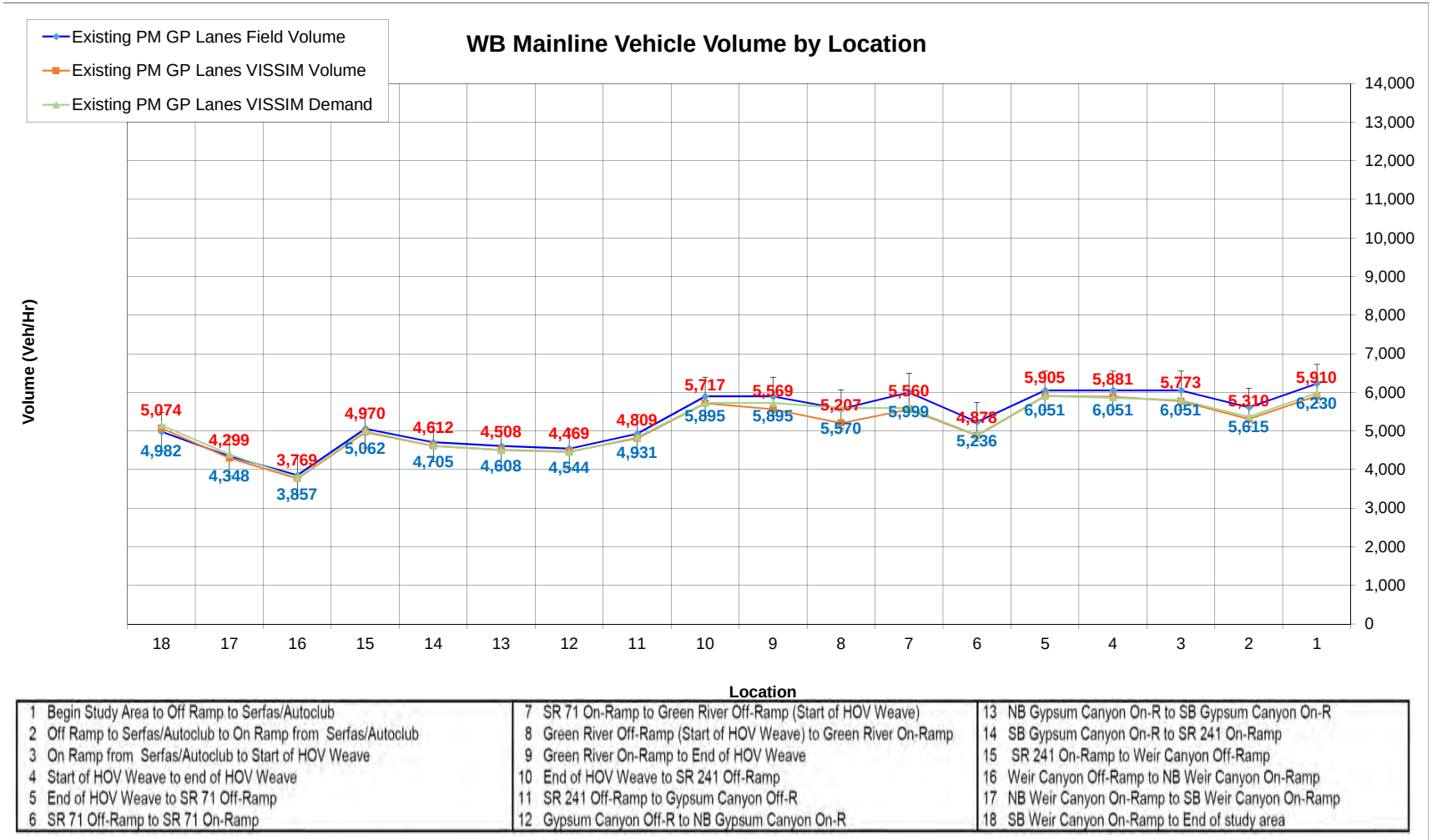
Charts 3-4 PM-Calibration



Charts 3-4 PM-Calibration

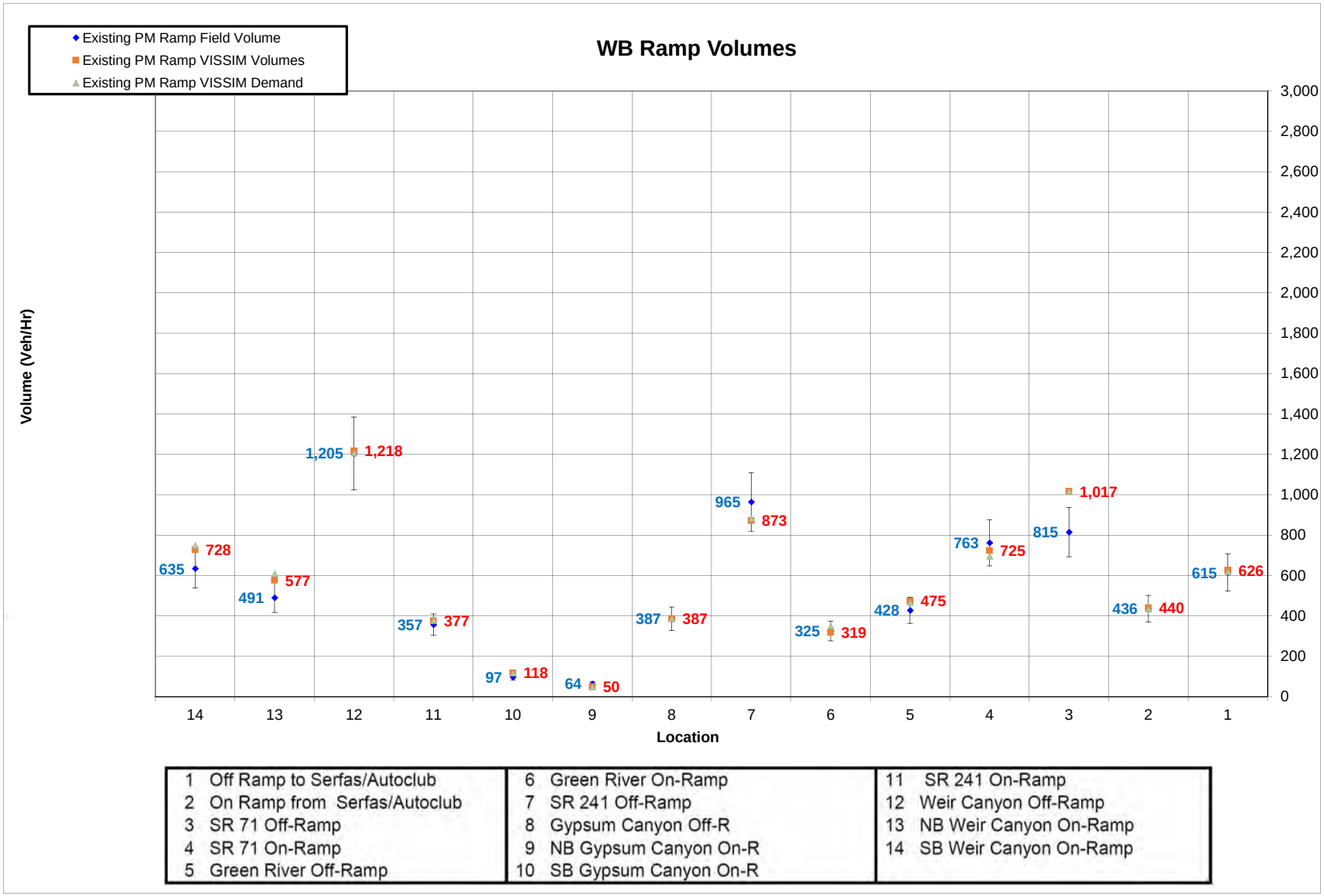


Charts 3-4 PM-Calibration

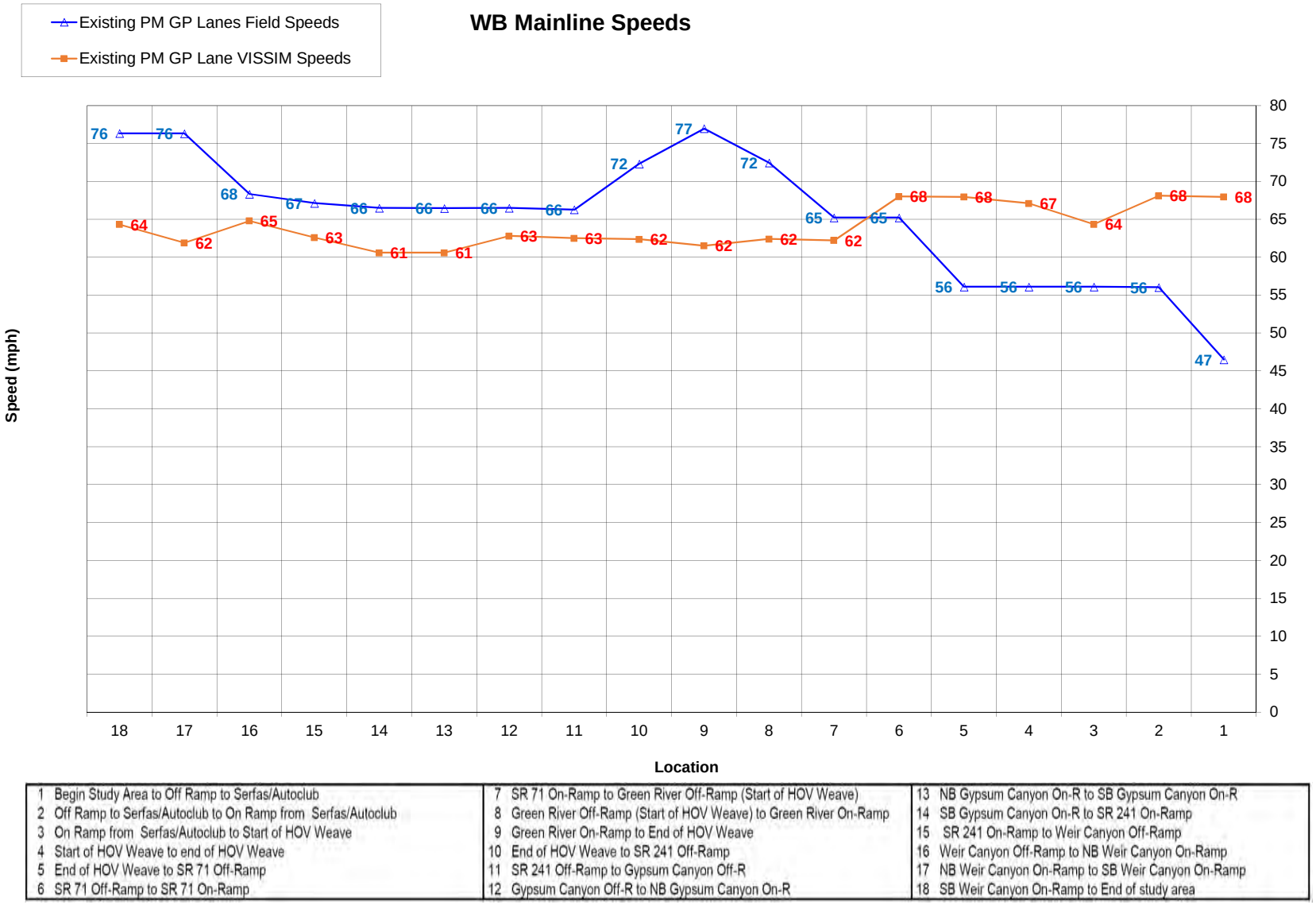


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

Charts 3-4 PM-Calibration

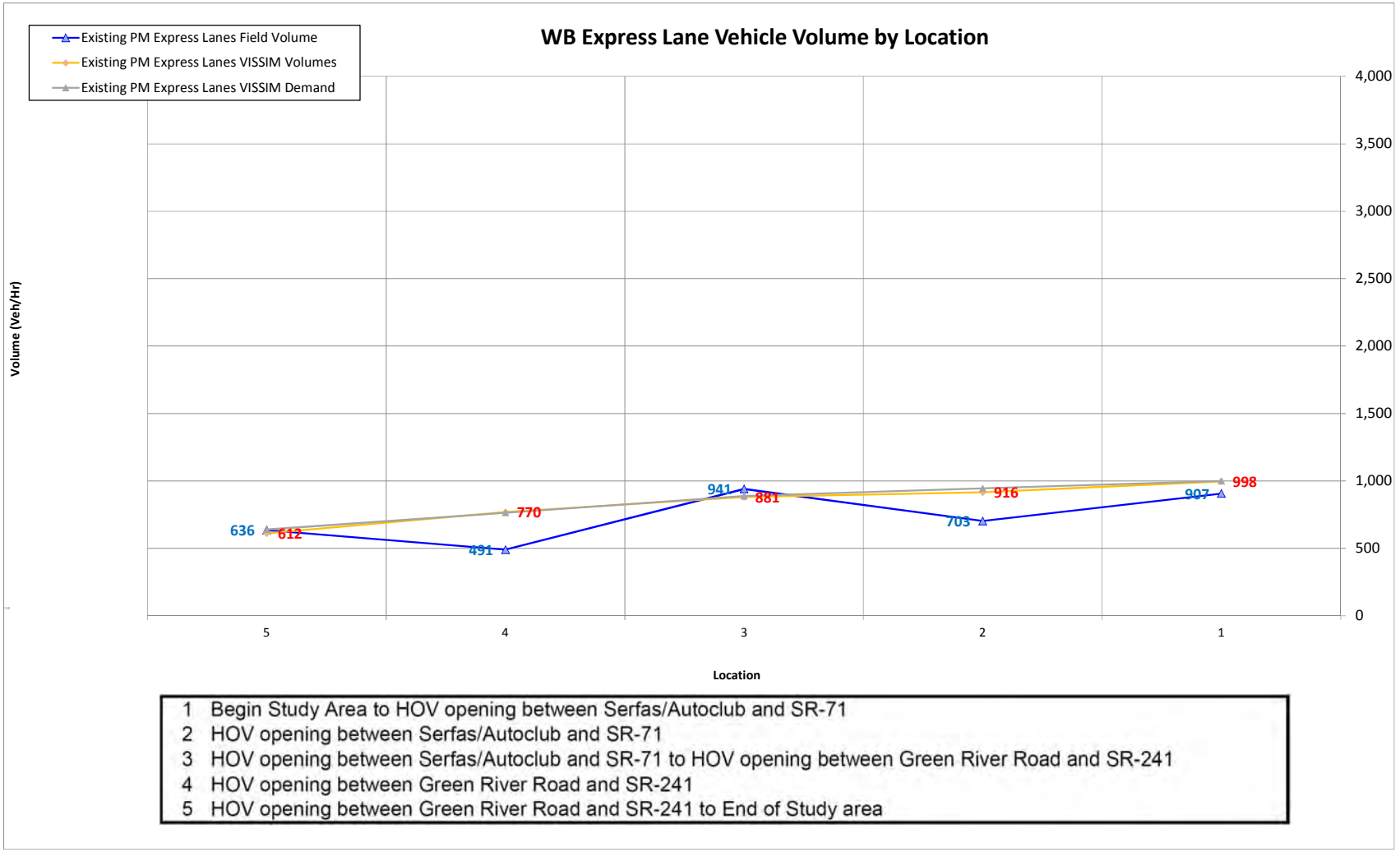


Charts 3-4 PM-Calibration

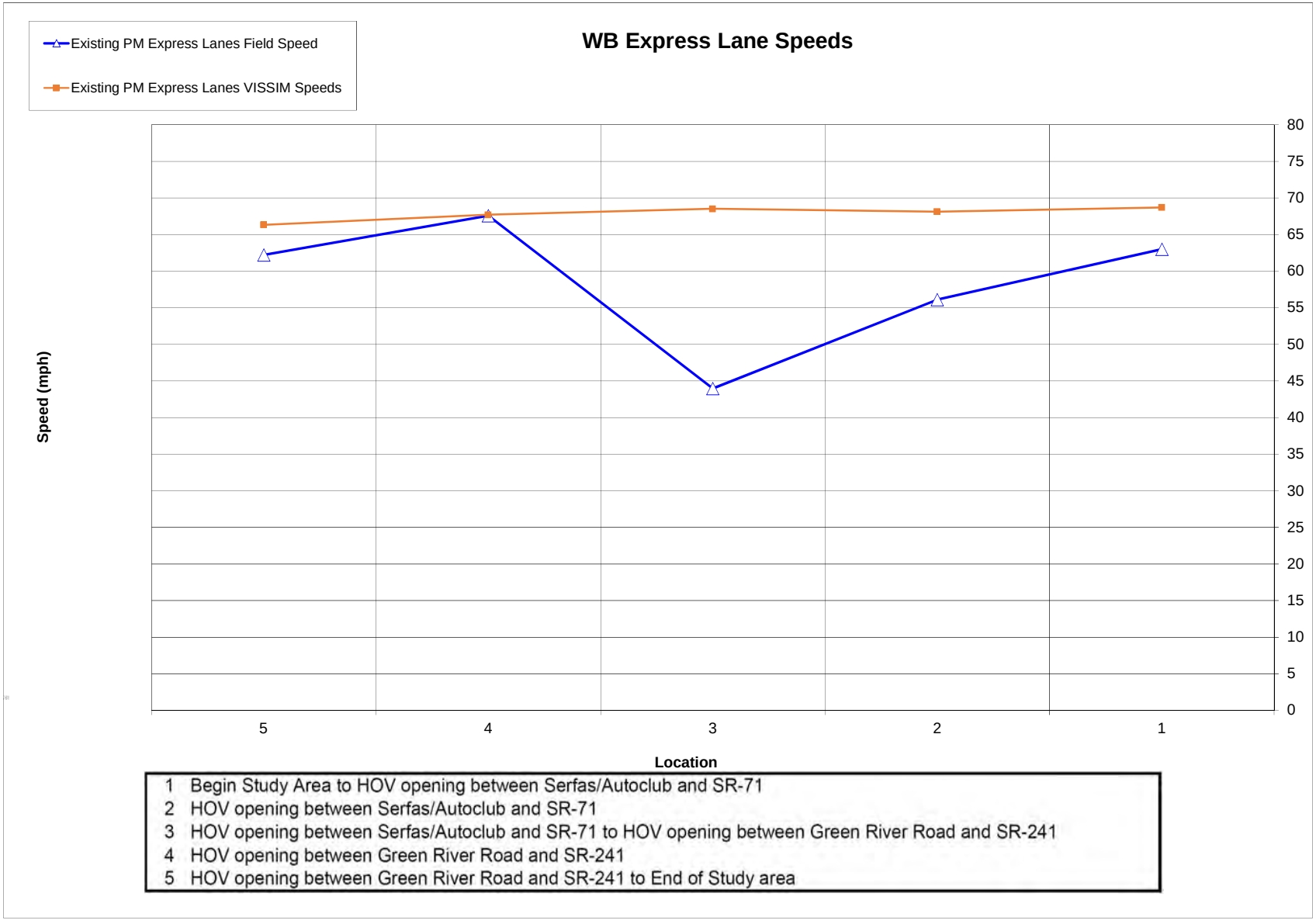


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

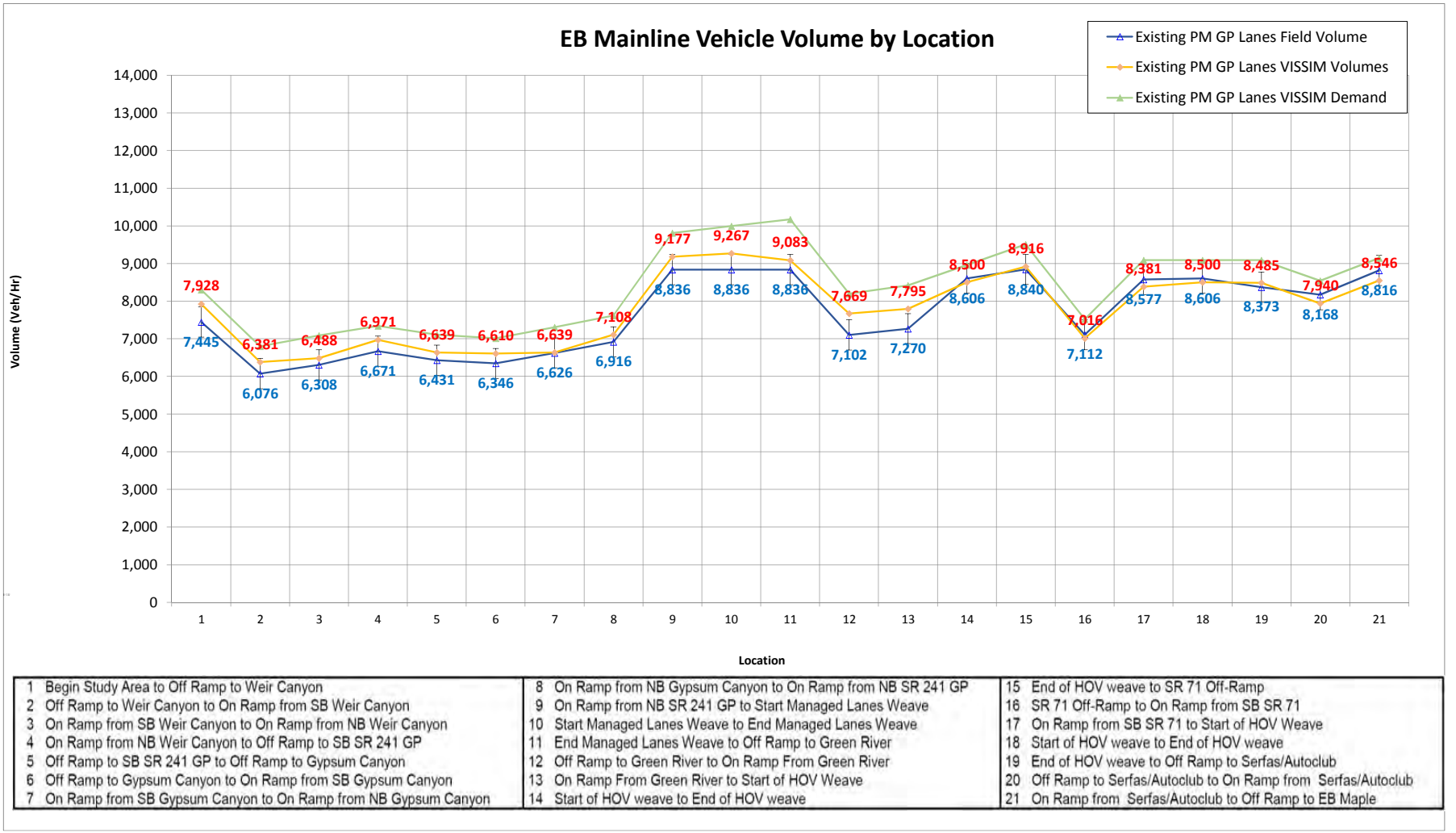
Charts 3-4 PM-Calibration



Charts 3-4 PM-Calibration

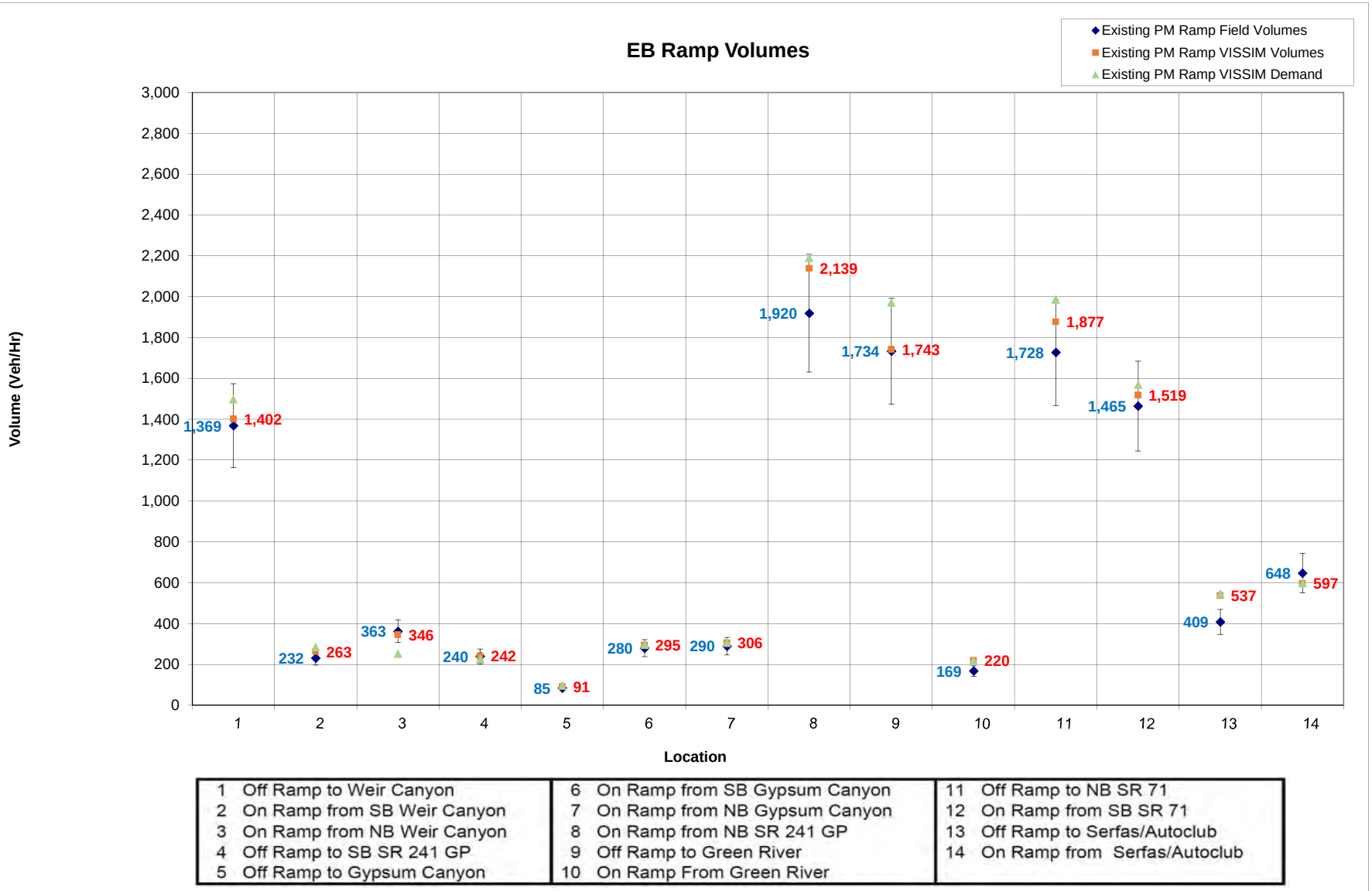


Charts 3-4 PM-Calibration



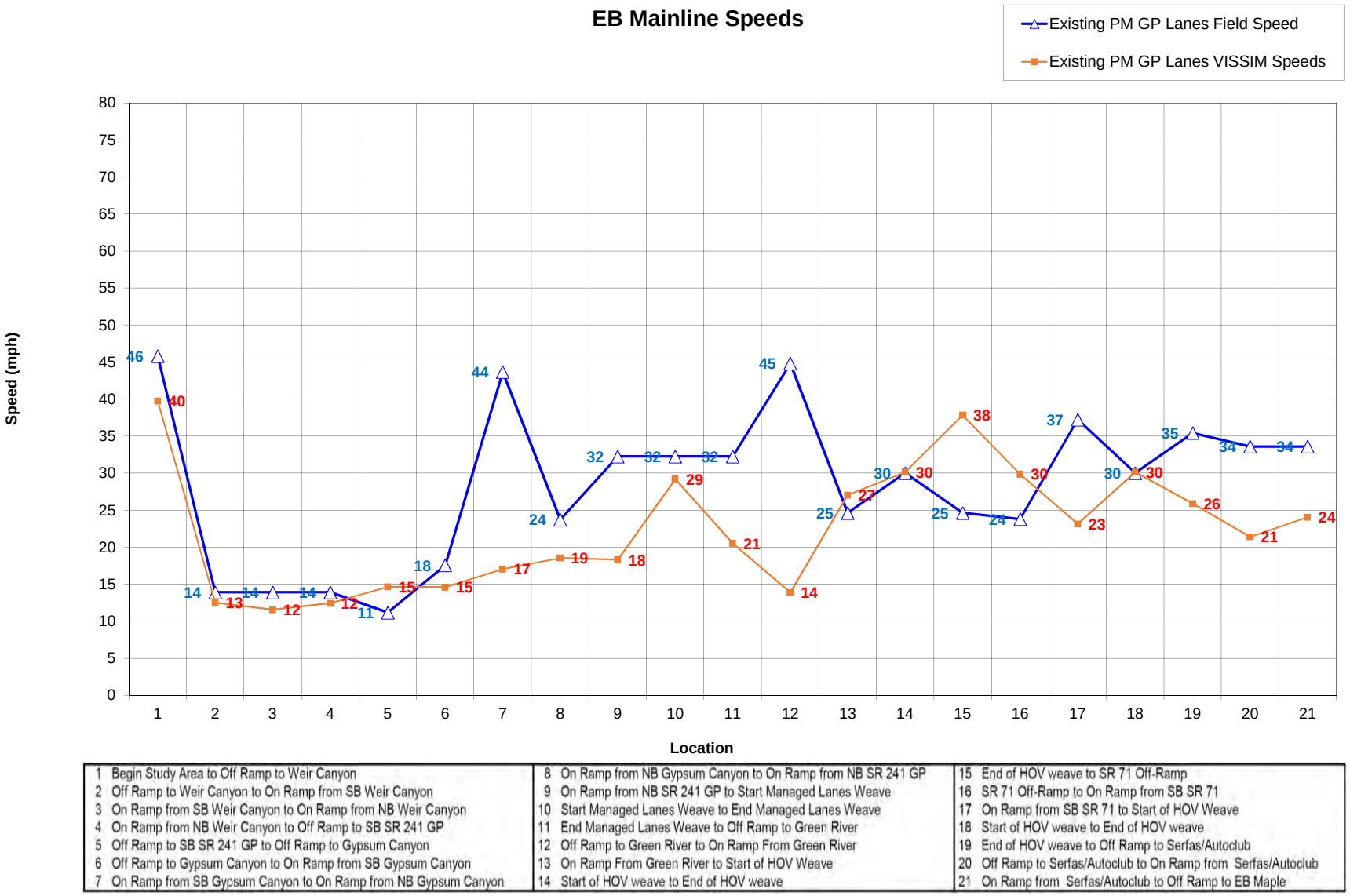
1	Begin Study Area to Off Ramp to Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15	End of HOV weave to SR 71 Off-Ramp
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16	SR 71 Off-Ramp to On Ramp from SB SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10	Start Managed Lanes Weave to End Managed Lanes Weave	17	On Ramp from SB SR 71 to Start of HOV Weave
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11	End Managed Lanes Weave to Off Ramp to Green River	18	Start of HOV weave to End of HOV weave
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	19	End of HOV weave to Off Ramp to Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13	On Ramp From Green River to Start of HOV Weave	20	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14	Start of HOV weave to End of HOV weave	21	On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

Charts 4-5 PM-Calibration



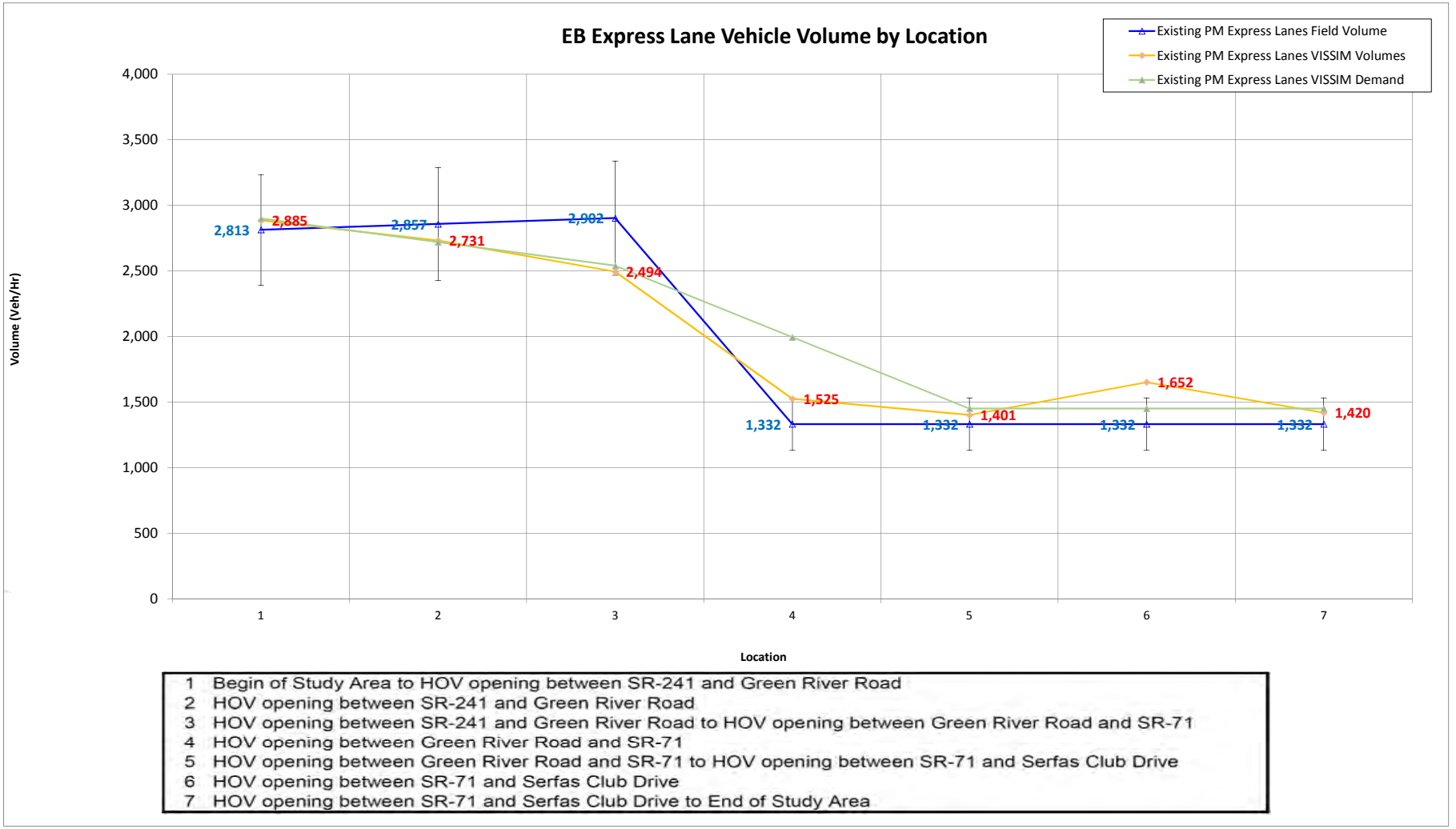
Charts 4-5 PM-Calibration

EB Mainline Speeds

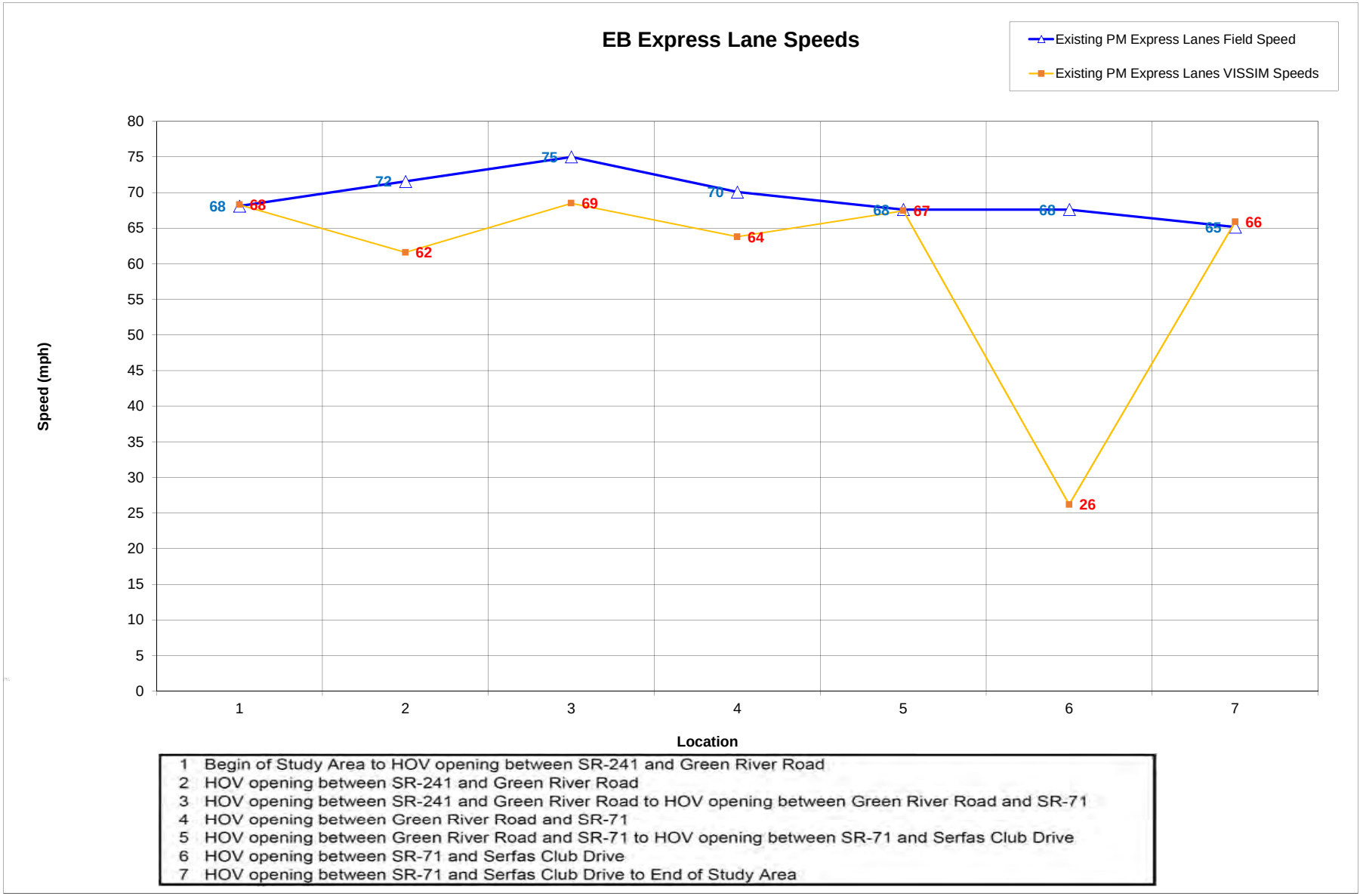


1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

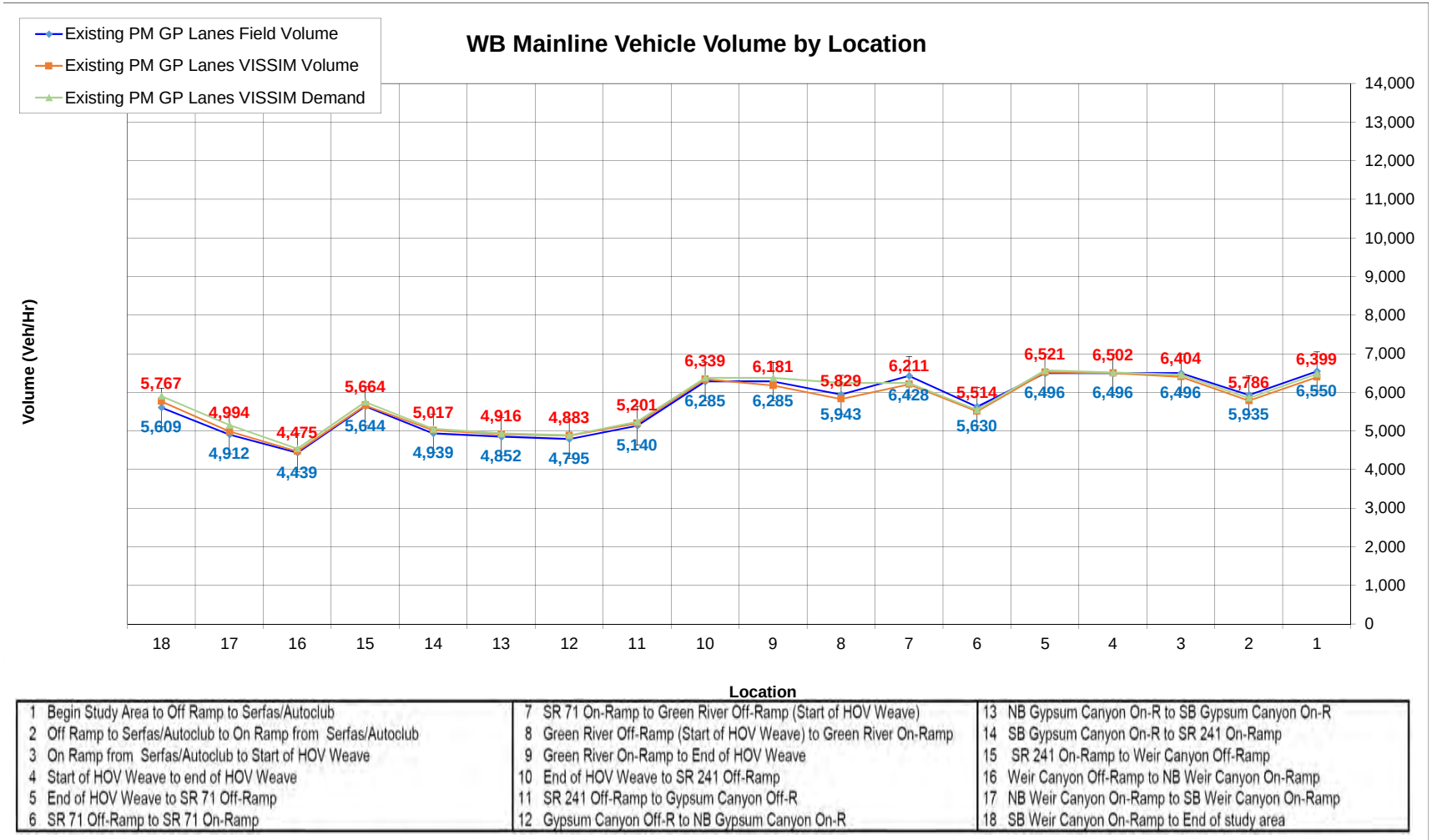
Charts 4-5 PM-Calibration



Charts 4-5 PM-Calibration

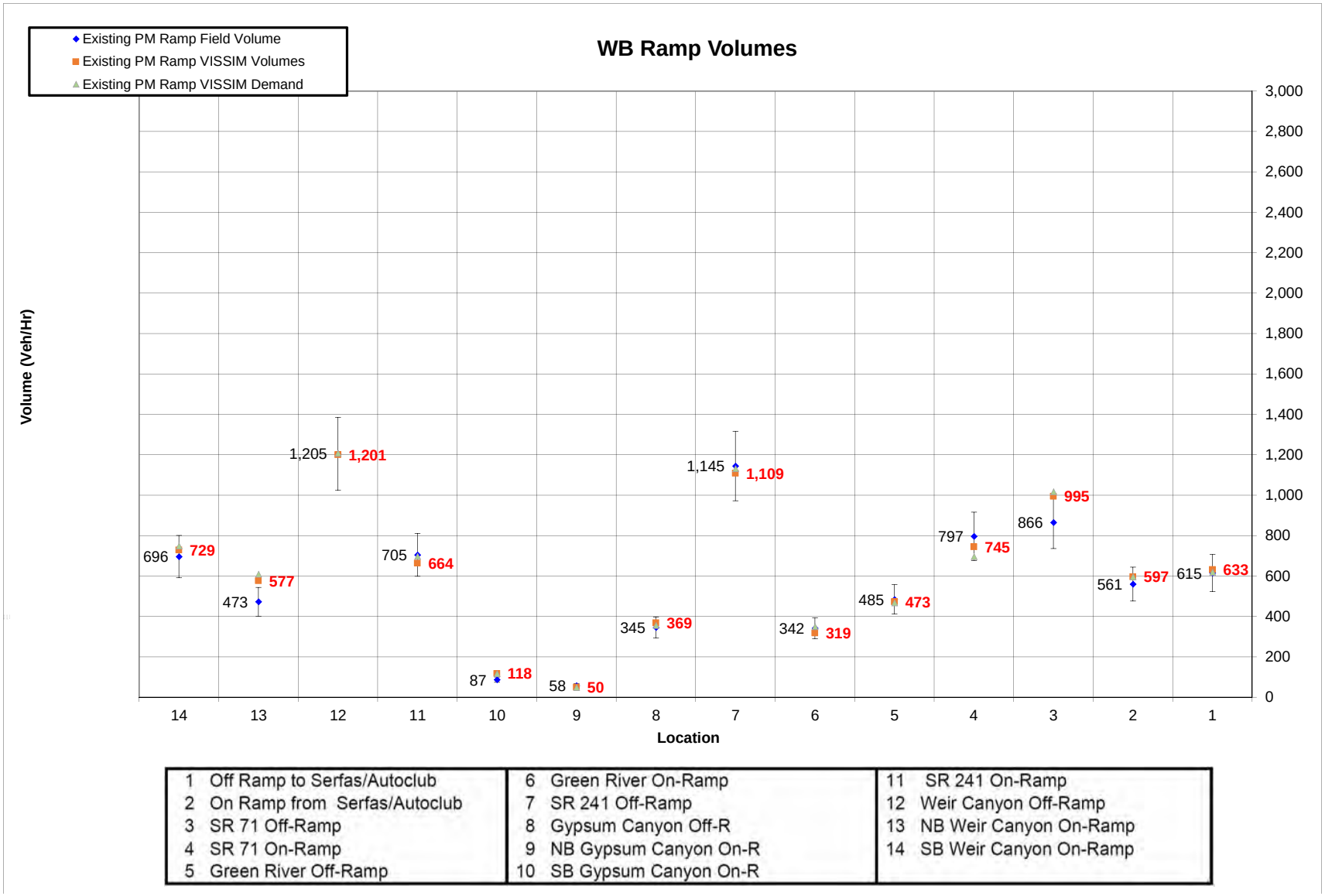


Charts 4-5 PM-Calibration



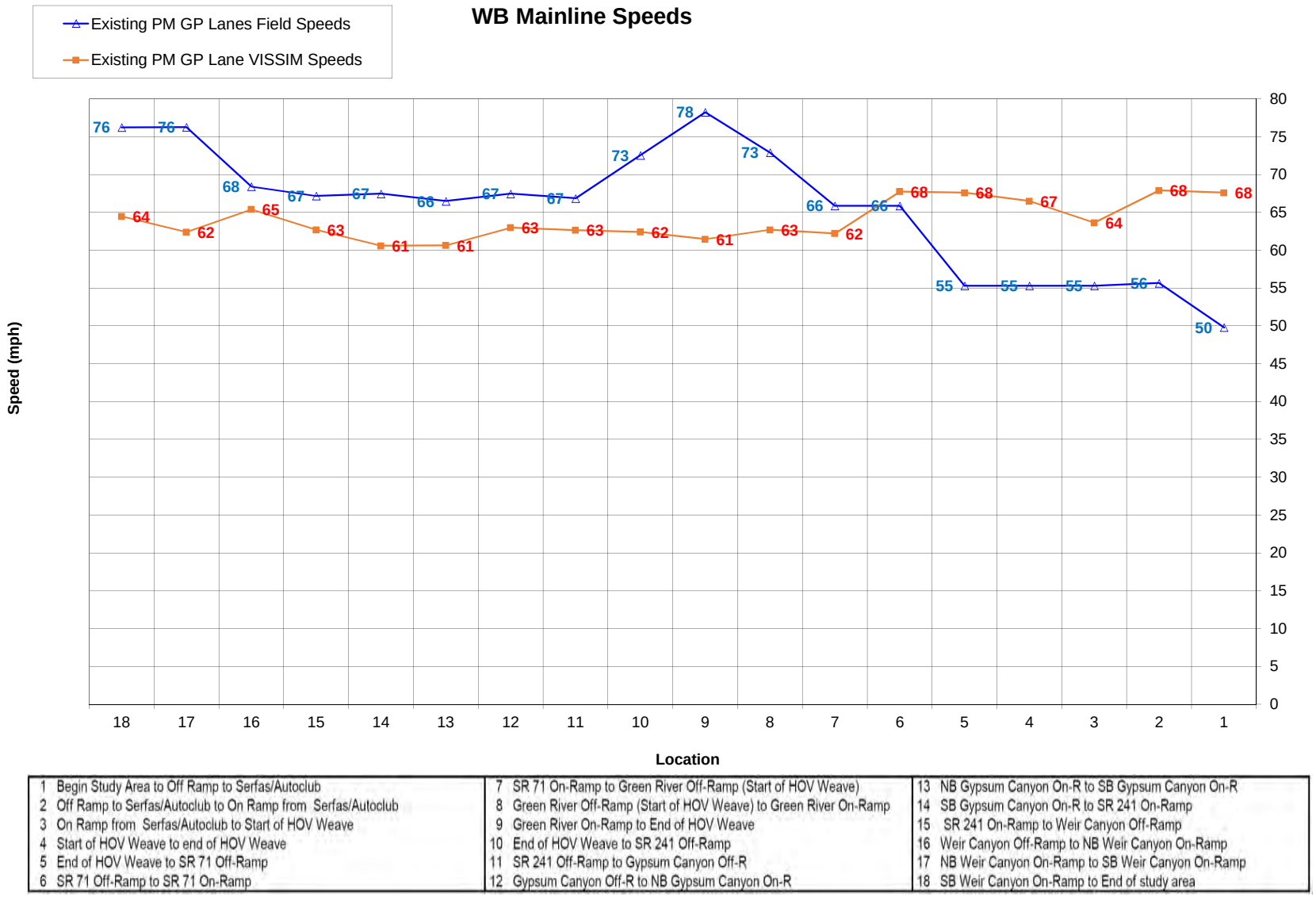
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

Charts 4-5 PM-Calibration



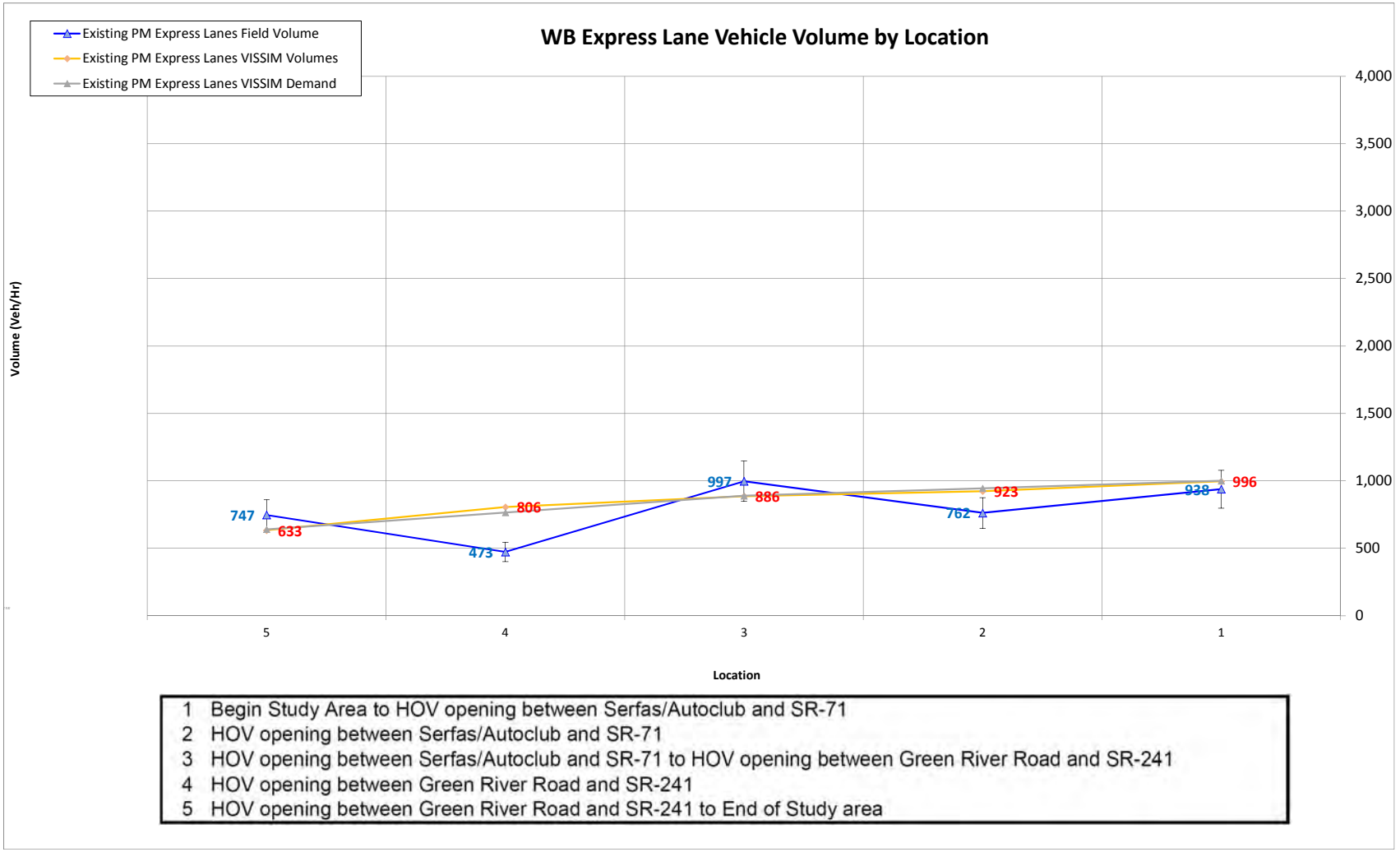
1	Off Ramp to Serfas/Autoclub	6	Green River On-Ramp	11	SR 241 On-Ramp
2	On Ramp from Serfas/Autoclub	7	SR 241 Off-Ramp	12	Weir Canyon Off-Ramp
3	SR 71 Off-Ramp	8	Gypsum Canyon Off-R	13	NB Weir Canyon On-Ramp
4	SR 71 On-Ramp	9	NB Gypsum Canyon On-R	14	SB Weir Canyon On-Ramp
5	Green River Off-Ramp	10	SB Gypsum Canyon On-R		

Charts 4-5 PM-Calibration

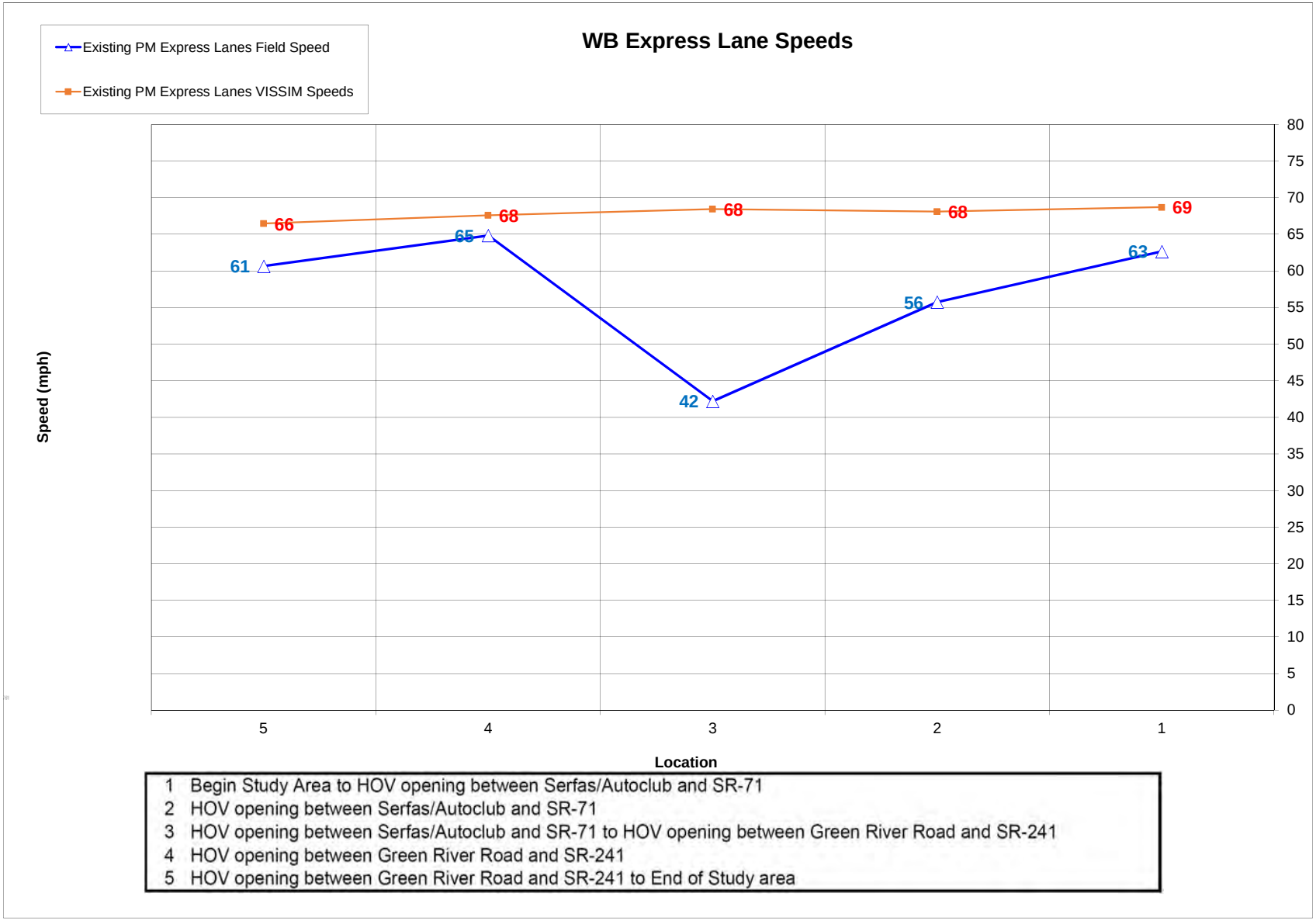


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

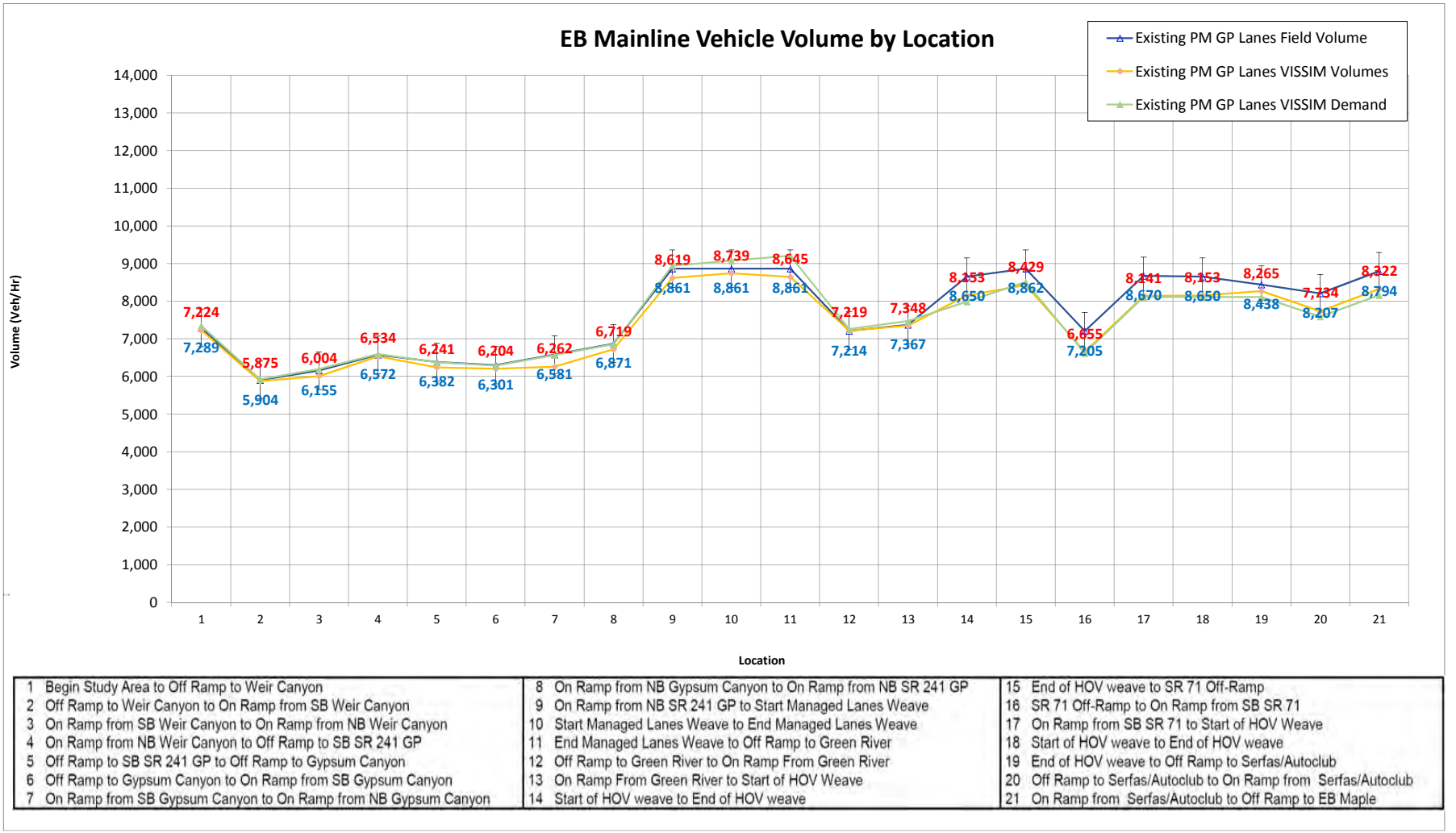
Charts 4-5 PM-Calibration



Charts 4-5 PM-Calibration

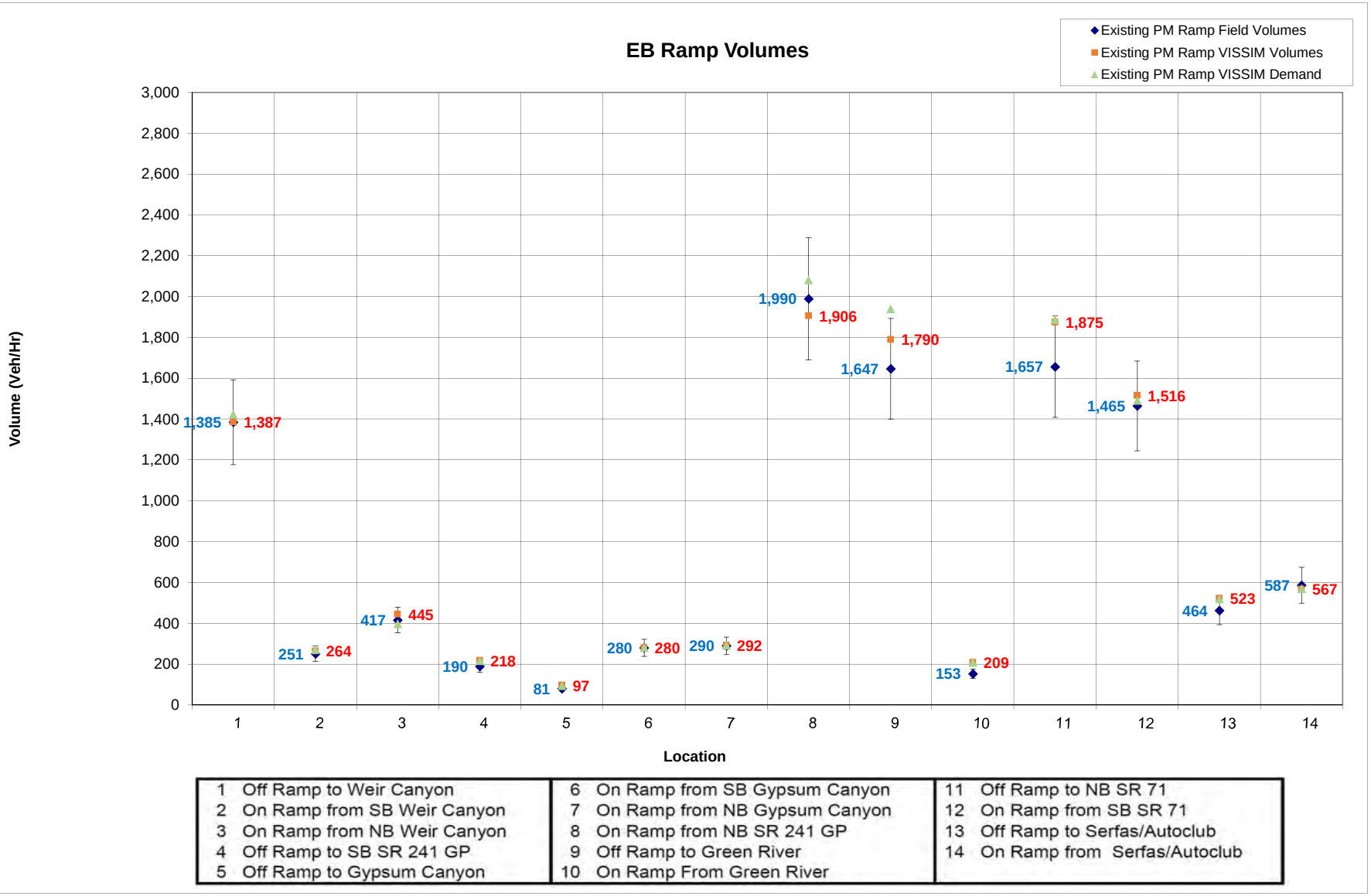


Charts 4-5 PM-Calibration



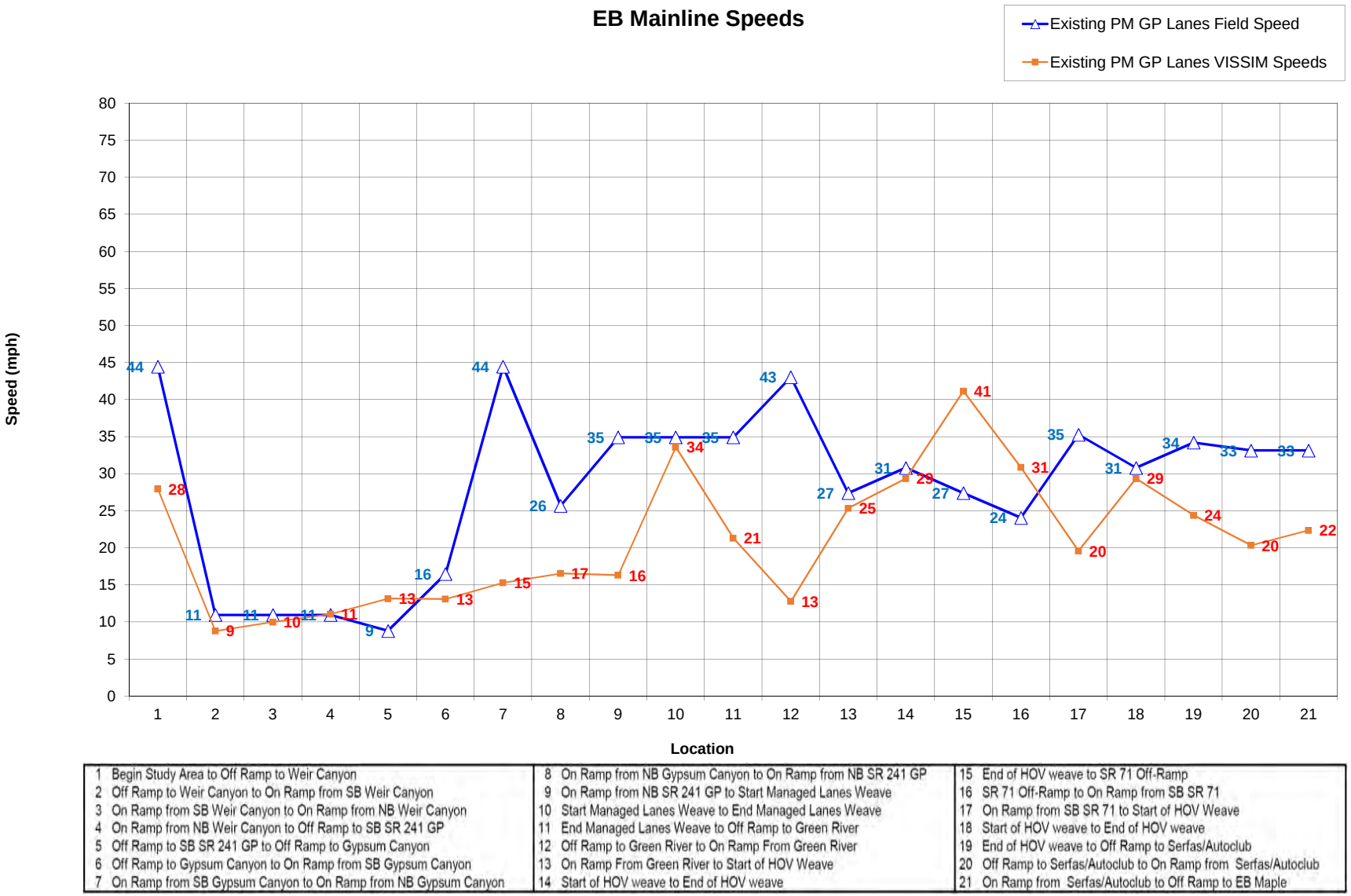
1	Begin Study Area to Off Ramp to Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15	End of HOV weave to SR 71 Off-Ramp
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16	SR 71 Off-Ramp to On Ramp from SB SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10	Start Managed Lanes Weave to End Managed Lanes Weave	17	On Ramp from SB SR 71 to Start of HOV Weave
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11	End Managed Lanes Weave to Off Ramp to Green River	18	Start of HOV weave to End of HOV weave
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	19	End of HOV weave to Off Ramp to Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13	On Ramp From Green River to Start of HOV Weave	20	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14	Start of HOV weave to End of HOV weave	21	On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

Charts 5-6 PM-Calibration

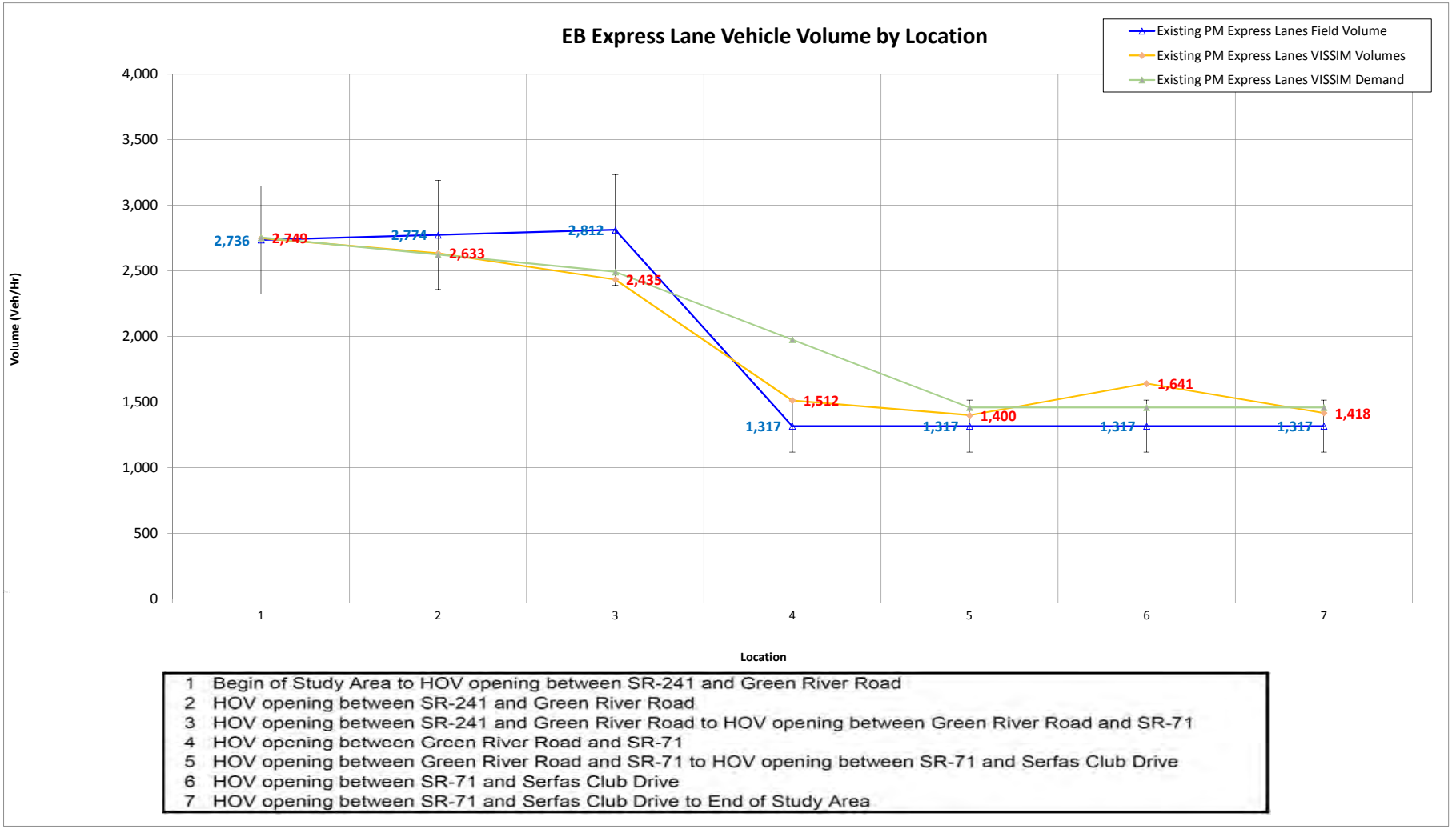


Charts 5-6 PM-Calibration

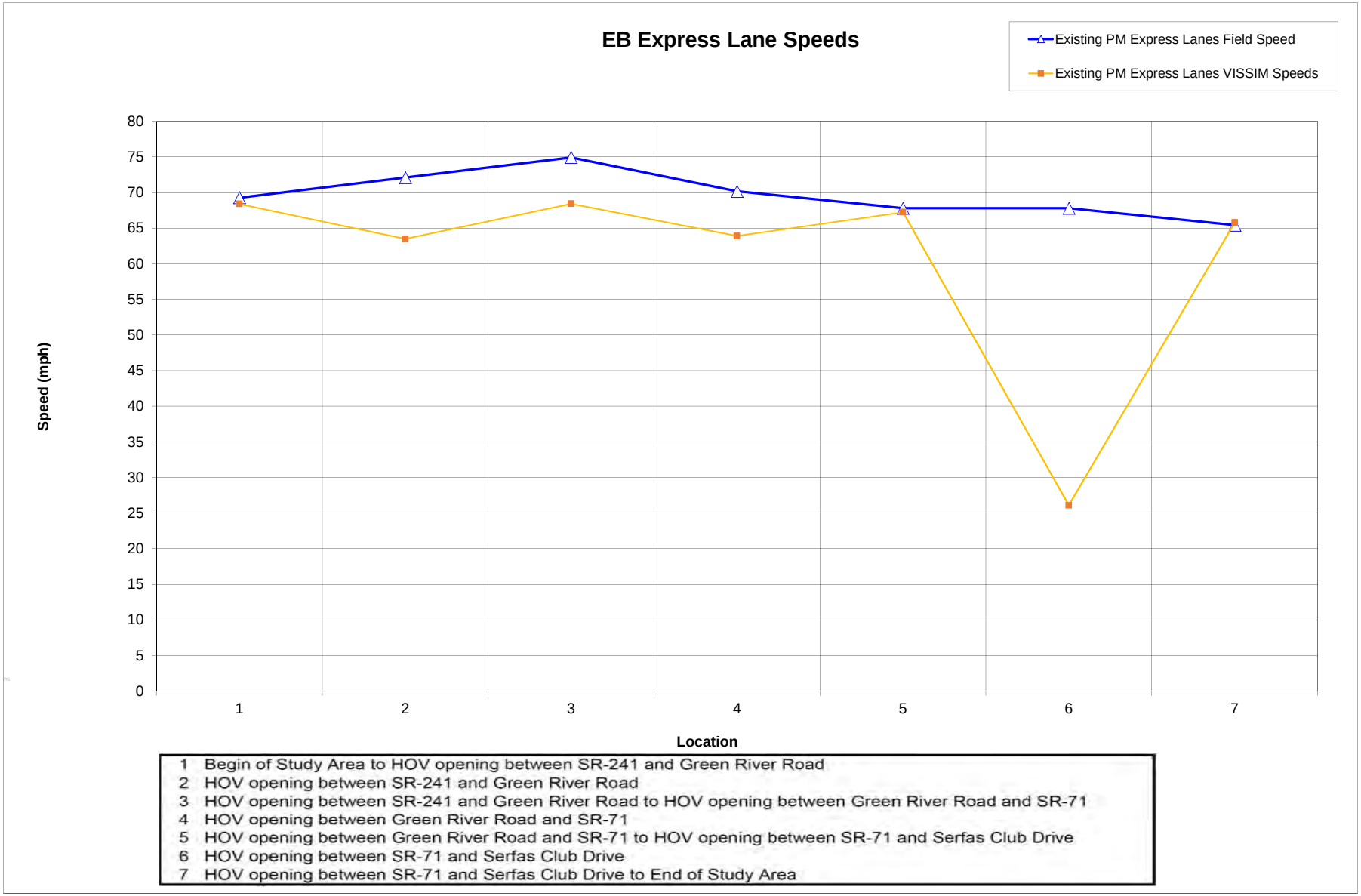
EB Mainline Speeds



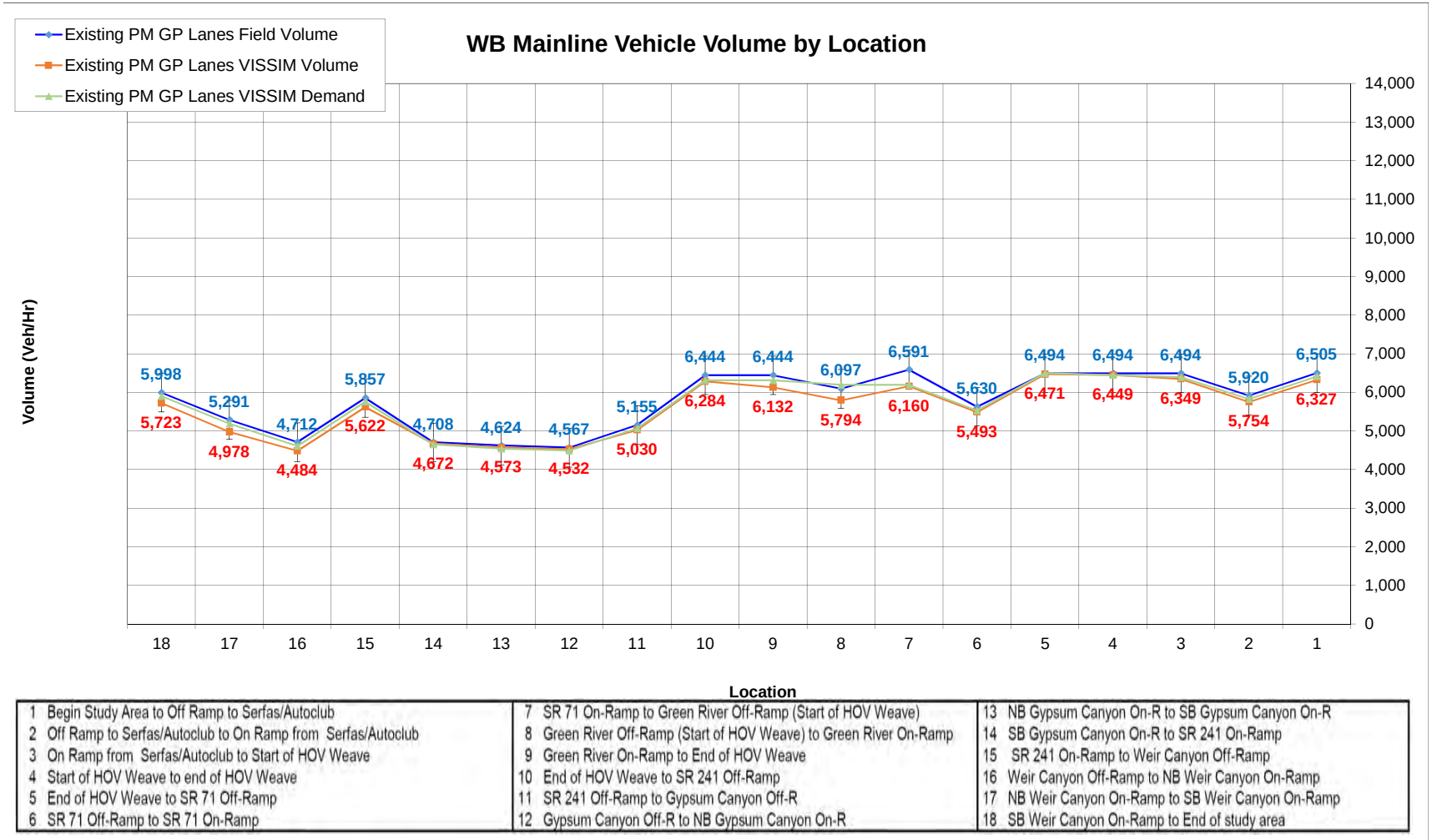
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple



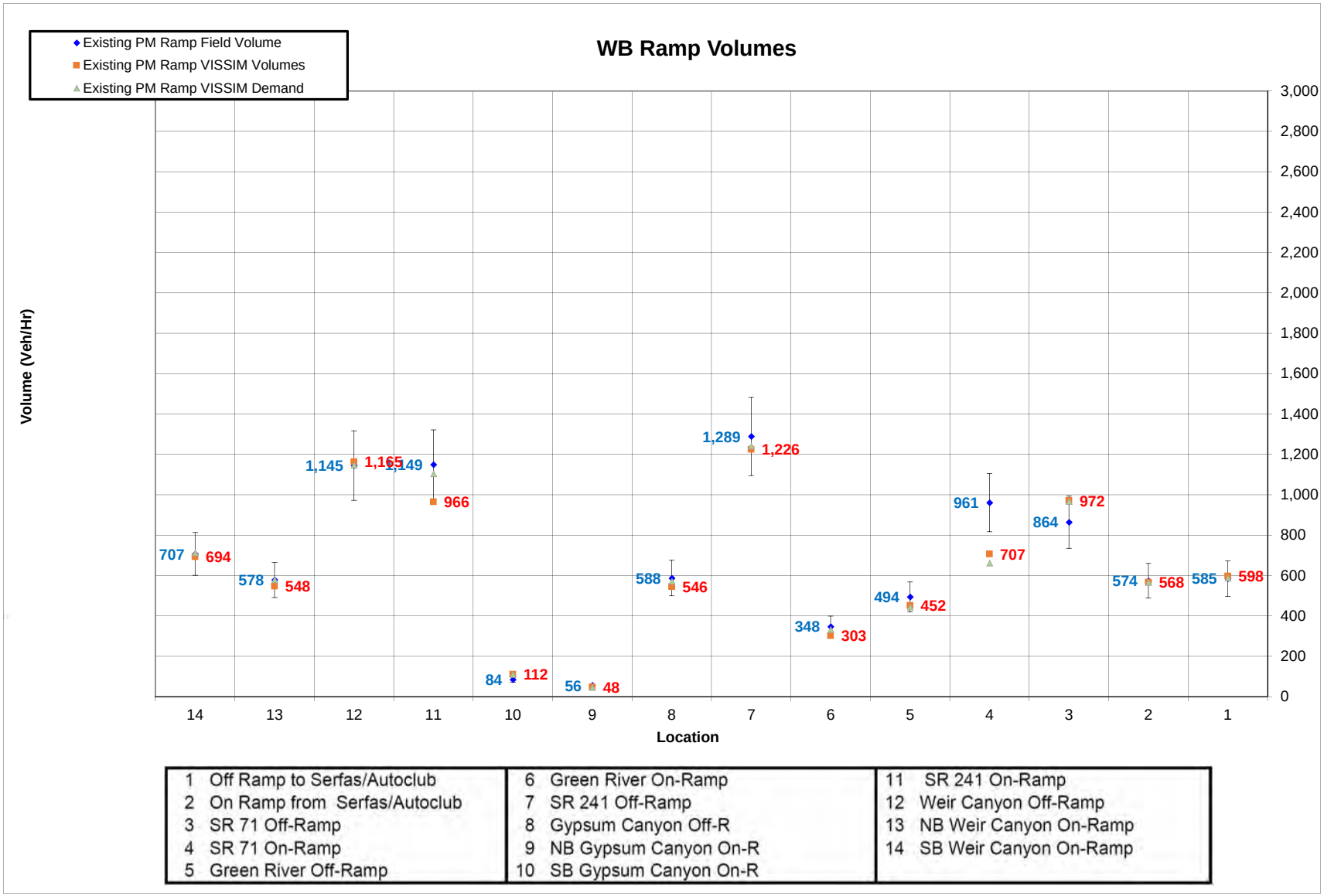
Charts 5-6 PM-Calibration



Charts 5-6 PM-Calibration

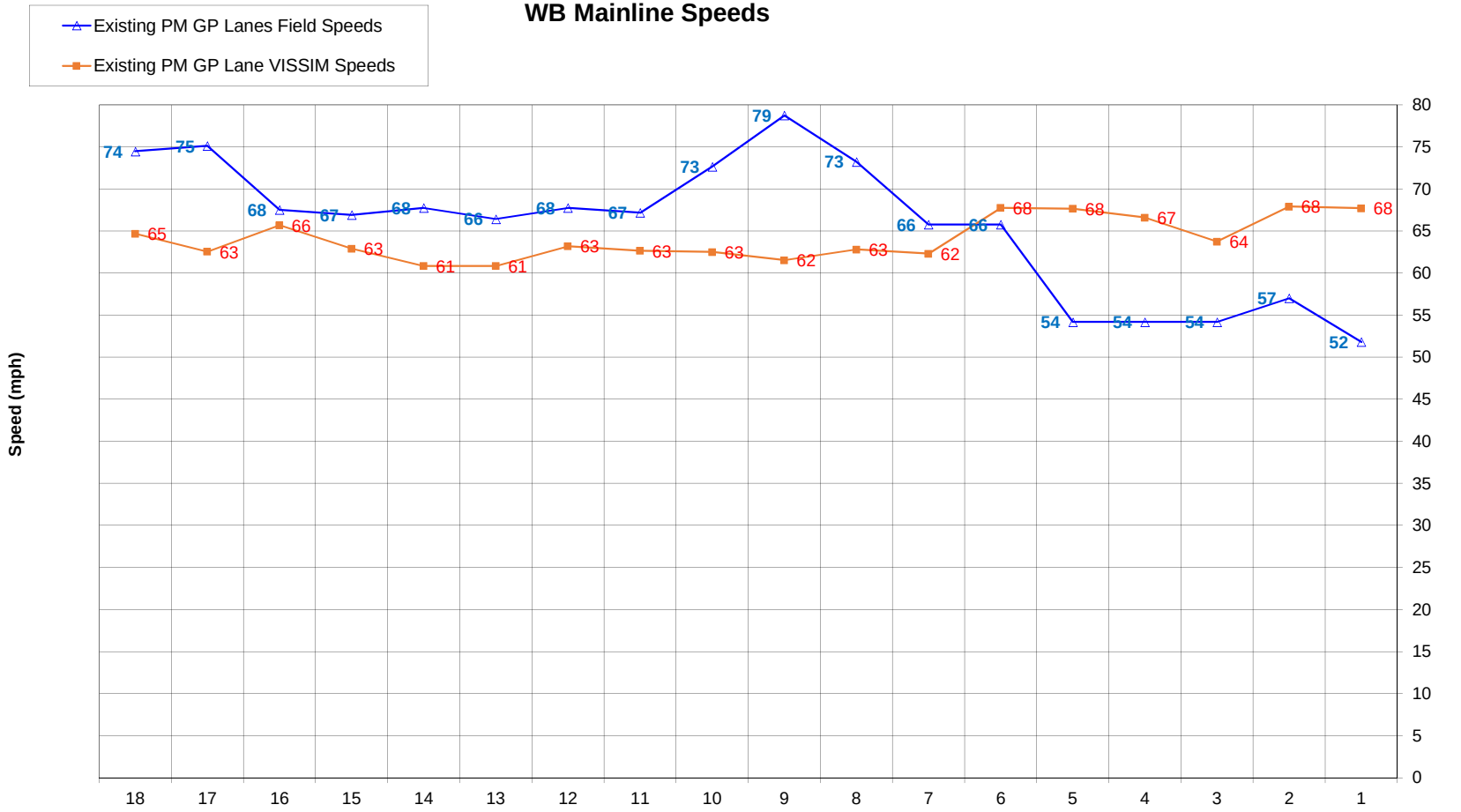


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

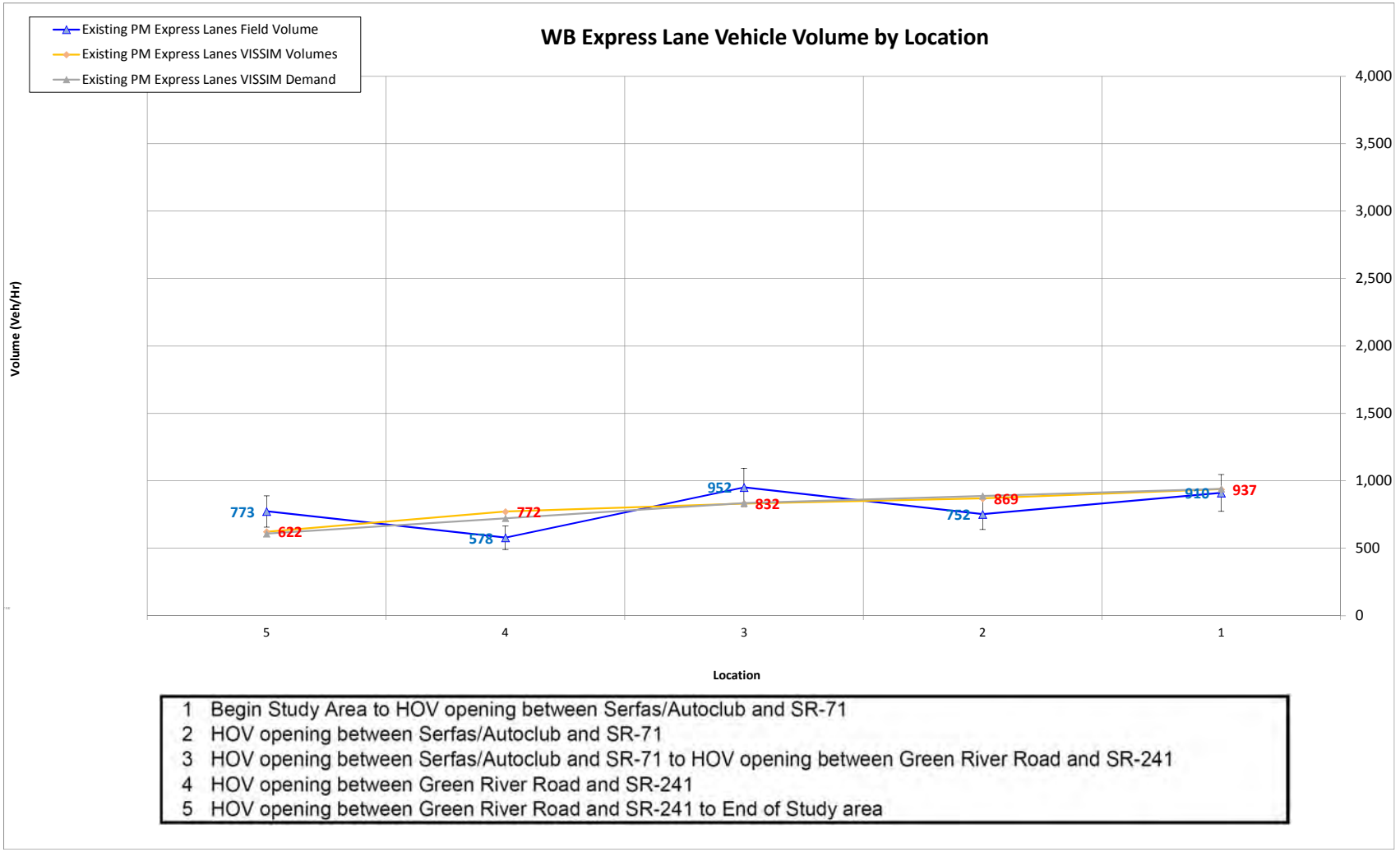


Charts 5-6 PM-Calibration

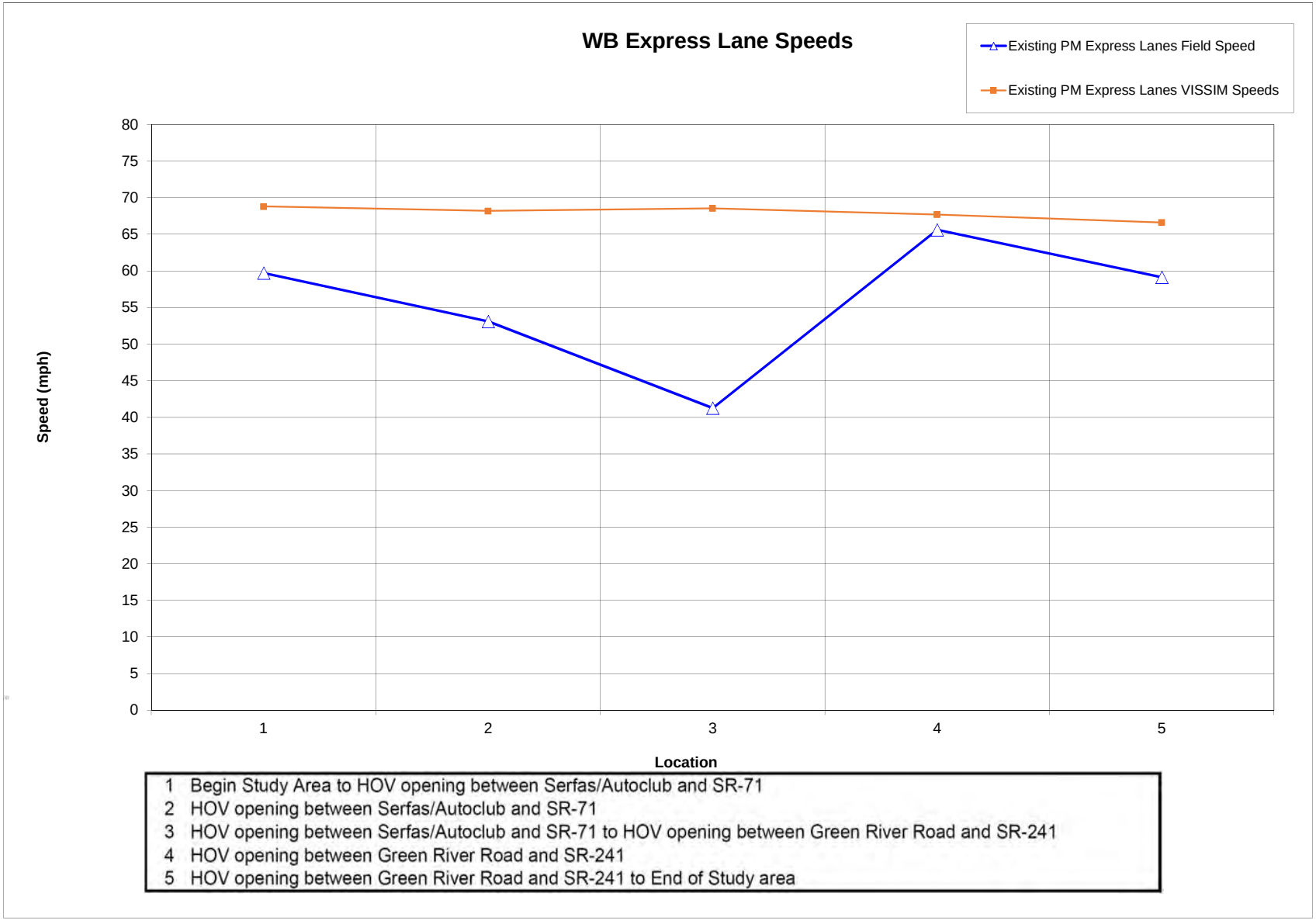
WB Mainline Speeds



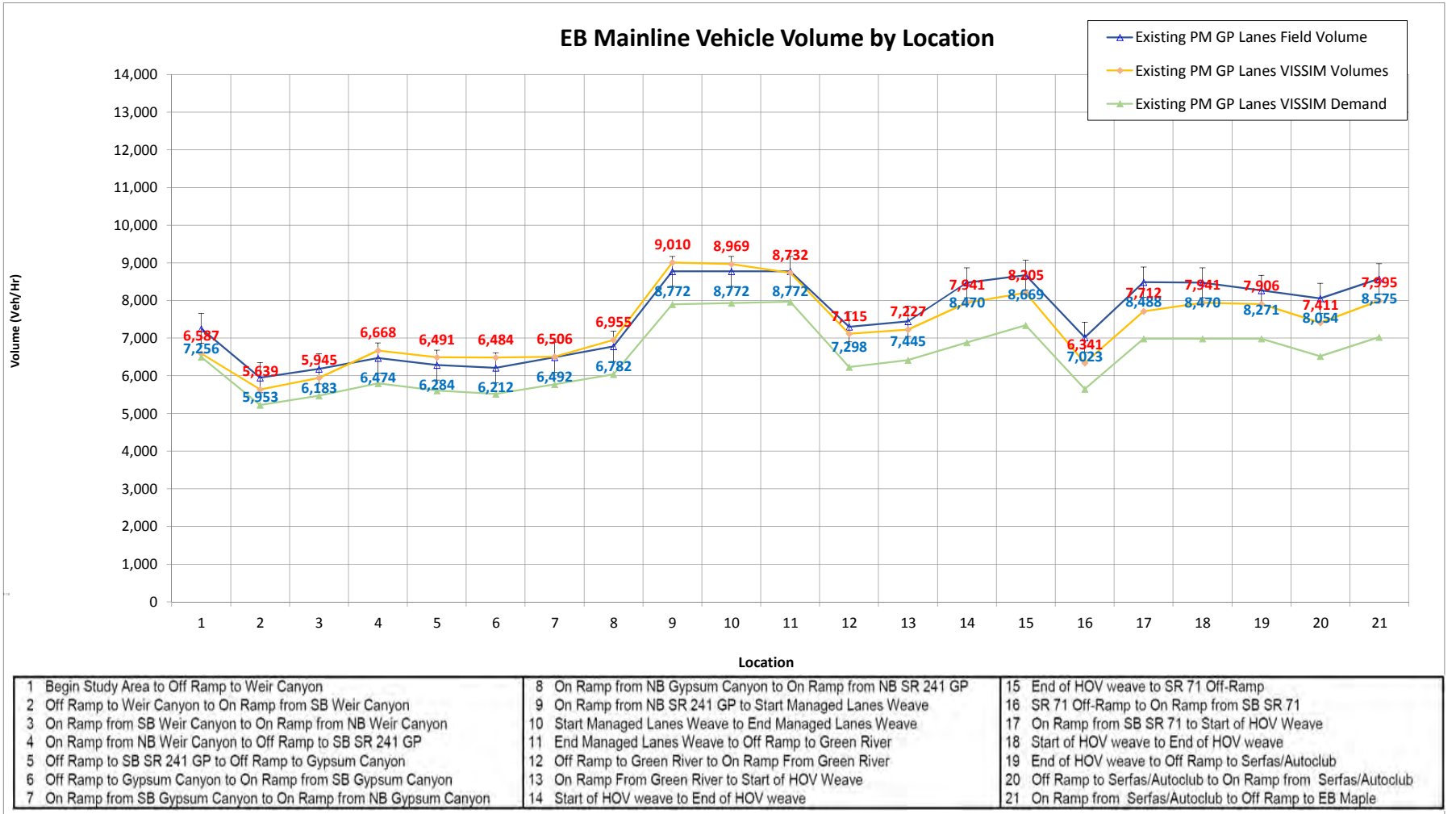
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area



Charts 5-6 PM-Calibration

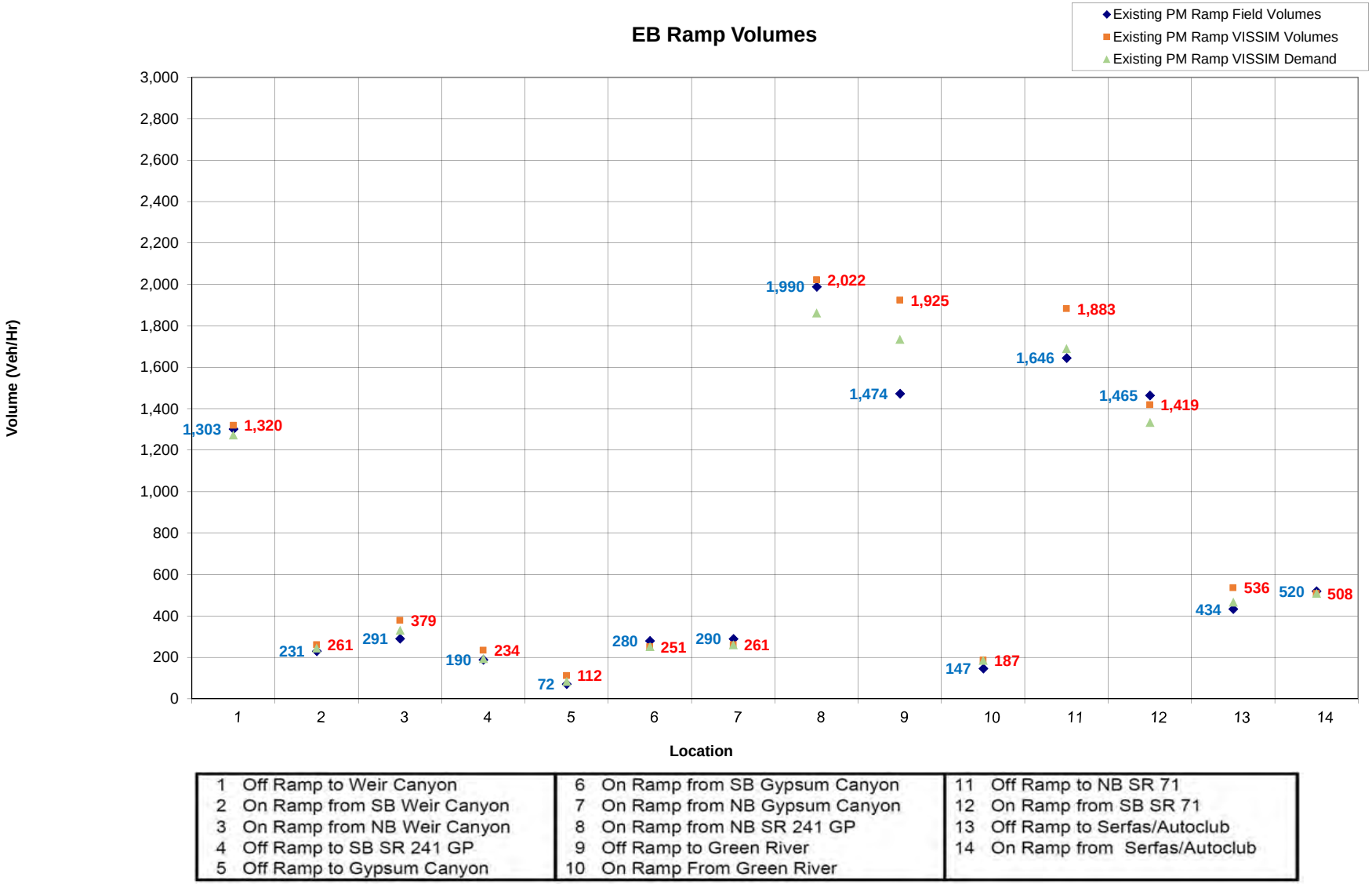


Charts 5-6 PM-Calibration



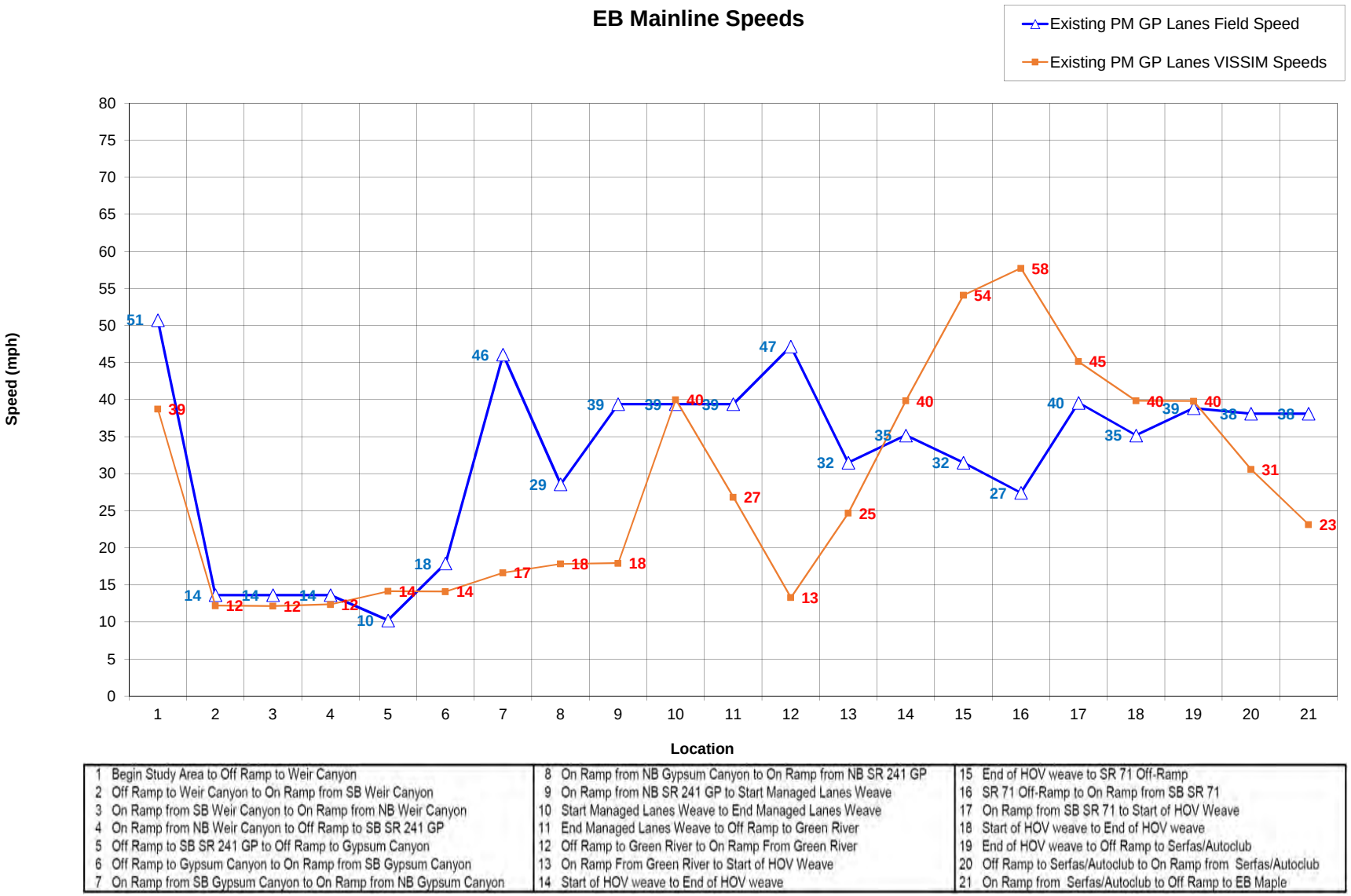
1	Begin Study Area to Off Ramp to Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15	End of HOV weave to SR 71 Off-Ramp
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16	SR 71 Off-Ramp to On Ramp from SB SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10	Start Managed Lanes Weave to End Managed Lanes Weave	17	On Ramp from SB SR 71 to Start of HOV Weave
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11	End Managed Lanes Weave to Off Ramp to Green River	18	Start of HOV weave to End of HOV weave
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	19	End of HOV weave to Off Ramp to Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13	On Ramp From Green River to Start of HOV Weave	20	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14	Start of HOV weave to End of HOV weave	21	On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

Charts 6-7 PM-Calibration



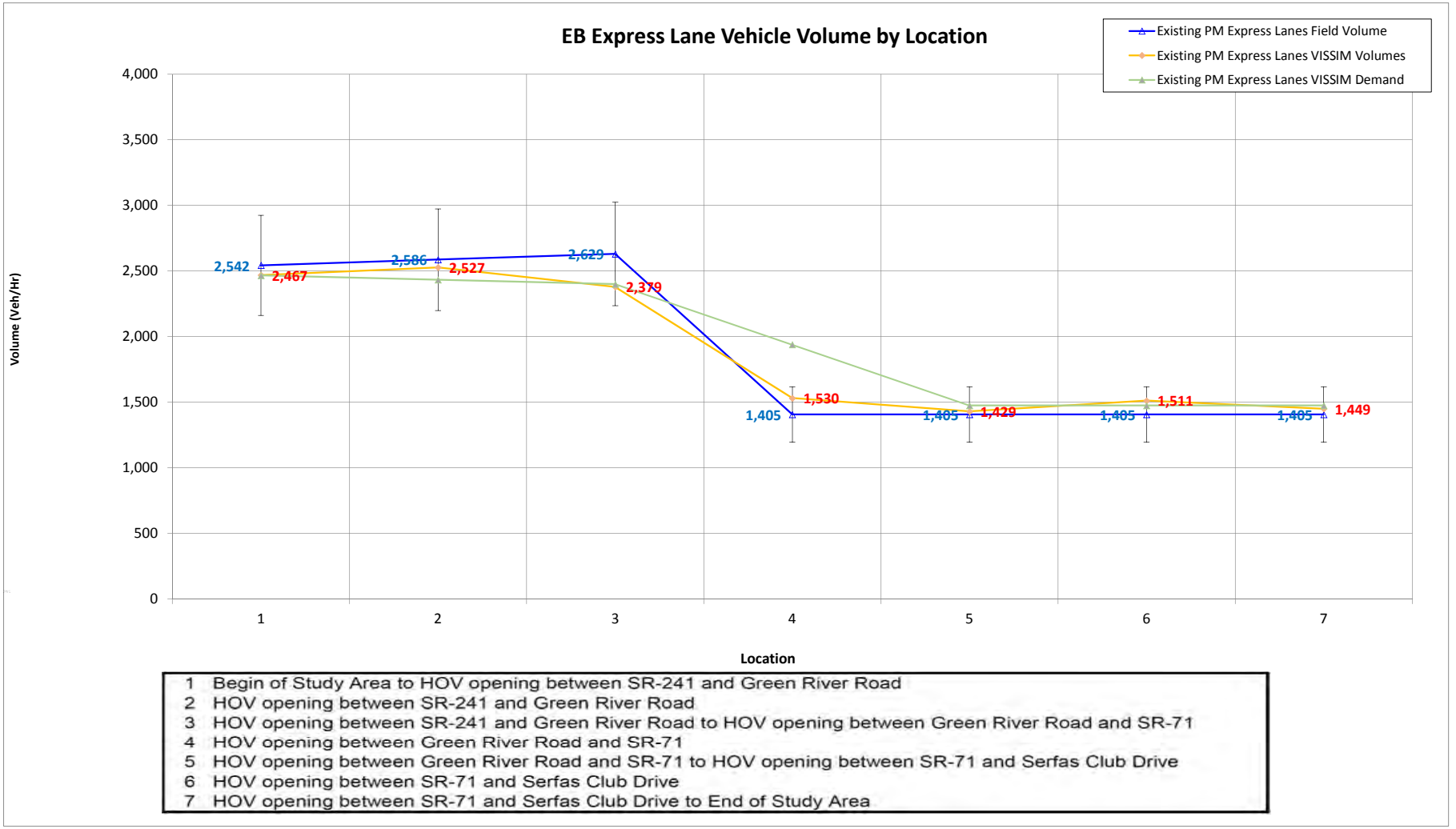
Charts 6-7 PM-Calibration

EB Mainline Speeds

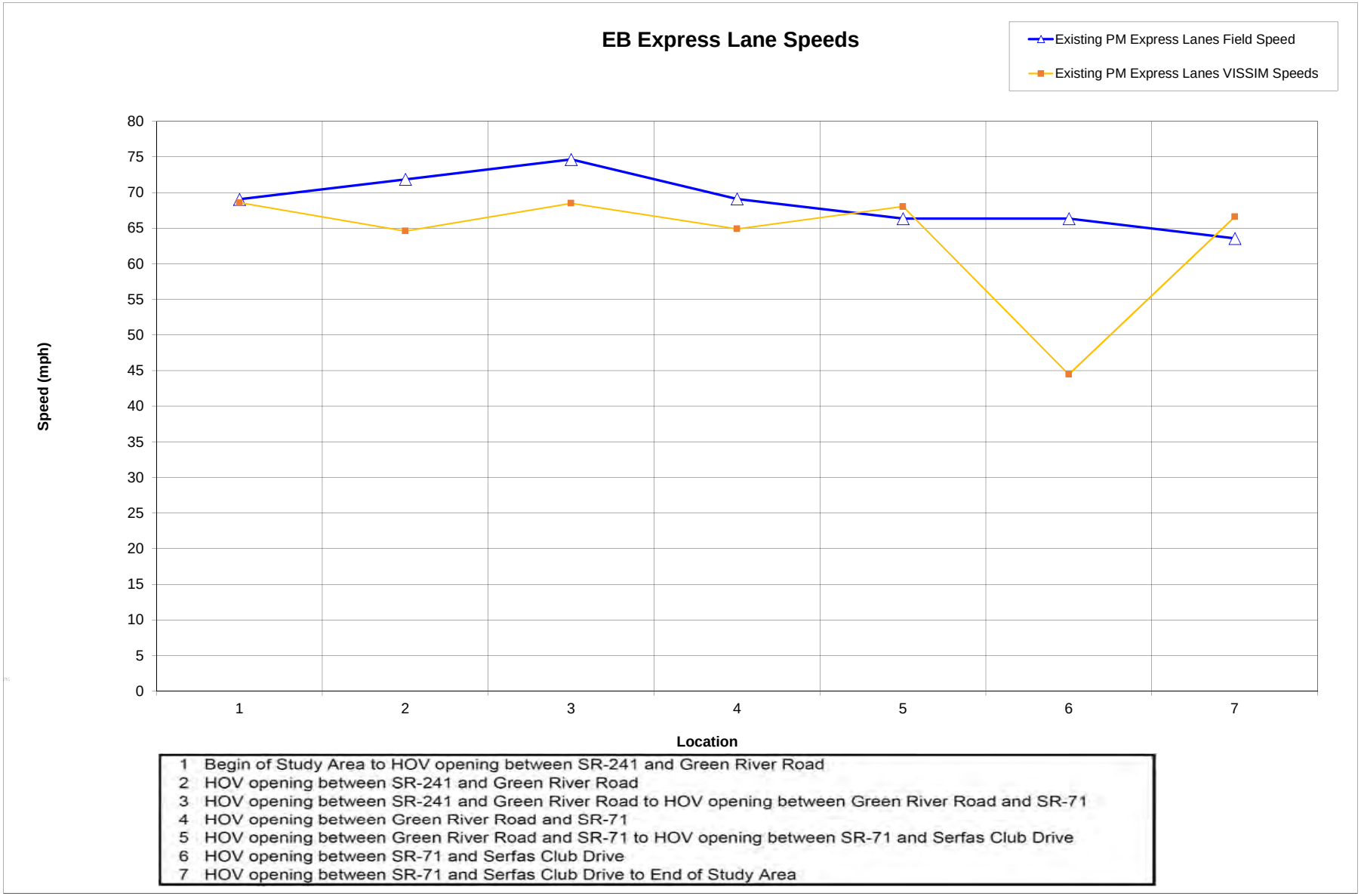


1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

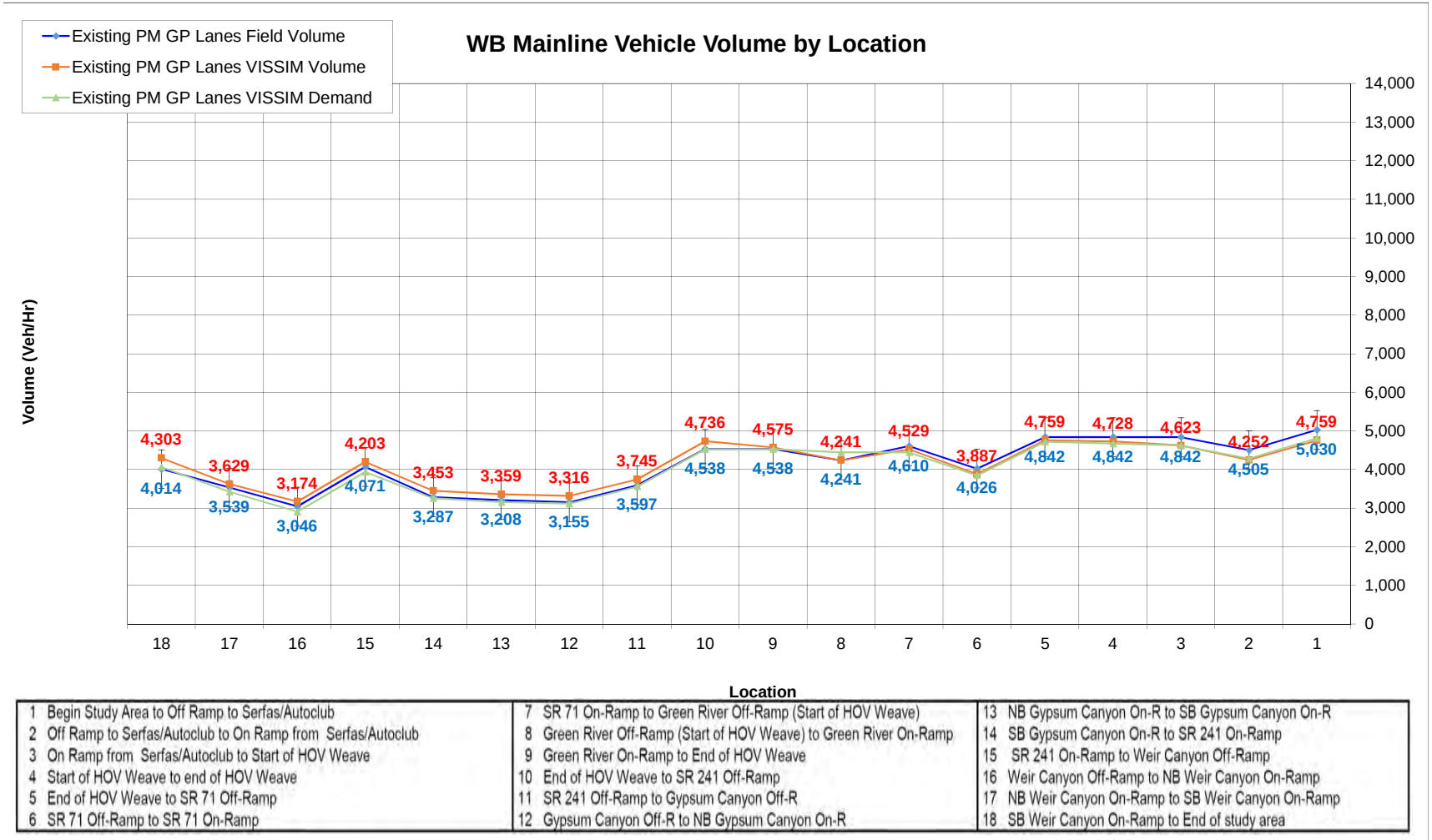
Charts 6-7 PM-Calibration



Charts 6-7 PM-Calibration

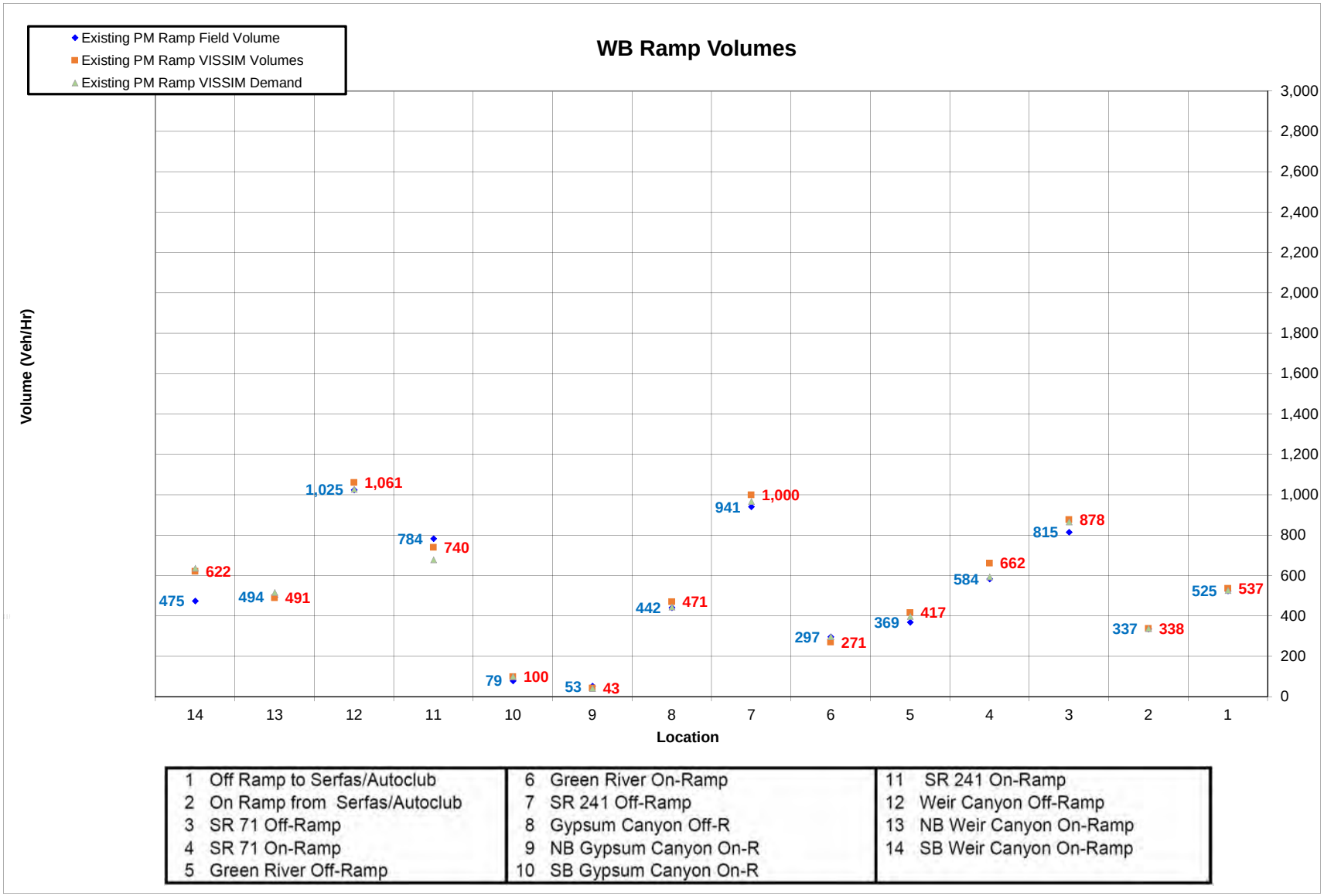


Charts 6-7 PM-Calibration

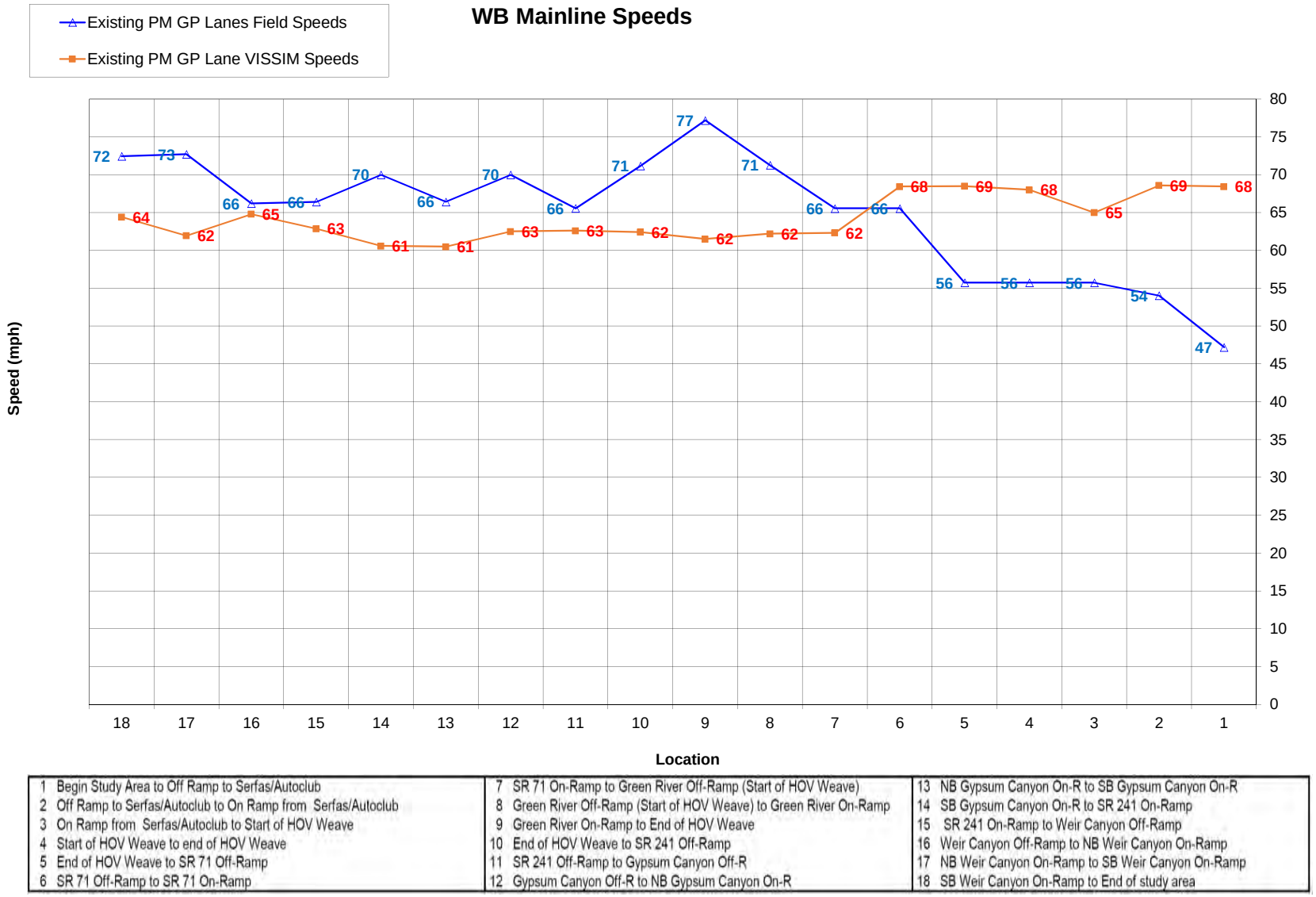


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

Charts 6-7 PM-Calibration

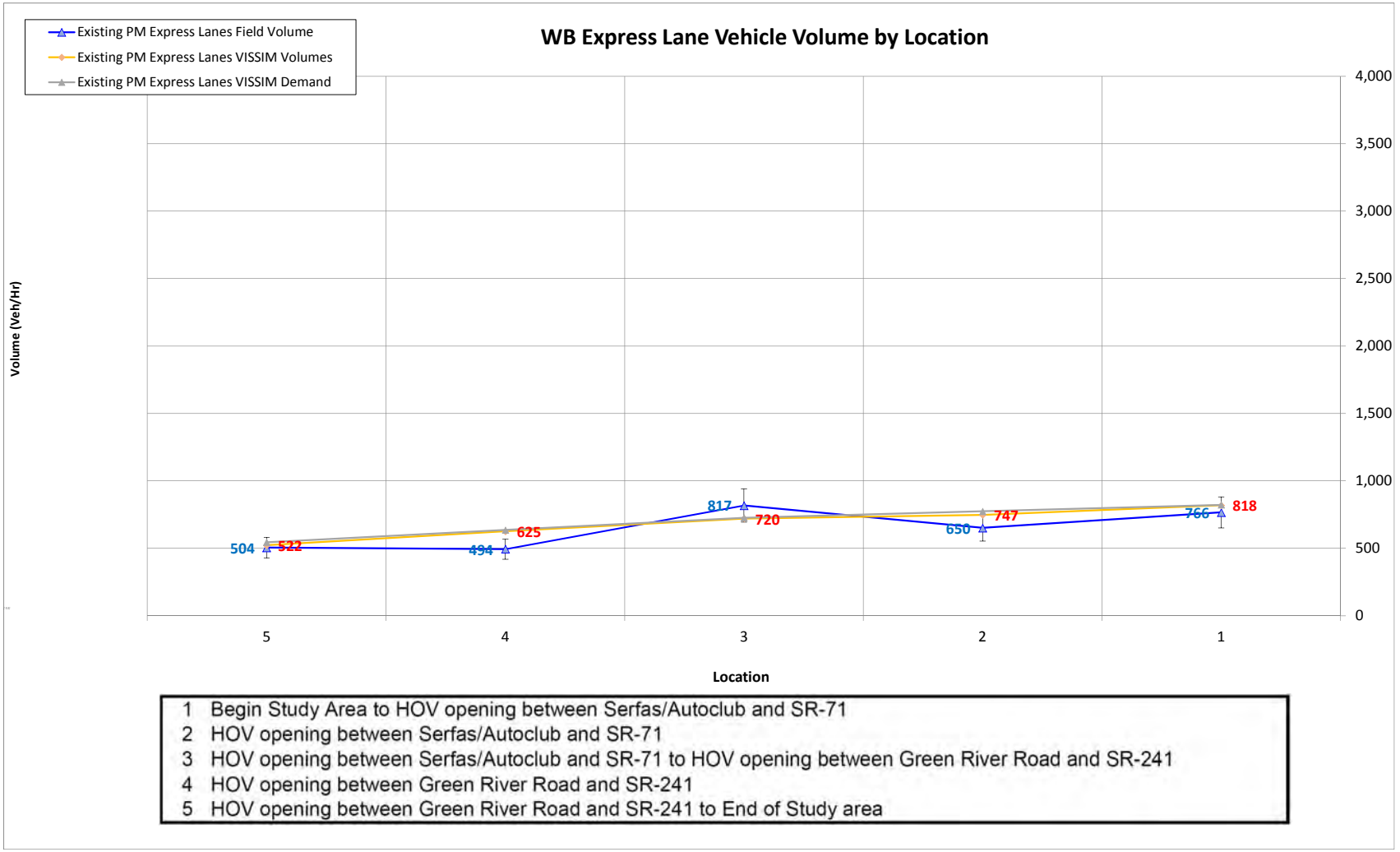


Charts 6-7 PM-Calibration

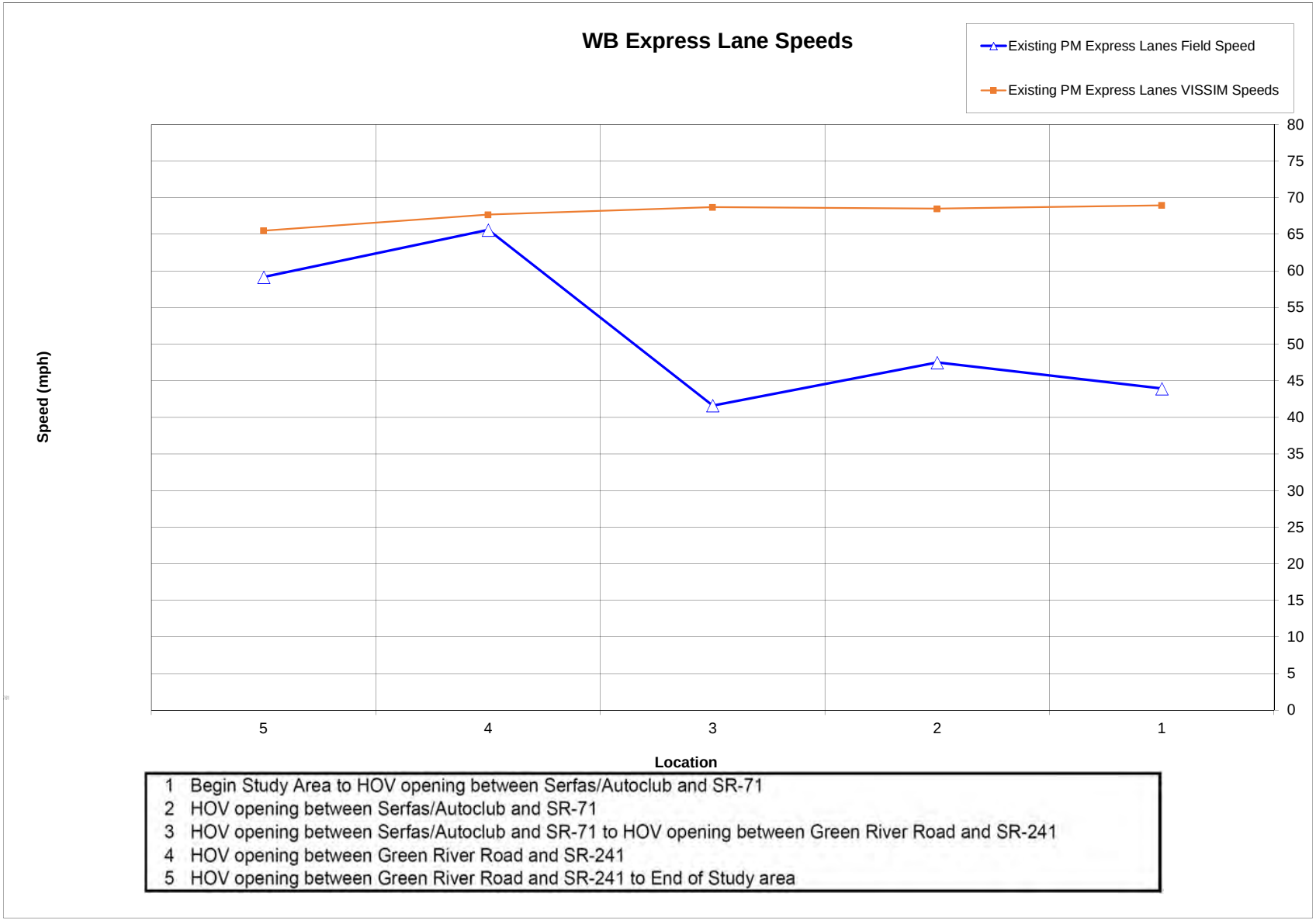


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

Charts 6-7 PM-Calibration



Charts 6-7 PM-Calibration



Charts 6-7 PM-Calibration

Appendix C

VISSIM Summary of Results
2017 No Build Conditions

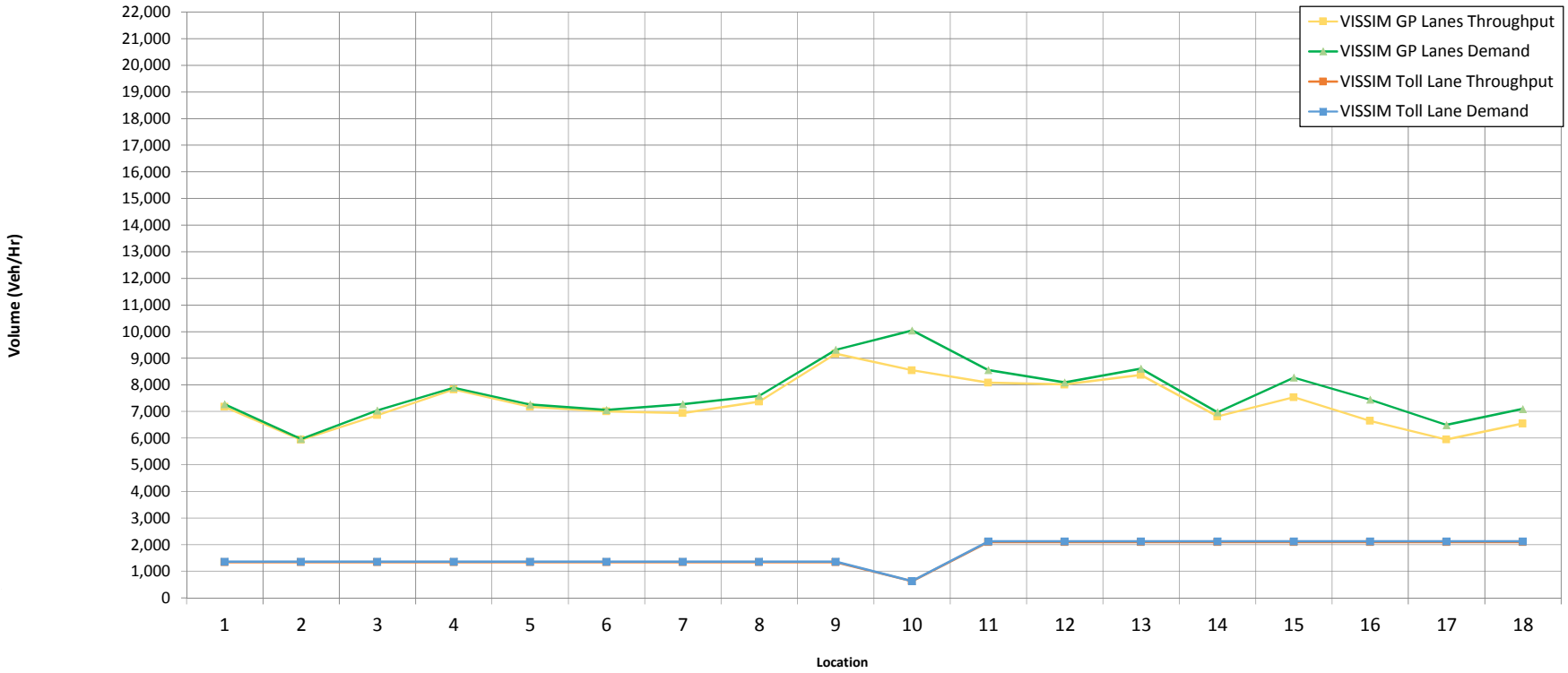
SR-91/241
Vissim Model Summary - 2017 No Build - AM Peak Period
Network Summary Statistics

Parameter			2017 No Project		Difference
Total Vehicle Demand (4 Hr)			100,741		
Total number of vehicles that did not reach their desitination			9,016		
Totla number of vehicles that have reached their destination			91,725		
Total vehicle-miles traveled (VMT)			796,551		
Total travel time, All Vehicle Types (VHT)			23,068		
Average speed [mph], All Vehicle Types			34.5		
Average delay time per vehicle [mins], All Vehicle Types			6.83		

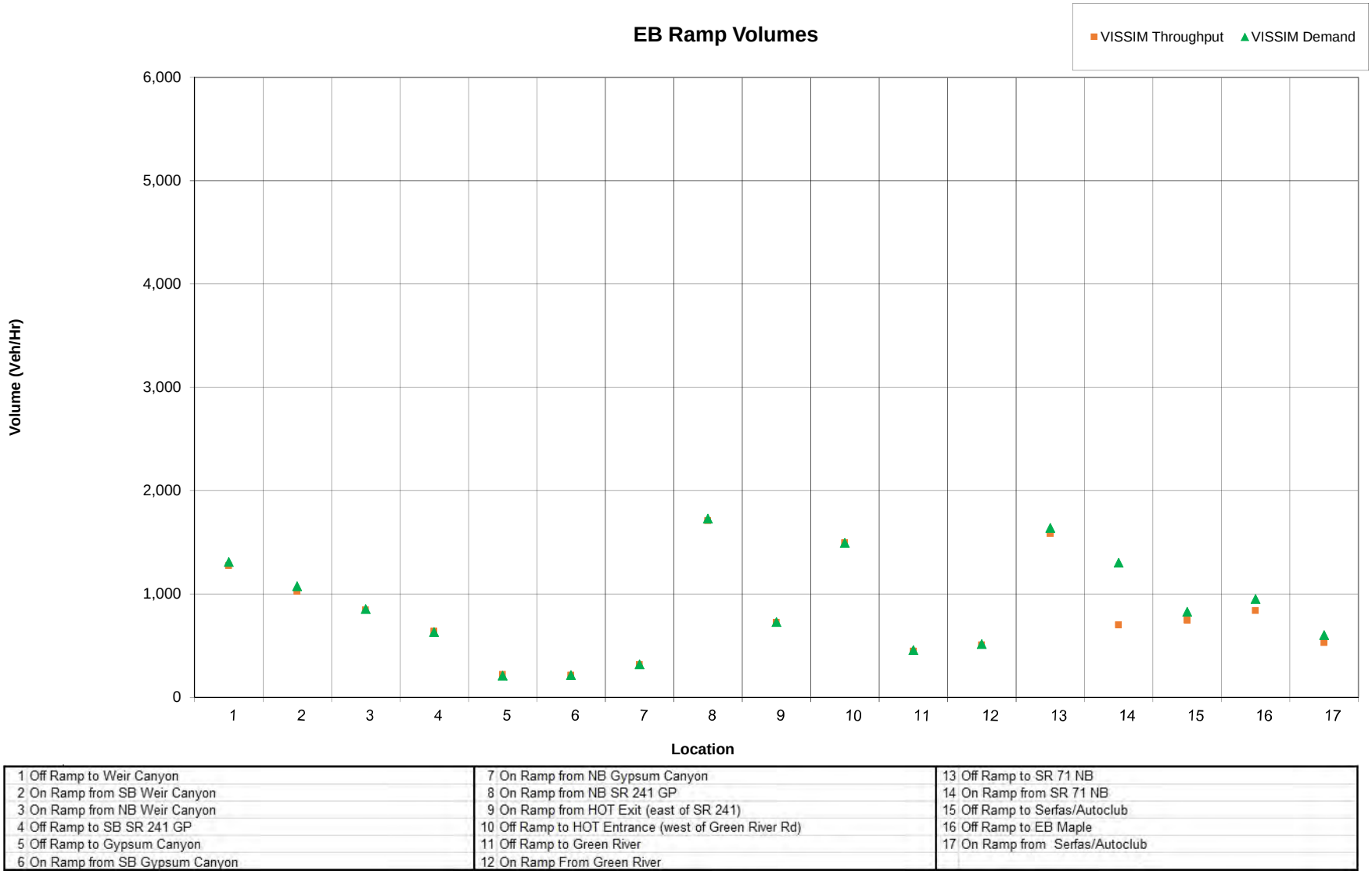
SR-91/241
Vissim Model Summary - 2017 No Build - AM Peak Period
Travel Time Results

#	Origin	#	Destination	p Key	Hide Travel Time Seg 1	Seg 2	Seg 3	2017 AM No Build VISSIM Travel Time 6-7 AM	7-8 AM	7-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	8.6	8.7	8.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	8.6	8.6	8.6
		5	SR 241 SB south of SR 91	3	1001			7.1	7.2	7.2
		7	SR 71 NB north of SR 91	4	1002	1003	1004	11.0	11.1	11.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.5	8.5	8.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.4	8.4	8.4
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.9	10.9	10.9
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	23.1	24.8	24.1
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	23.0	24.7	24.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	25.4	27.1	26.5
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	12	1010			12.4	13.3	12.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	12.0	12.4	12.6
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	14.4	14.8	15.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.2	7.2	7.2
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.0	11.0	11.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	10.9	10.9	10.9
		7	SR 71 NB north of SR 91	20	1007	1003	1004	13.4	13.4	13.4
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	43.0	54.1	55.9
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	42.9	54.0	55.8
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			28.7	37.2	38.3
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	45.3	56.4	58.3
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a

EB Mainline & Toll Lane Vehicle Volume by Location



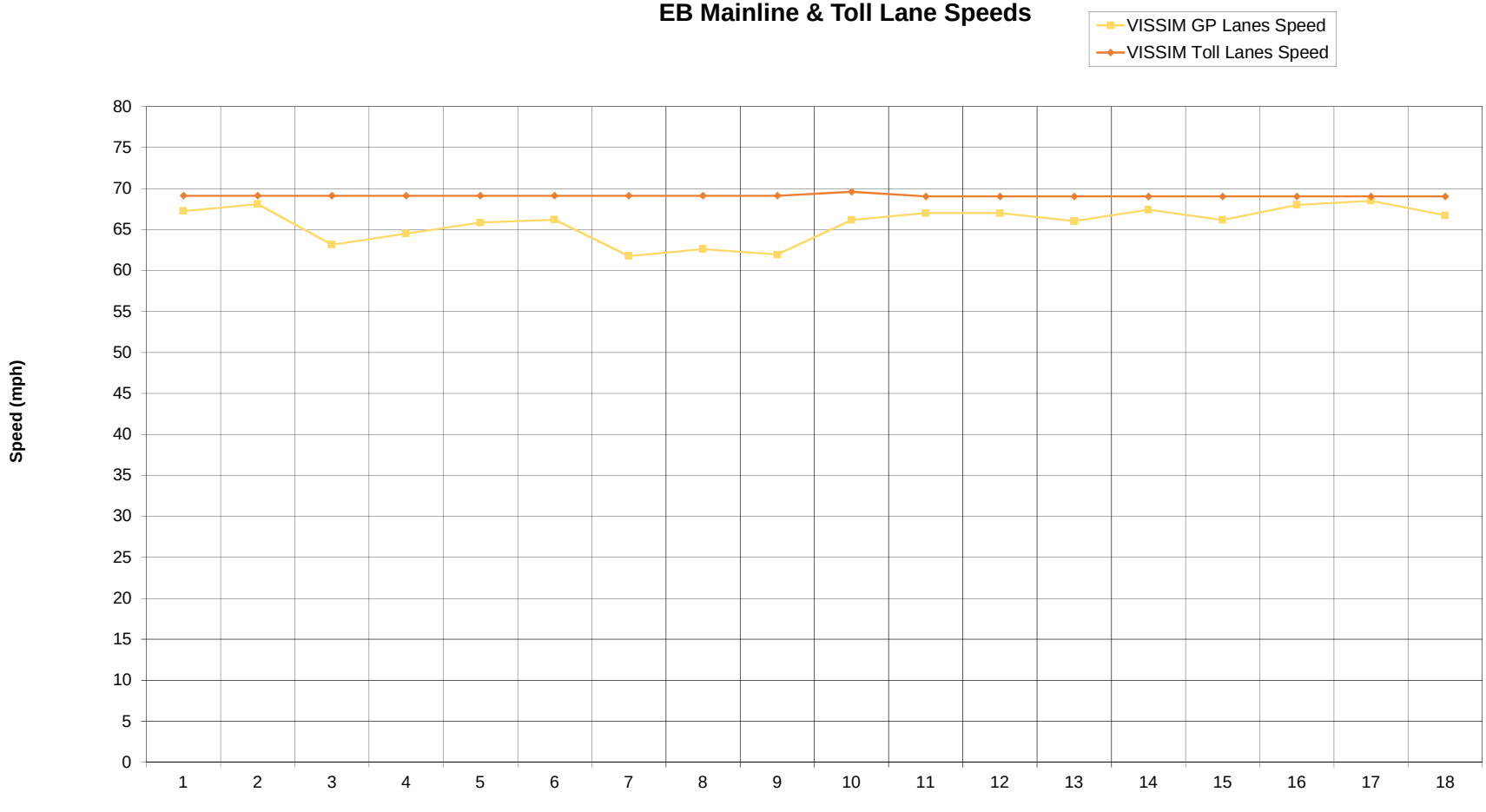
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR-71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	Managed Lanes Weave between SR 241 and Green River Rd	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	End Managed Lanes Weave to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area



1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 NB
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from SR 71 NB
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 Off Ramp to Serfas/Autoclub
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	12 On Ramp From Green River	

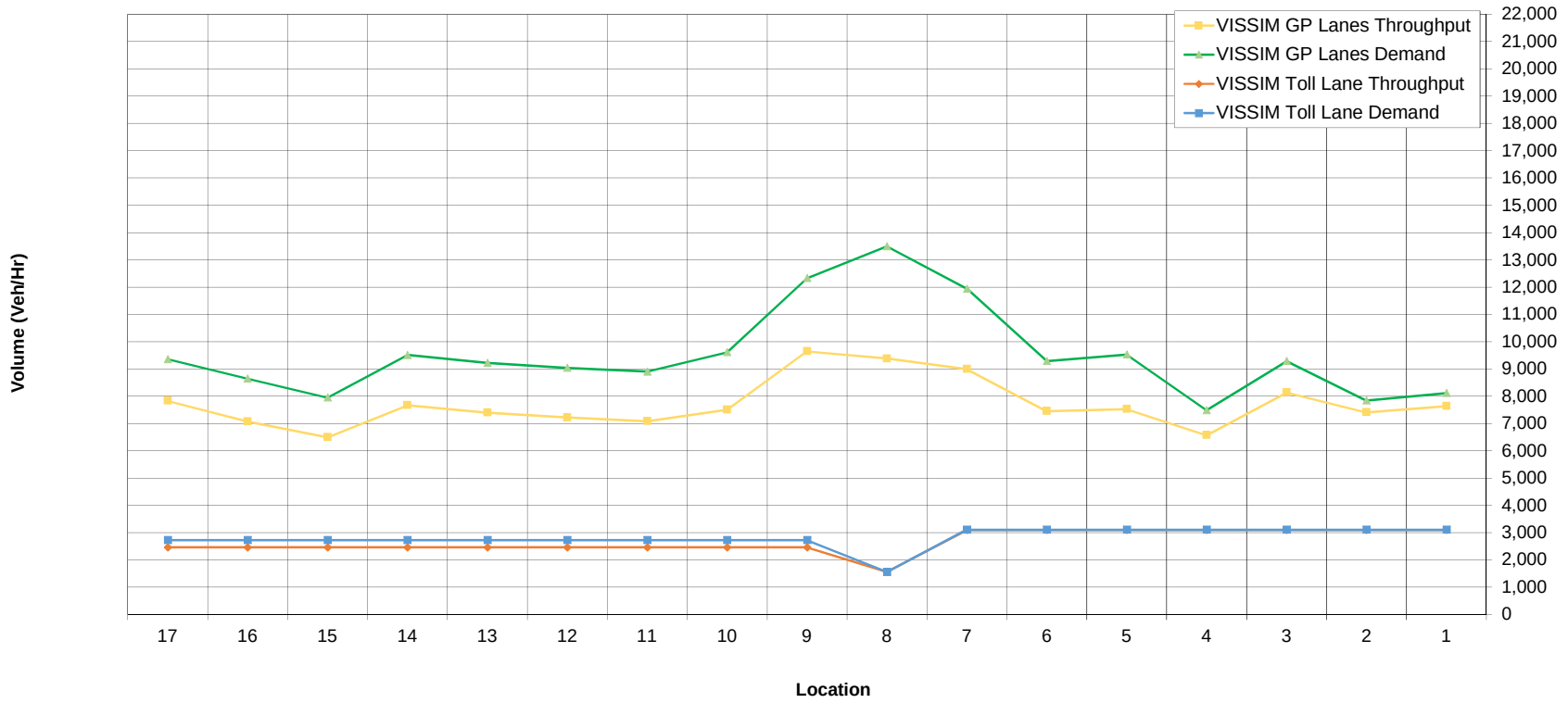
Charts 6-7 AM

EB Mainline & Toll Lane Speeds

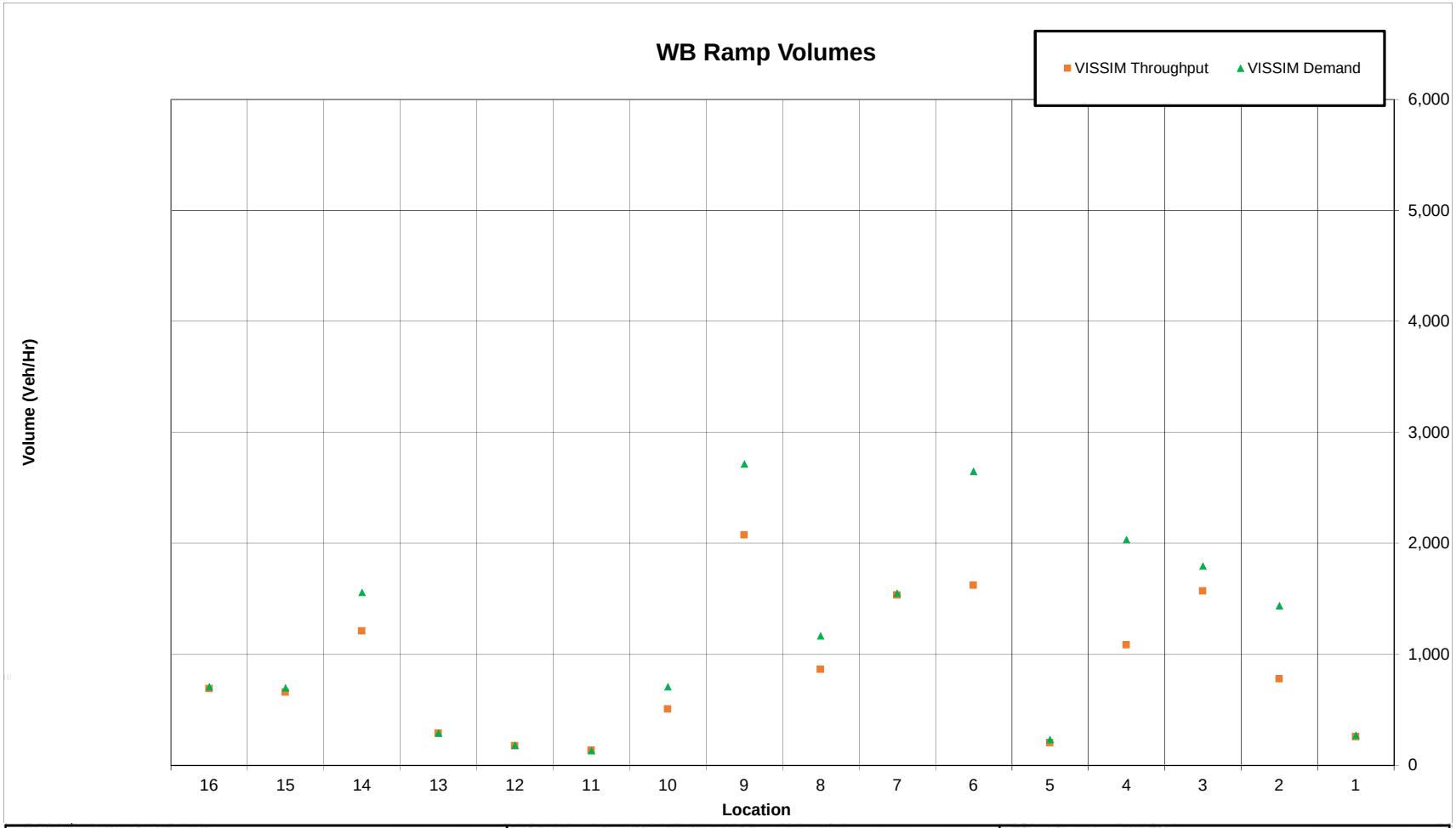


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR-71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	Managed Lanes Weave between SR 241 and Green River Rd	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	End Managed Lanes Weave to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location

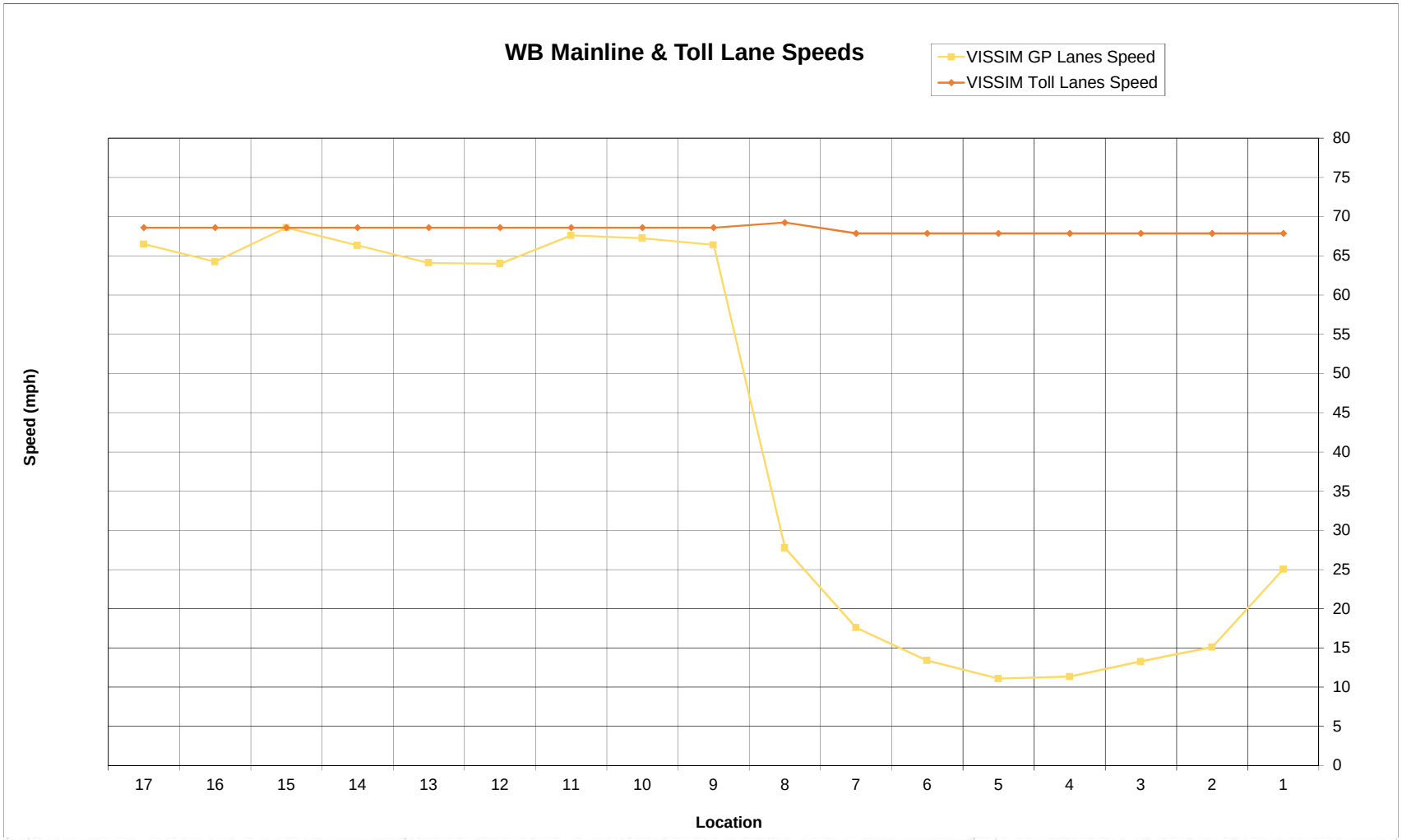


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

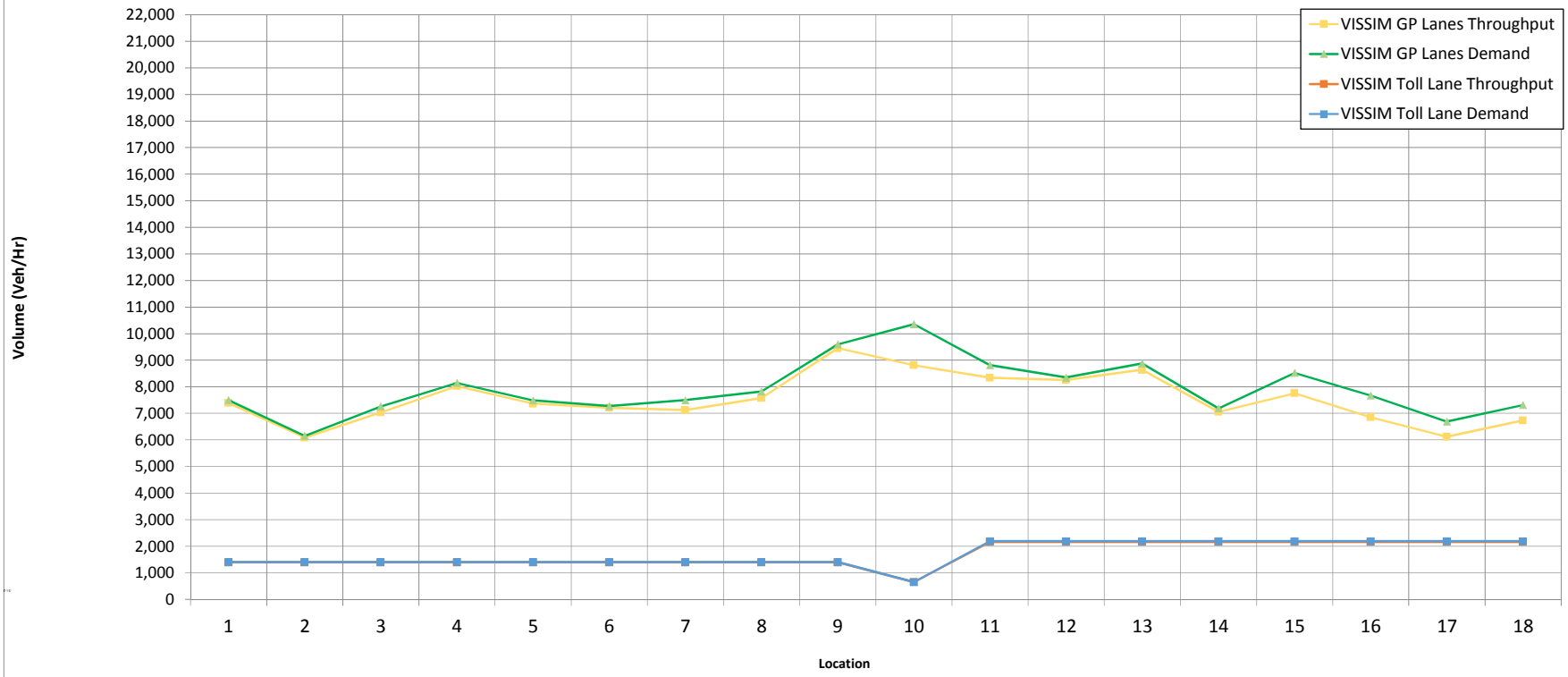
Charts 6-7 AM



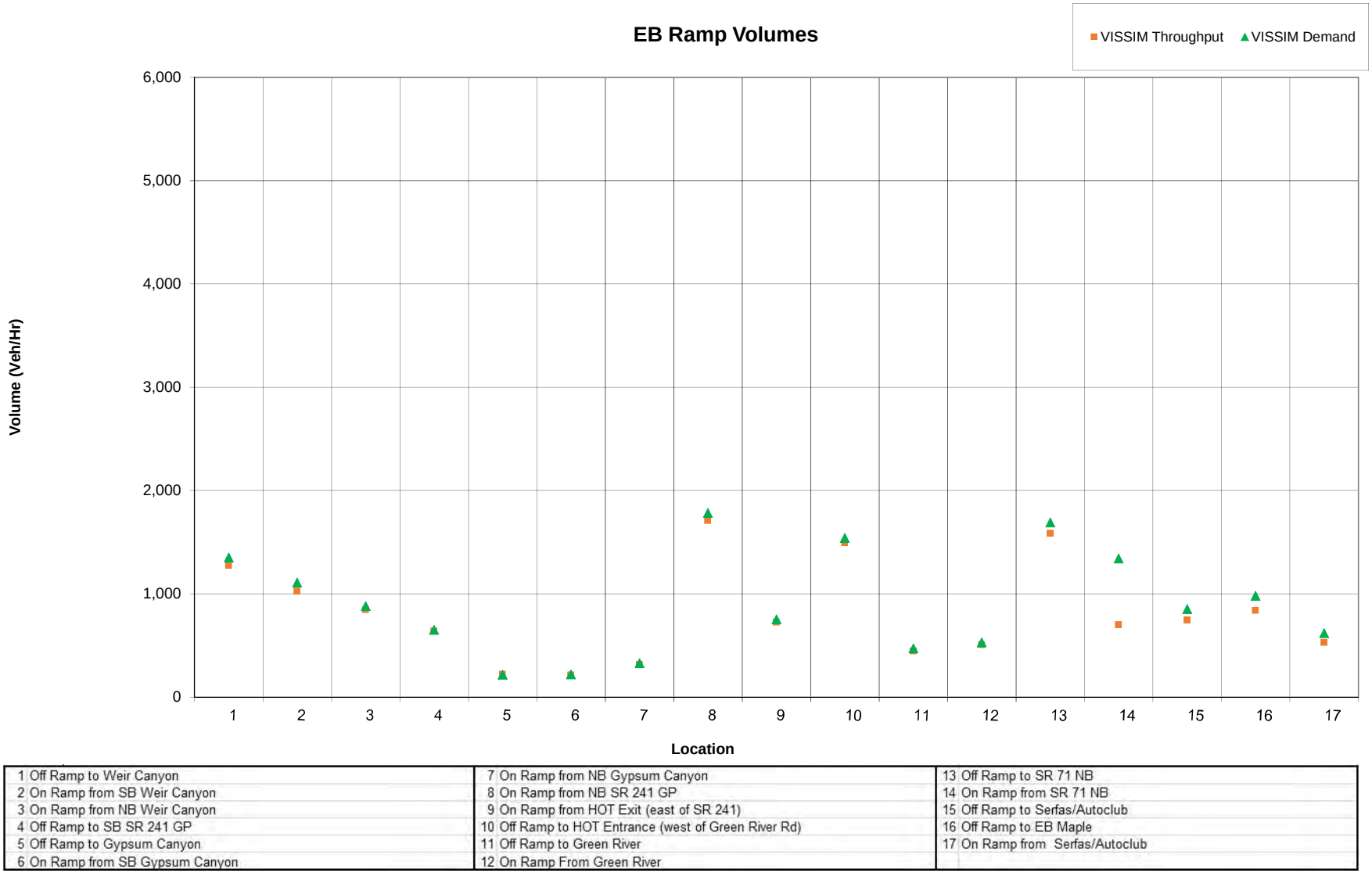
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 6-7 AM

EB Mainline & Toll Lane Vehicle Volume by Location

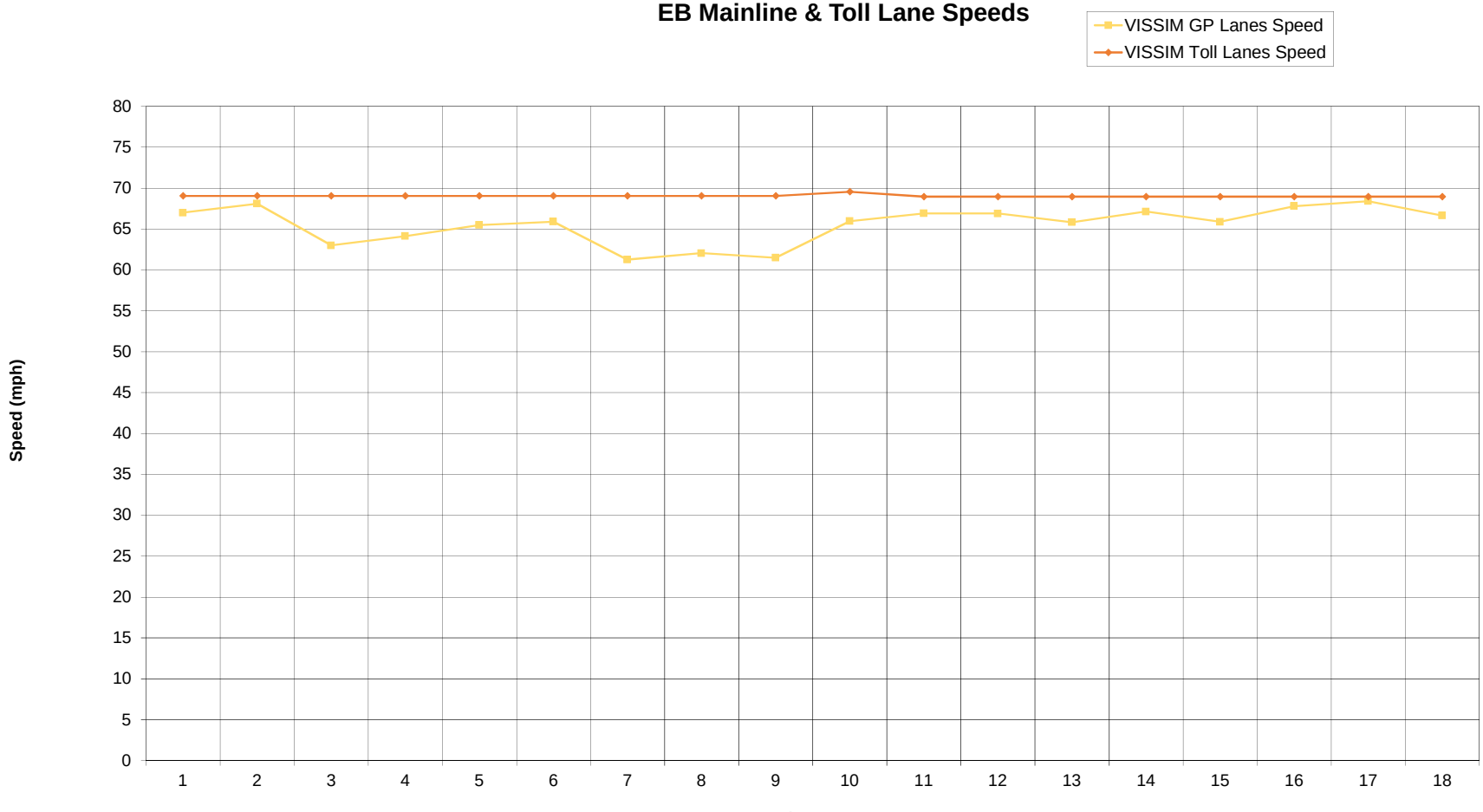


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR-71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	Managed Lanes Weave between SR 241 and Green River Rd	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	End Managed Lanes Weave to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area



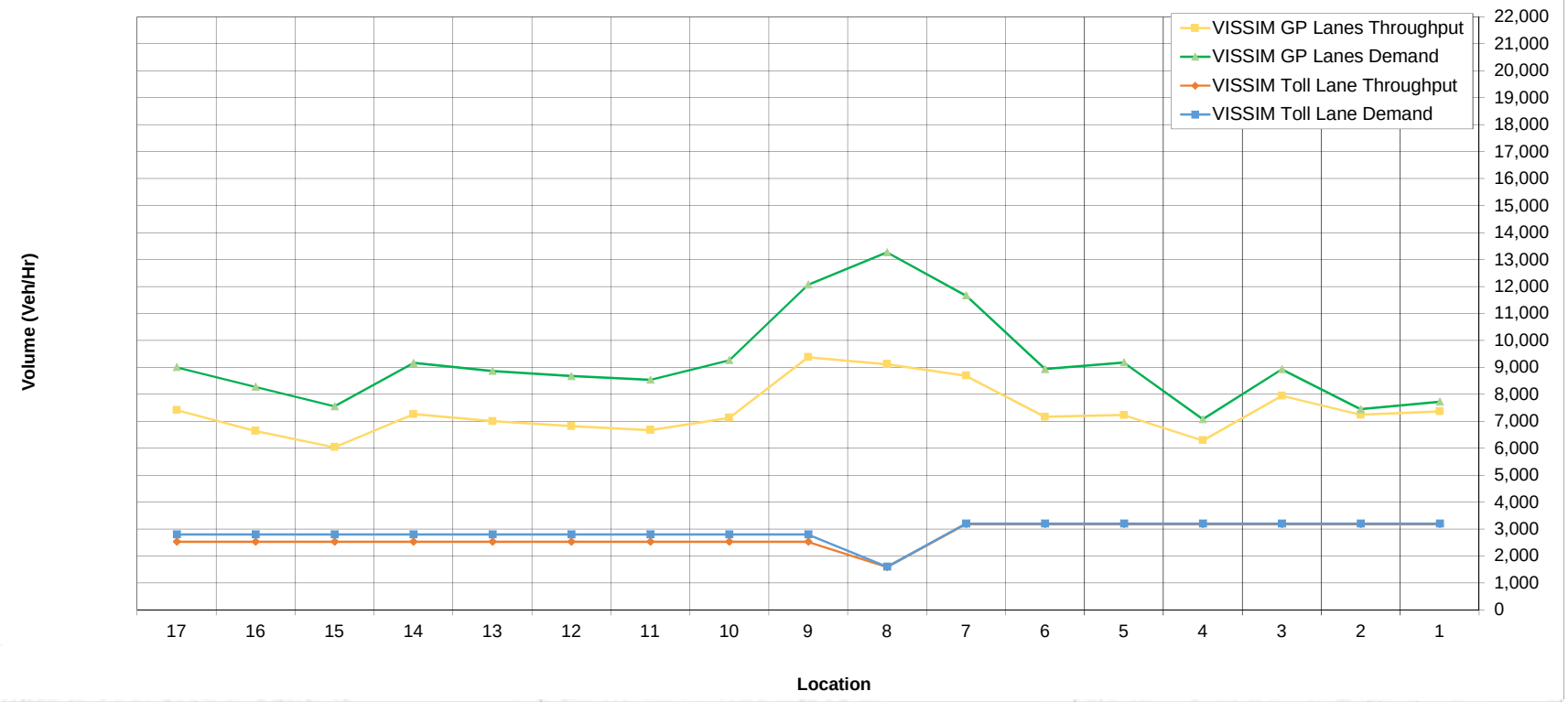
1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 NB
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from SR 71 NB
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 Off Ramp to Serfas/Autoclub
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	12 On Ramp From Green River	

EB Mainline & Toll Lane Speeds

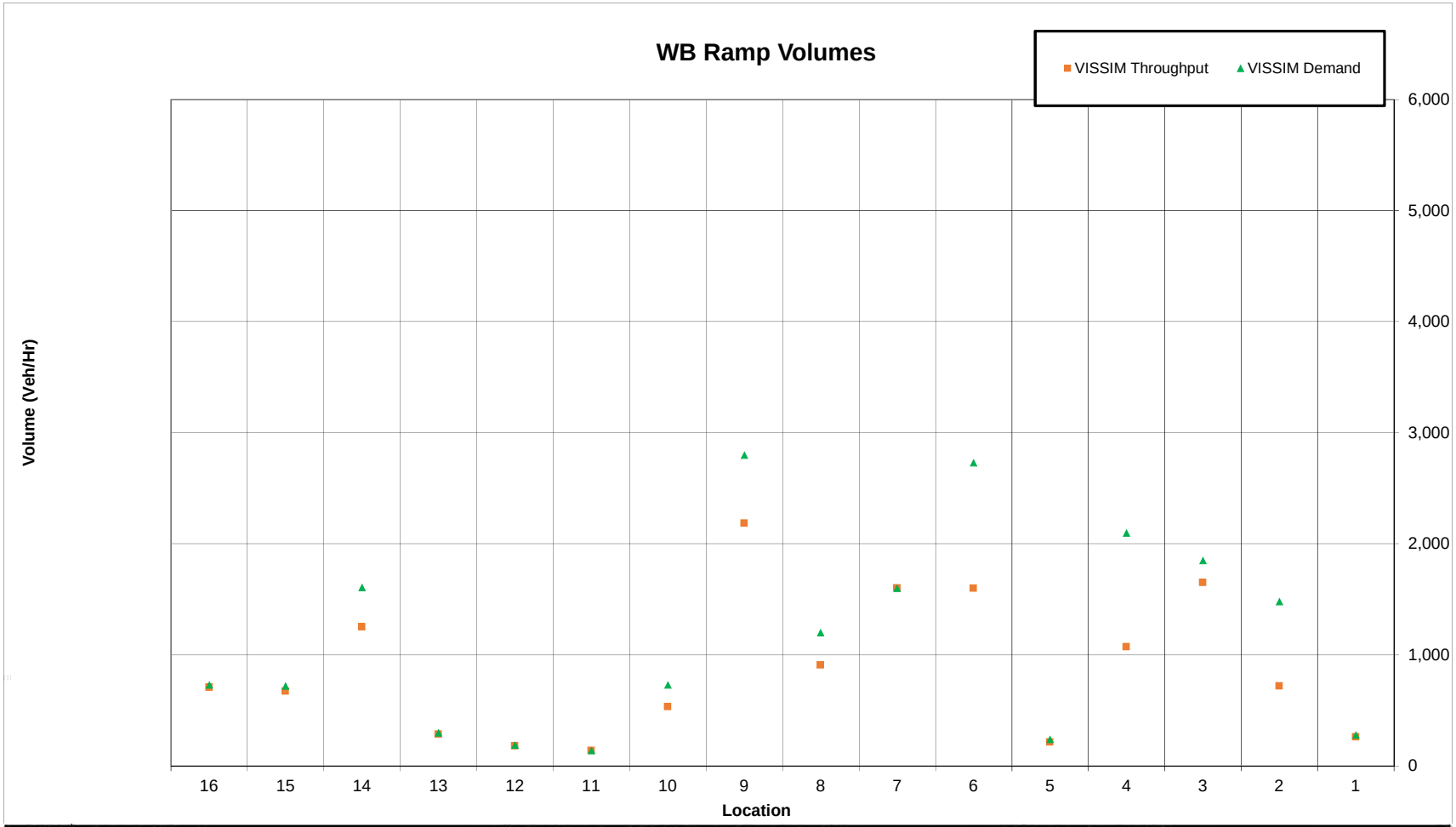


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR-71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	Managed Lanes Weave between SR 241 and Green River Rd	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	End Managed Lanes Weave to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location



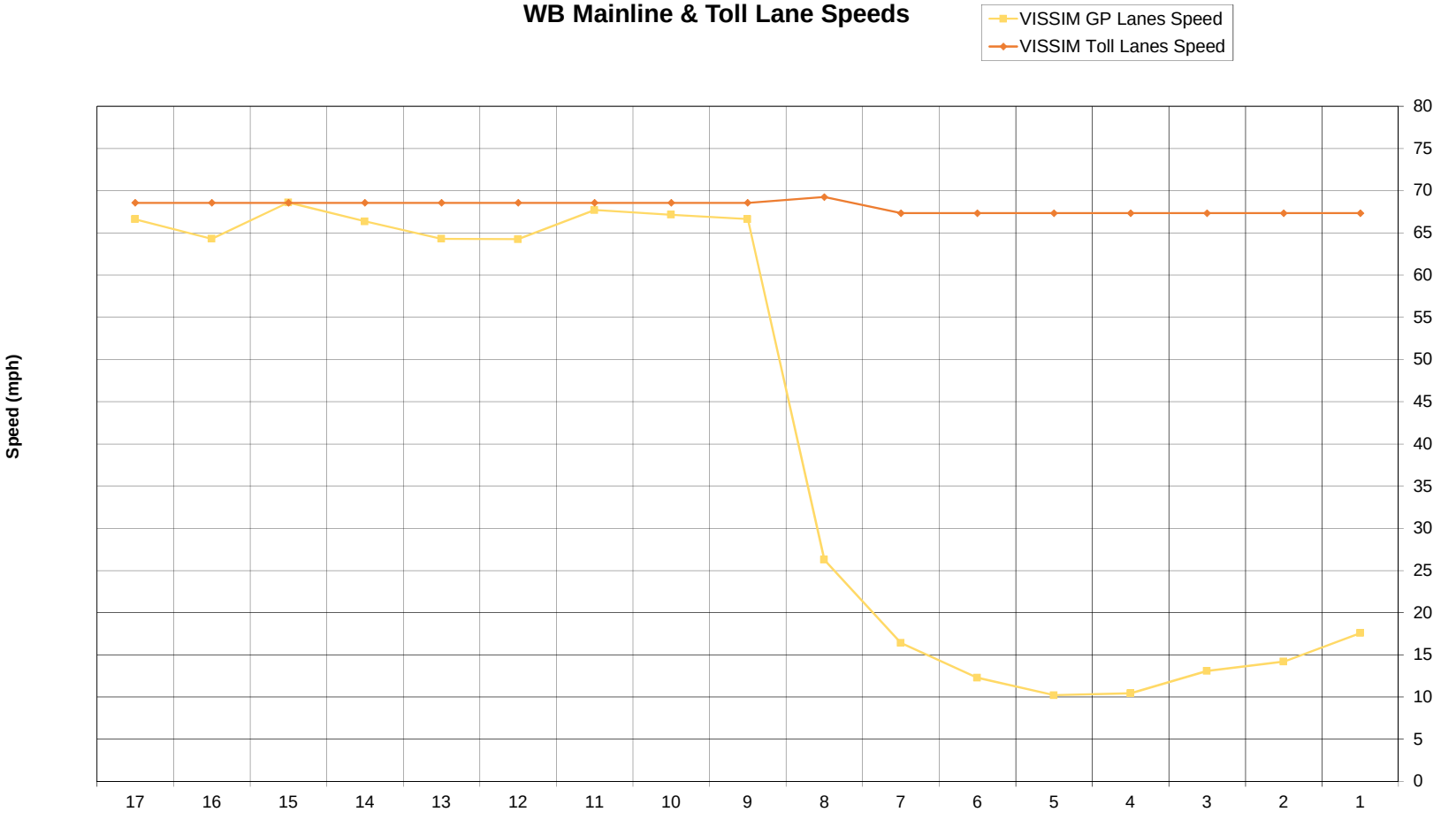
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

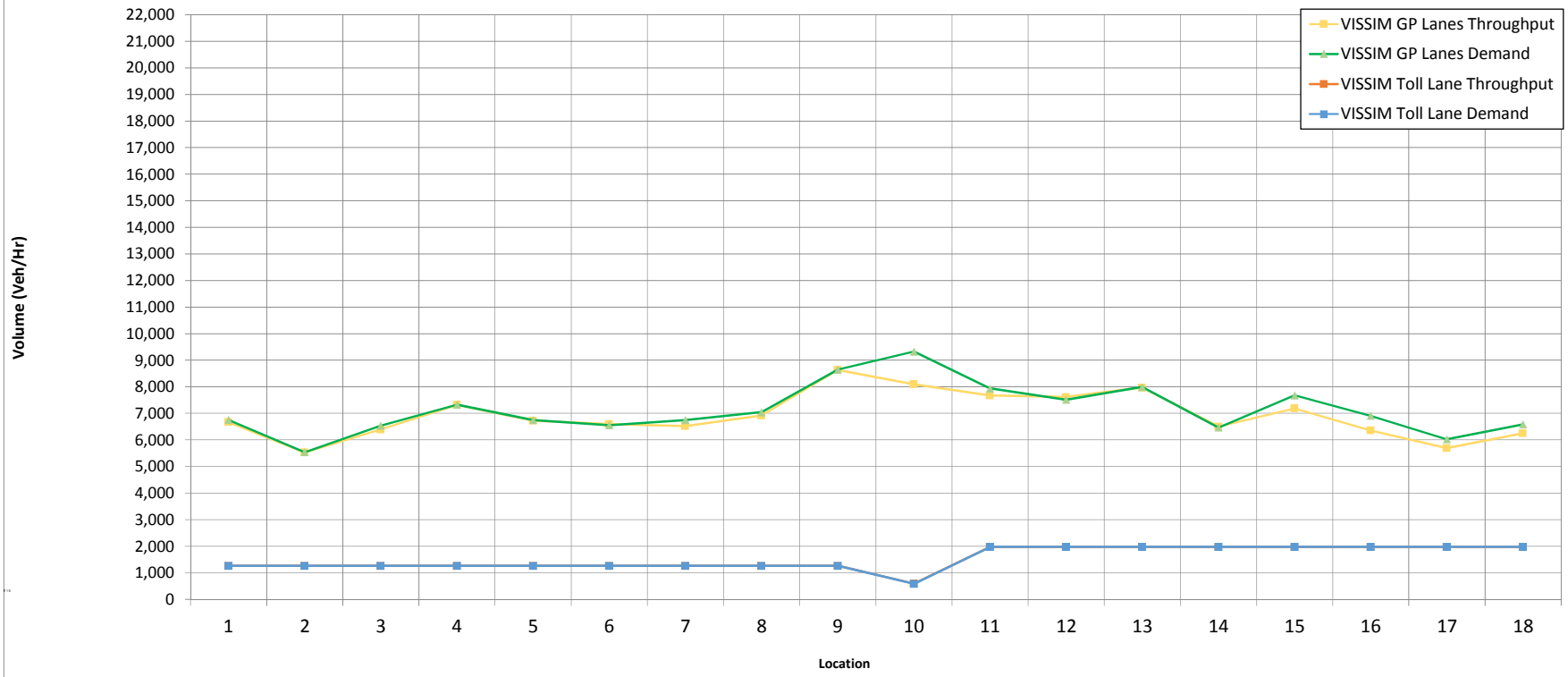
Charts 7-8 AM

WB Mainline & Toll Lane Speeds

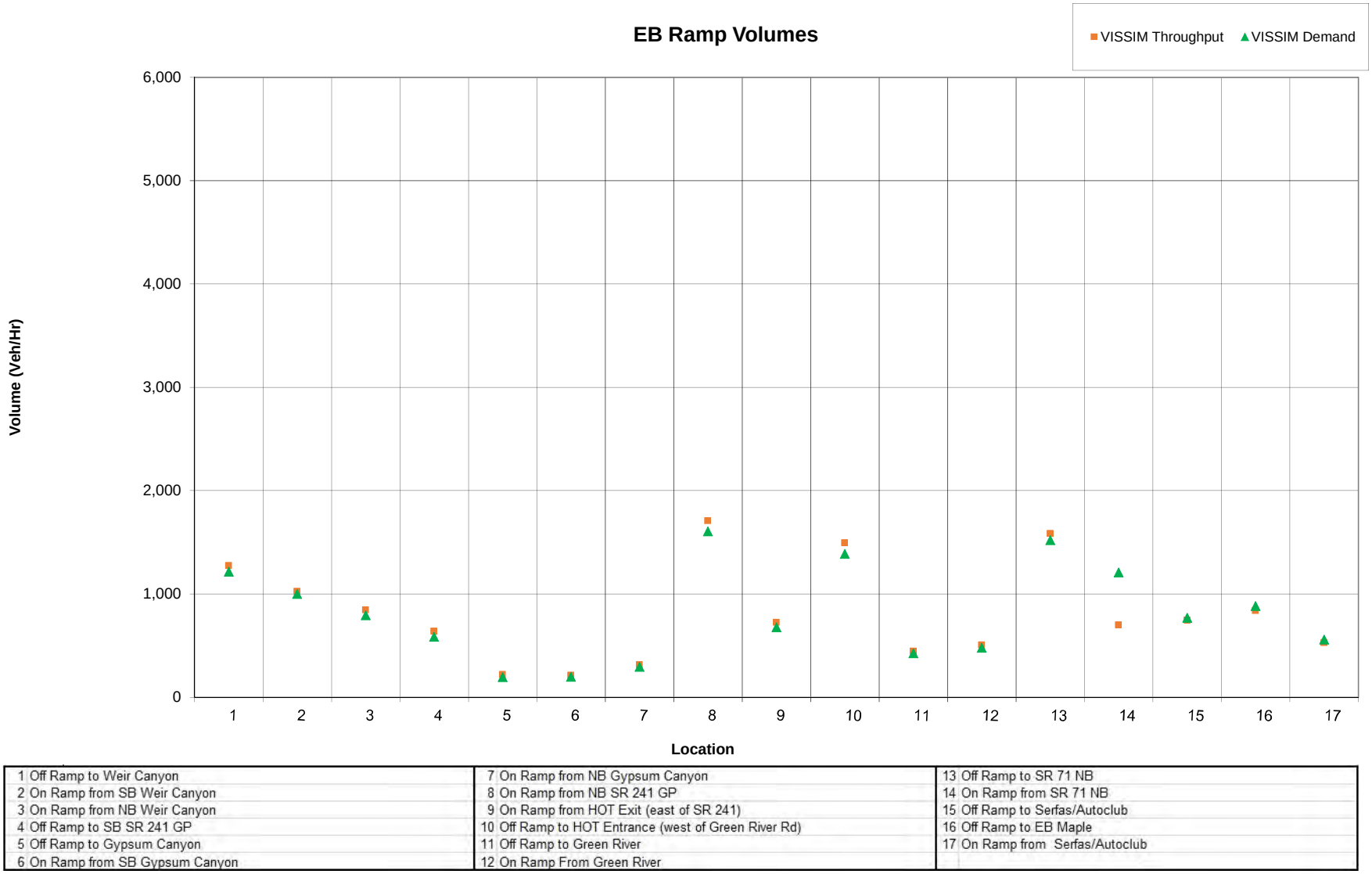


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

EB Mainline & Toll Lane Vehicle Volume by Location

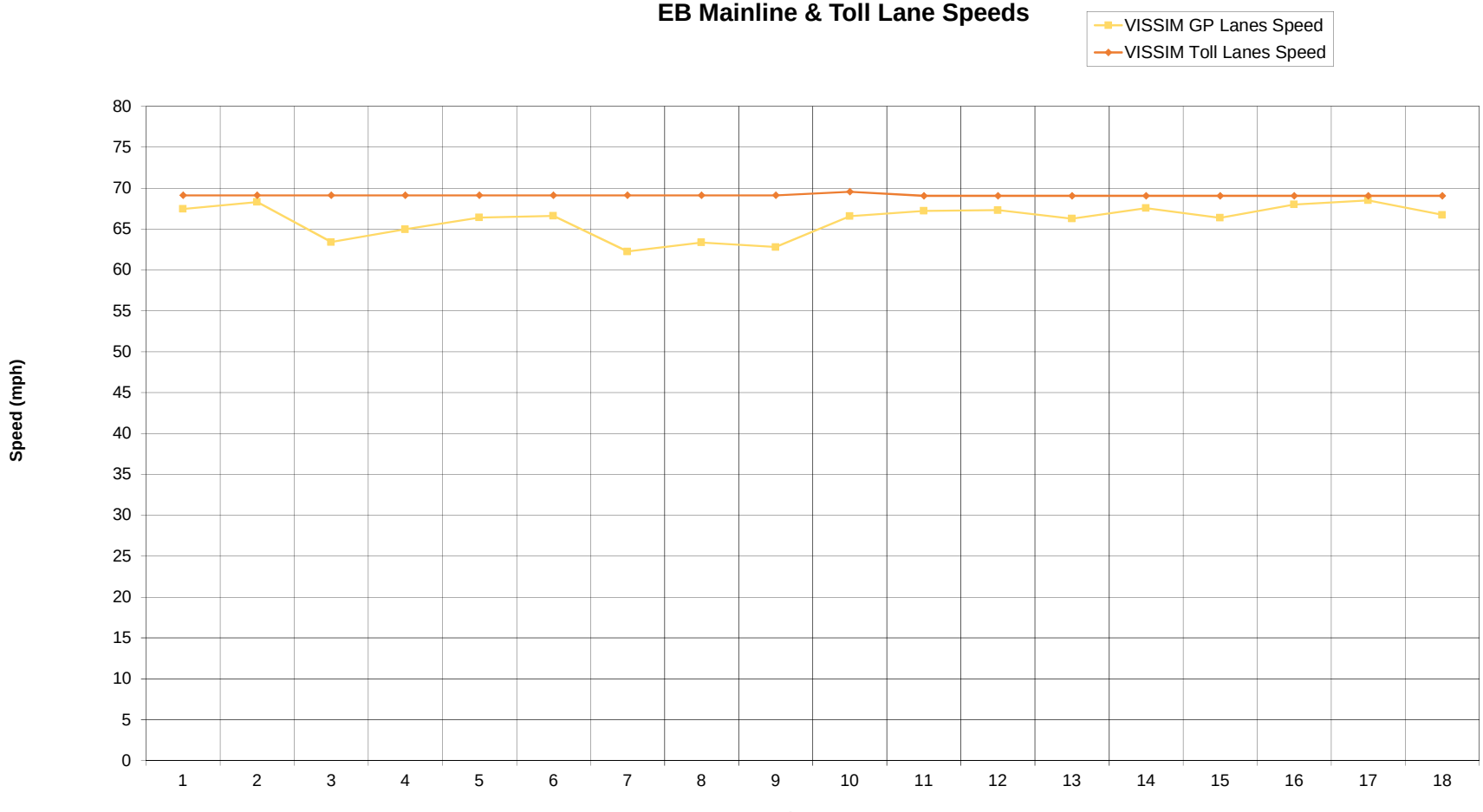


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



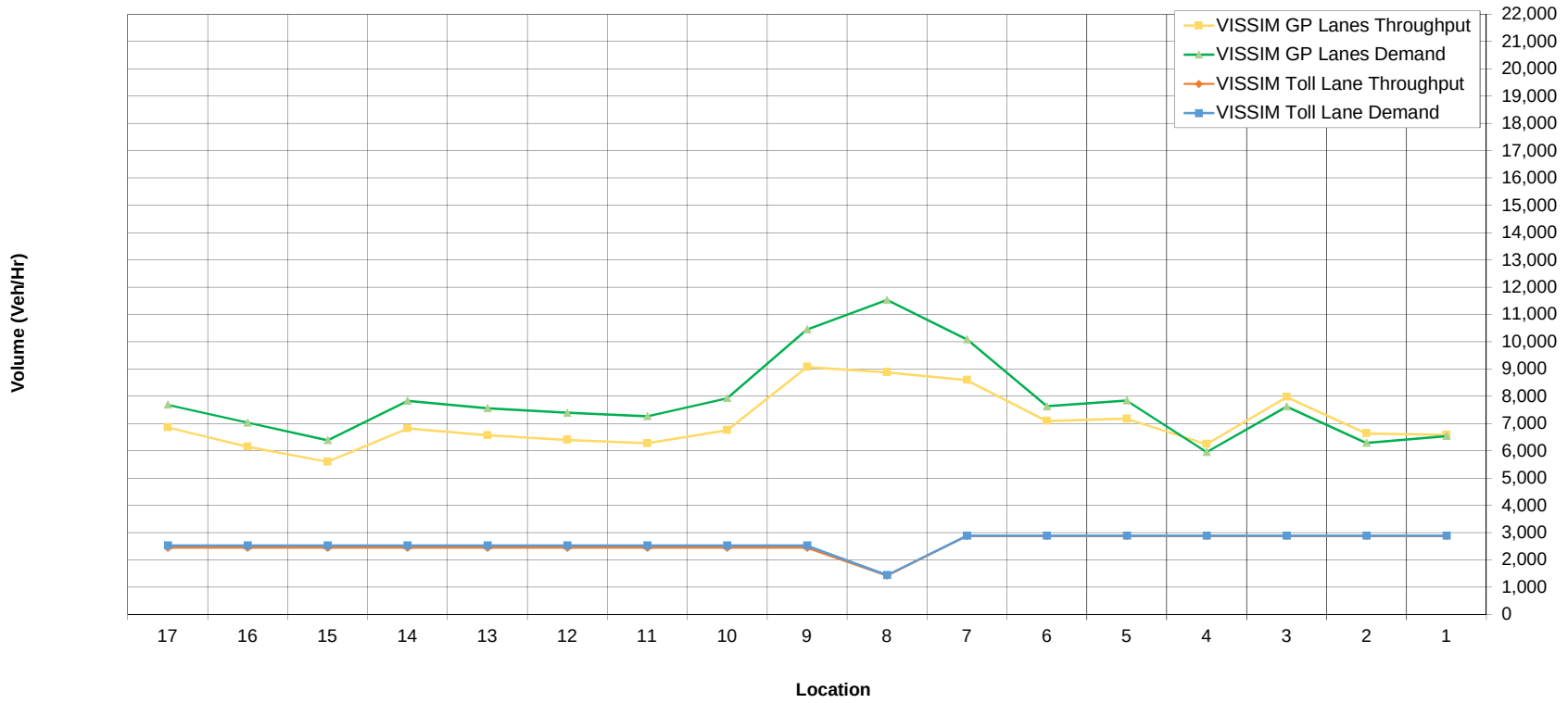
1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 NB
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from SR 71 NB
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 Off Ramp to Serfas/Autoclub
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	12 On Ramp From Green River	

EB Mainline & Toll Lane Speeds

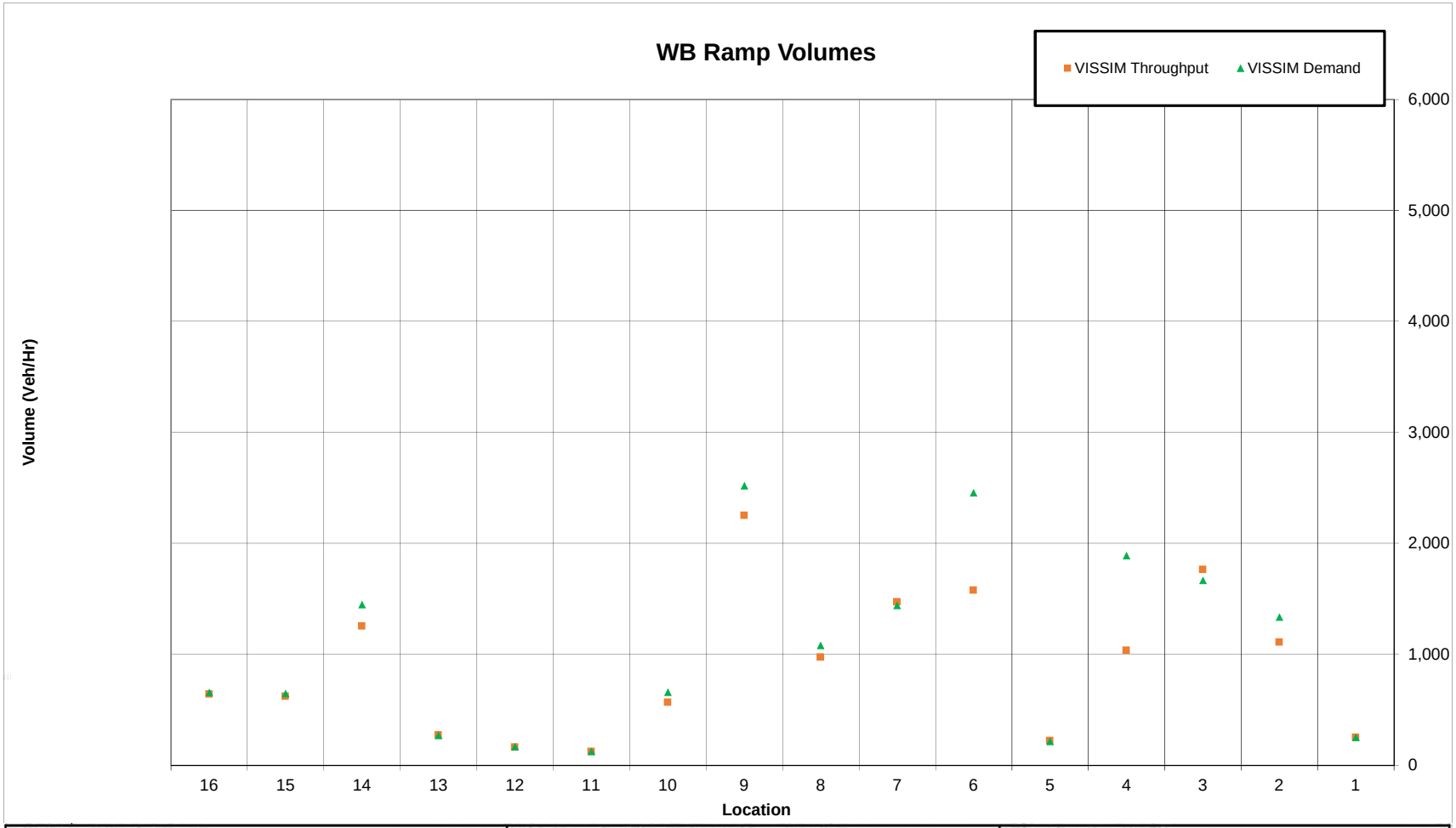


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR-71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	Managed Lanes Weave between SR 241 and Green River Rd	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	End Managed Lanes Weave to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location



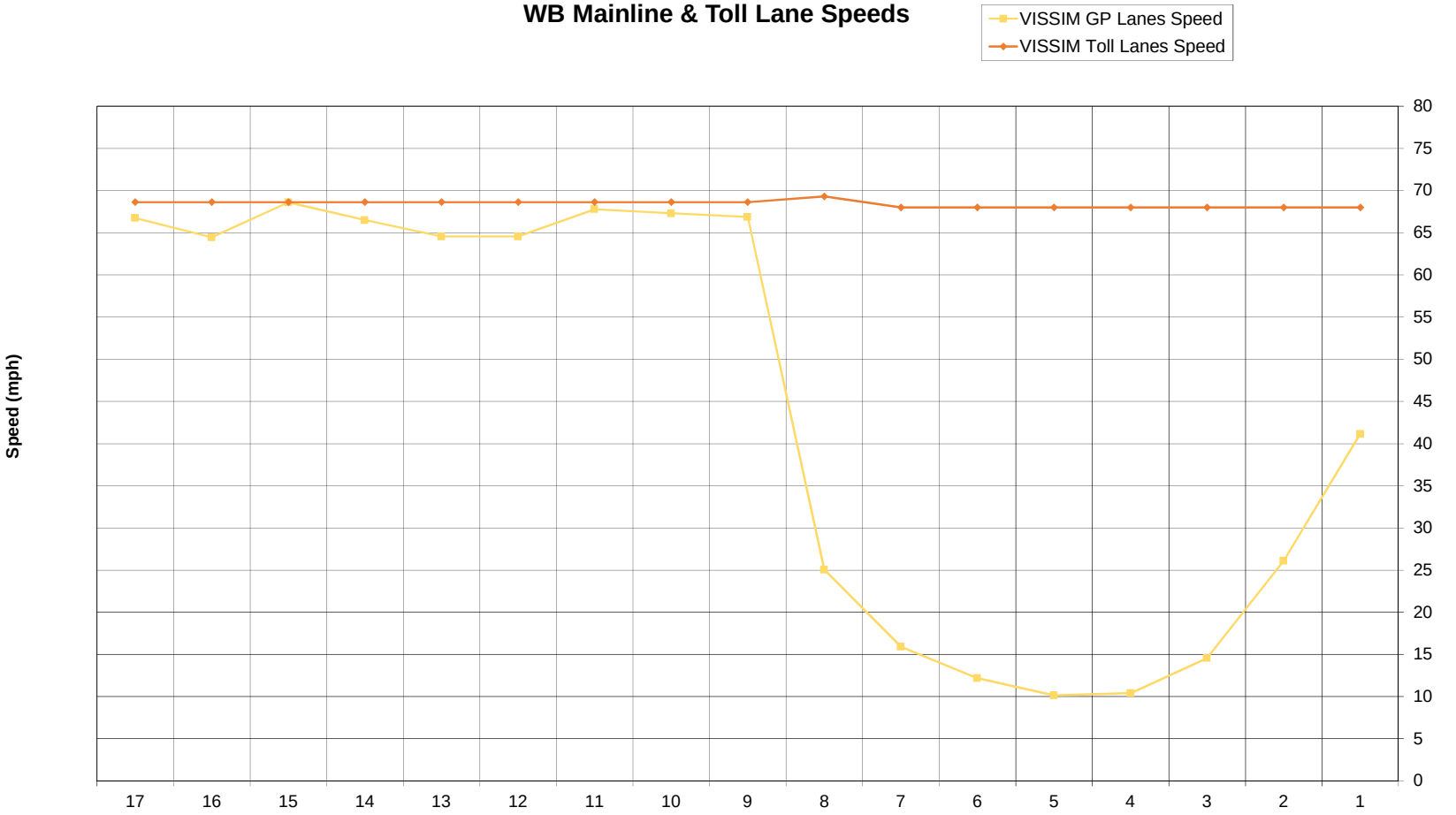
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

Charts 8-9 AM

WB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

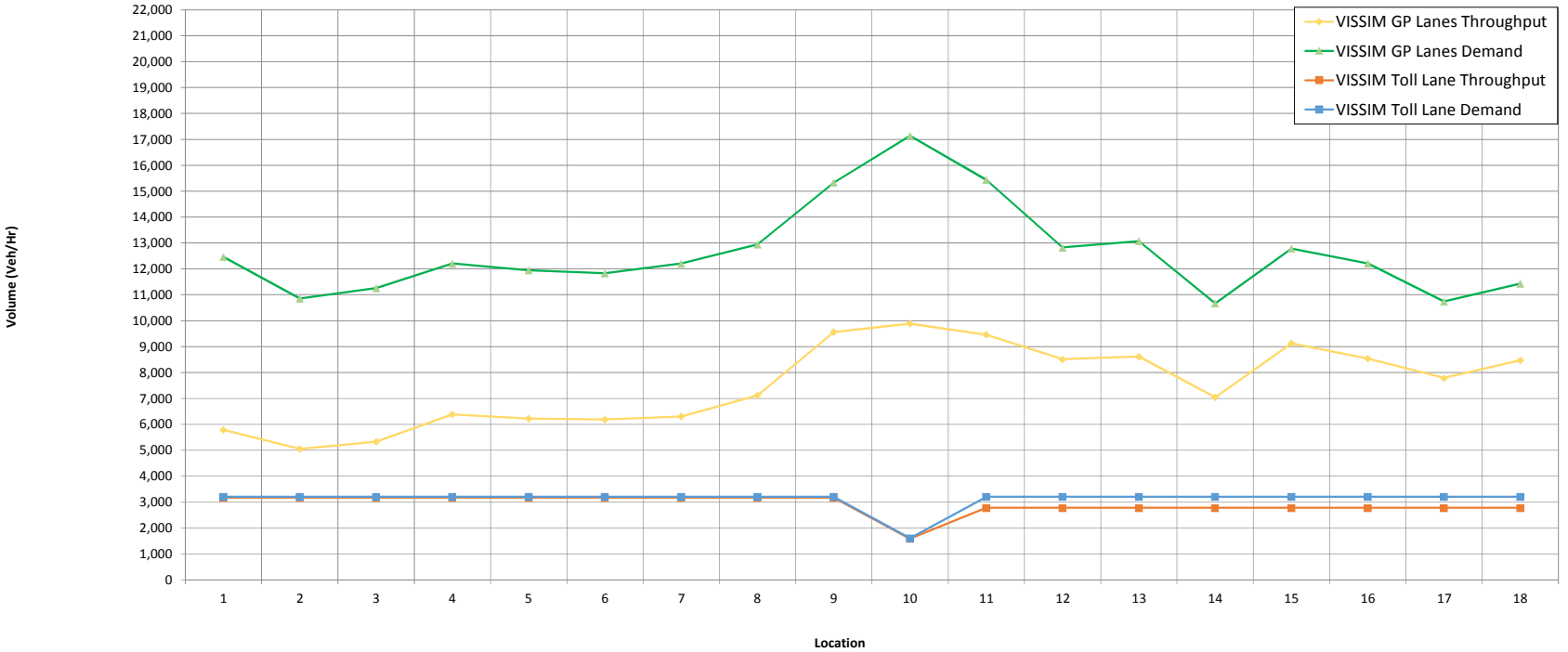
VISSIM Model Summary - 2017 No Build - PM Peak Period
Network Summary Statistics

Parameter			2017 No Project		Difference
Total Vehicle Demand (4 Hr)			141,937		
Total number of vehicles that did not reach their desitination			20,812		
Totla number of vehicles that have reached their destination			121,125		
Total vehicle-miles traveled (VMT)			1,014,001		
Total travel time, All Vehicle Types (VHT)			26,278		
Average speed [mph], All Vehicle Types			38.6		
Average delay time per vehicle [mins], All Vehicle Types			5.27		

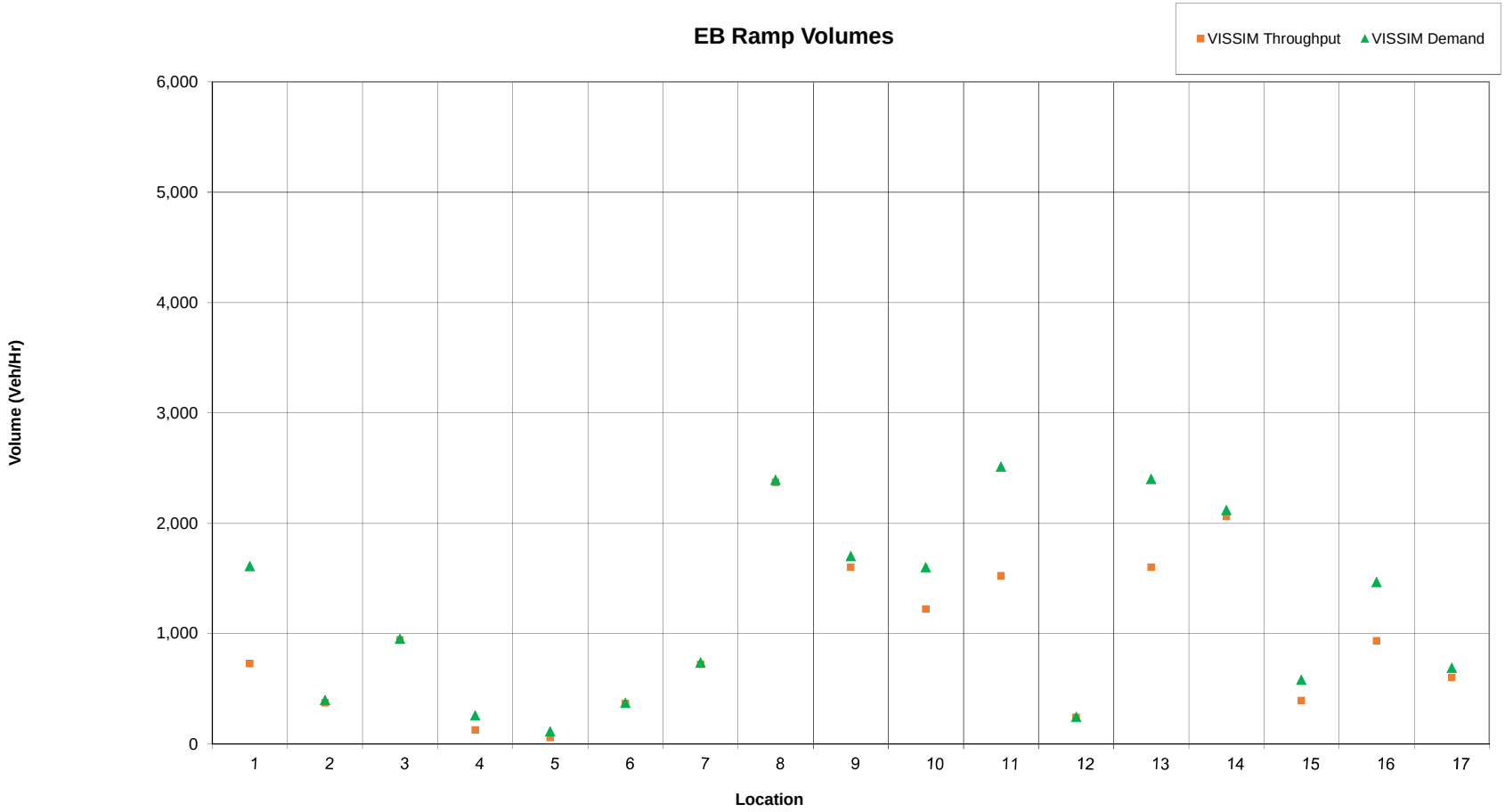
VISSIM Model Summary - 2017 No Build - PM Peak Period
Network Summary Statistics

#	Origin	#	Destination	p Ke	Hide Travel Time Segments Seg 1	Seg 2	Seg 3	2017 PM No Build VISSIM Travel Time (Minutes) 3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	28.3	29.6	29.4	27.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	28.3	29.5	29.4	27.6
		5	SR 241 SB south of SR 91	3	1001			18.4	19.1	19.0	17.7
		7	SR 71 NB north of SR 91	4	1002	1003	1004	30.6	31.9	31.8	30.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	10.4	10.5	10.5	10.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.4	8.4	8.4	8.4
		7	SR 71 NB north of SR 91	7	2002	1003	1004	12.7	12.8	12.9	12.9
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	8.5	8.5	8.5	8.5
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	8.5	8.5	8.5	8.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	10.9	11.0	10.9	10.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	12	1010			5.0	5.0	5.0	5.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	8.5	8.5	8.5	8.5
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4	8.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	10.9	10.9	10.9	10.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a	n/a
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.2	7.2	7.2	7.2
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	13.4	13.5	13.6	13.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	13.4	13.4	13.5	13.5
		7	SR 71 NB north of SR 91	20	1007	1003	1004	15.7	15.8	15.9	15.9
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a	n/a
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a	n/a
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	10.2	10.2	10.1	9.9
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	10.2	10.2	10.0	9.9
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			6.4	6.7	6.2	5.8
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	12.6	12.7	12.5	12.3
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a	n/a

EB Mainline & Toll Lane Vehicle Volume by Location

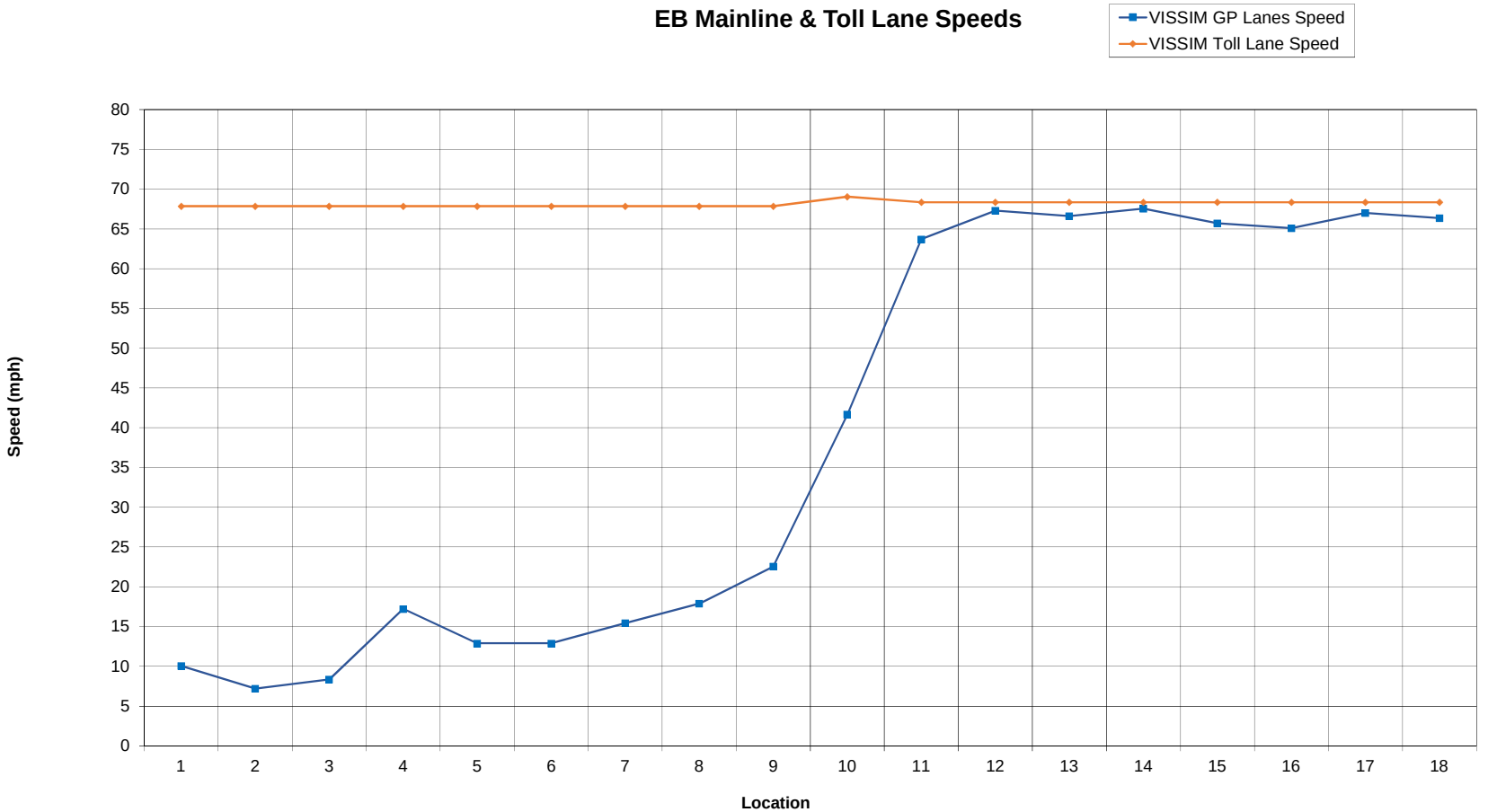


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



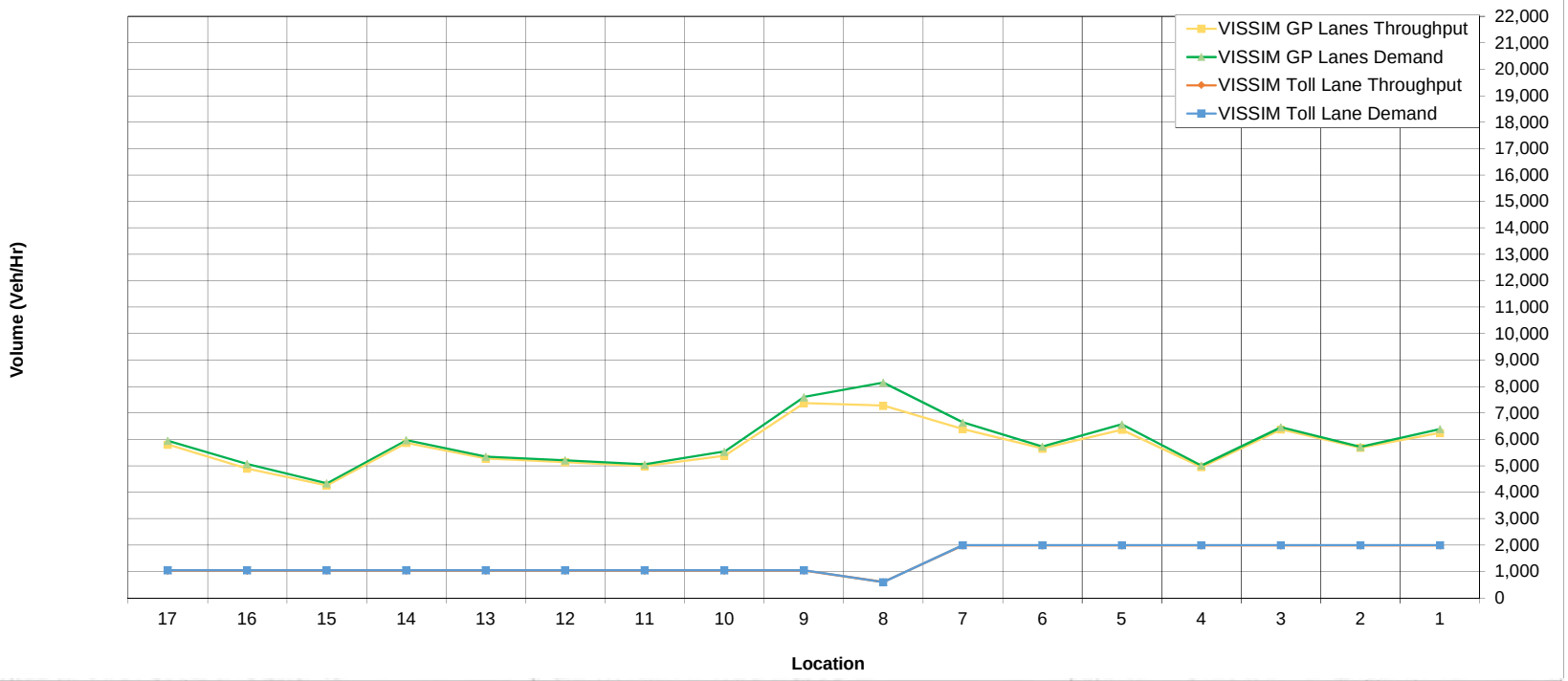
1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 NB
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from SR 71 NB
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 Off Ramp to Serfas/Autoclub
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	12 On Ramp From Green River	

Charts 3-4 PM

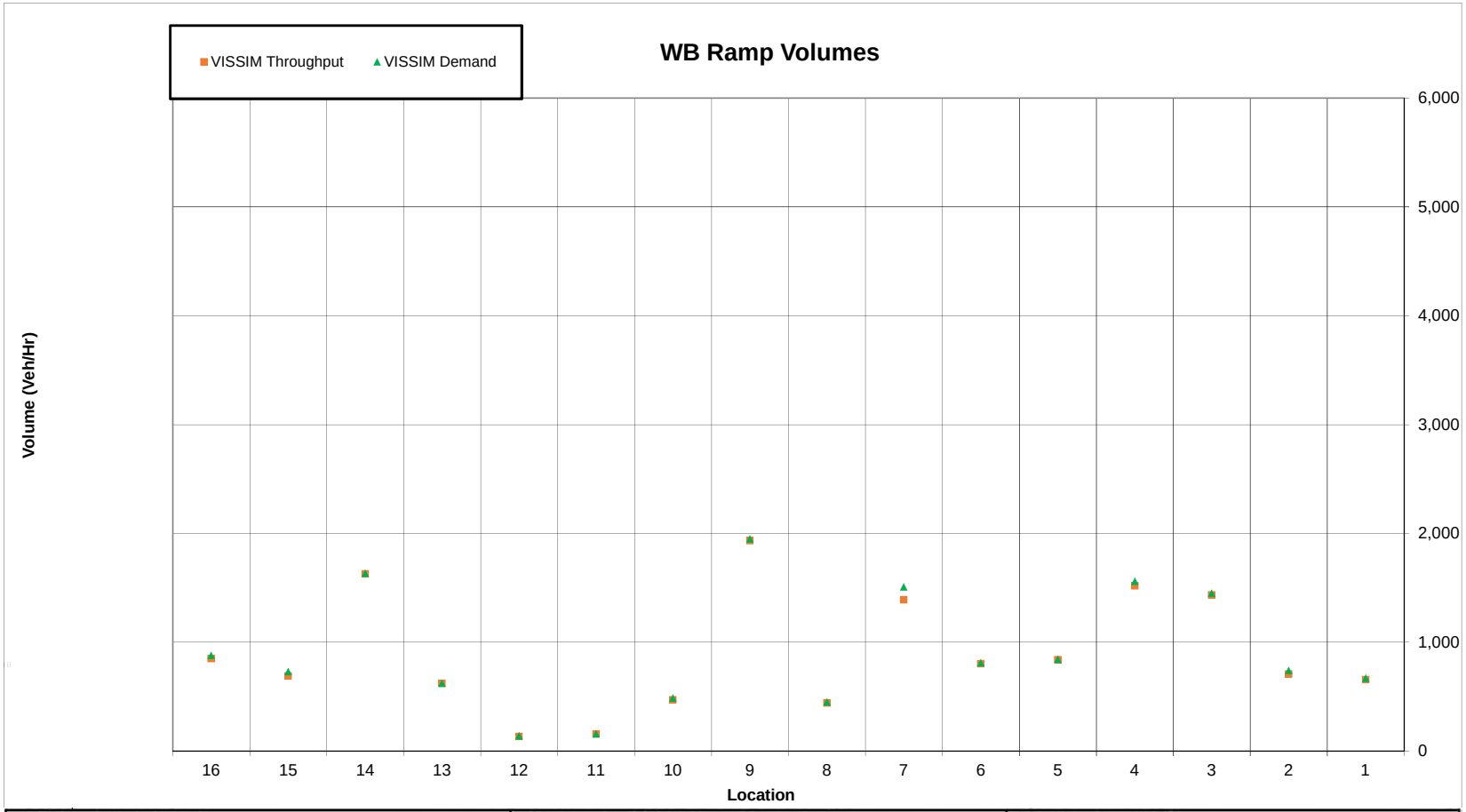


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location

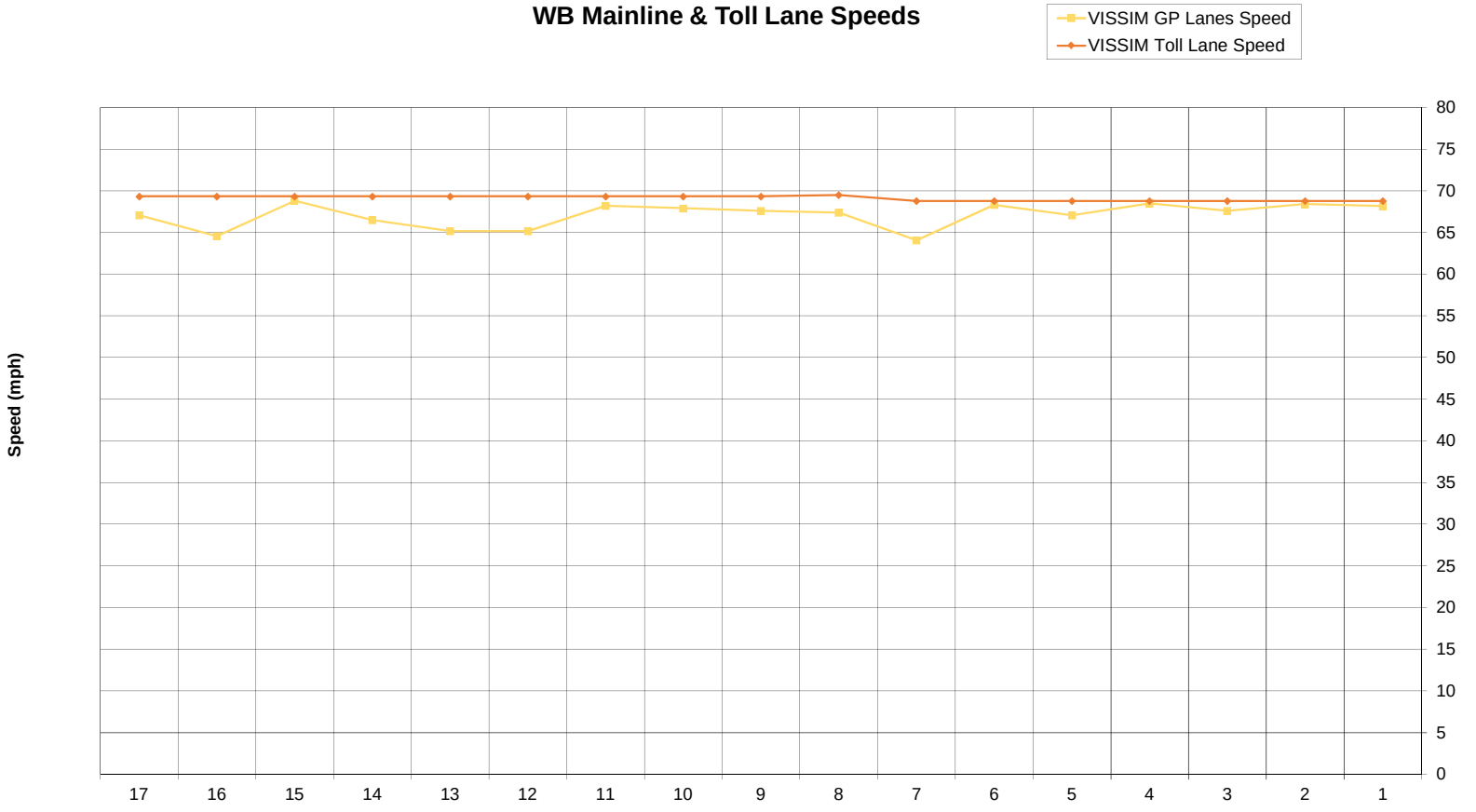


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



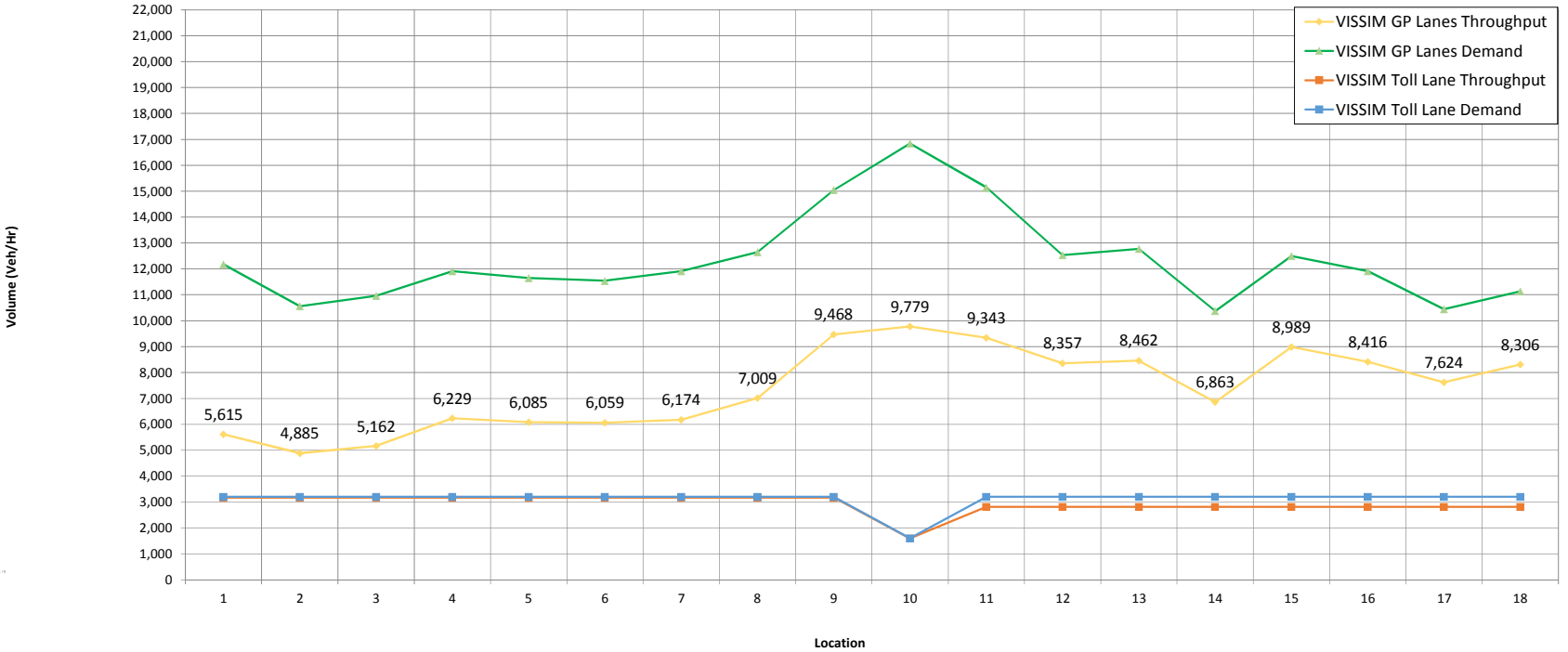
1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

Charts 3-4 PM

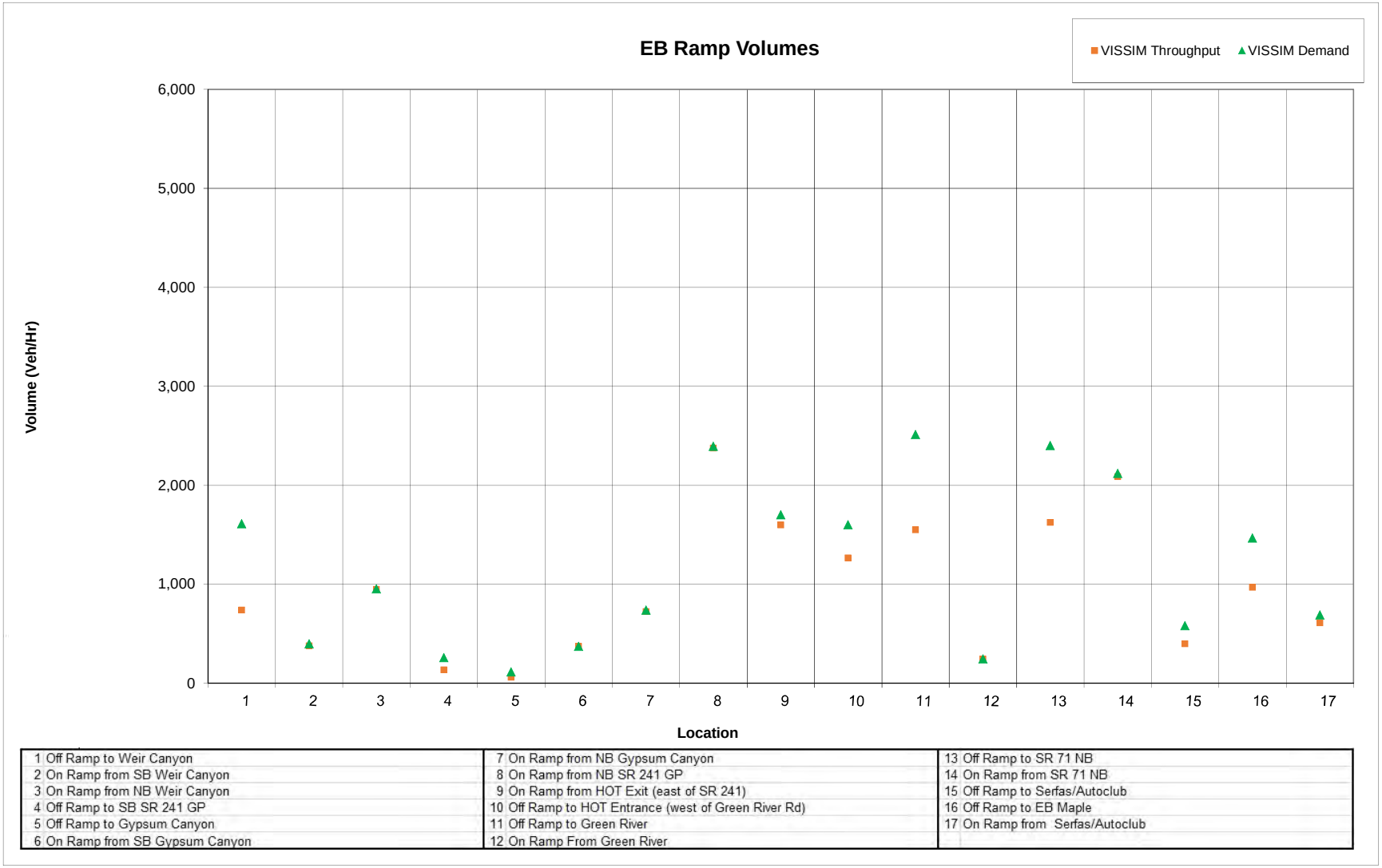


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

EB Mainline & Toll Lane Vehicle Volume by Location



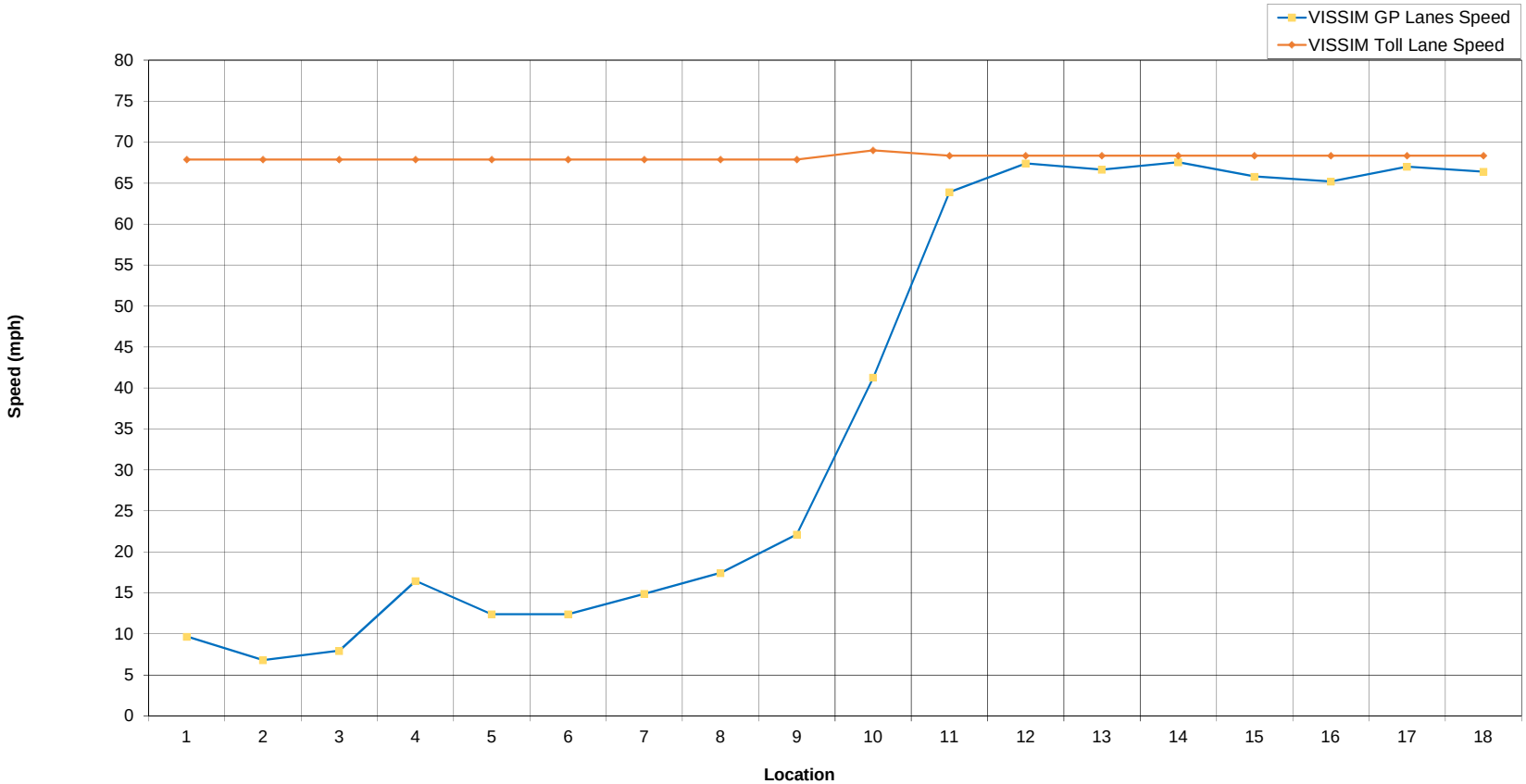
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR-71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	Managed Lanes Weave between SR 241 and Green River Rd	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	End Managed Lanes Weave to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area



1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 NB
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from SR 71 NB
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 Off Ramp to Serfas/Autoclub
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	12 On Ramp From Green River	

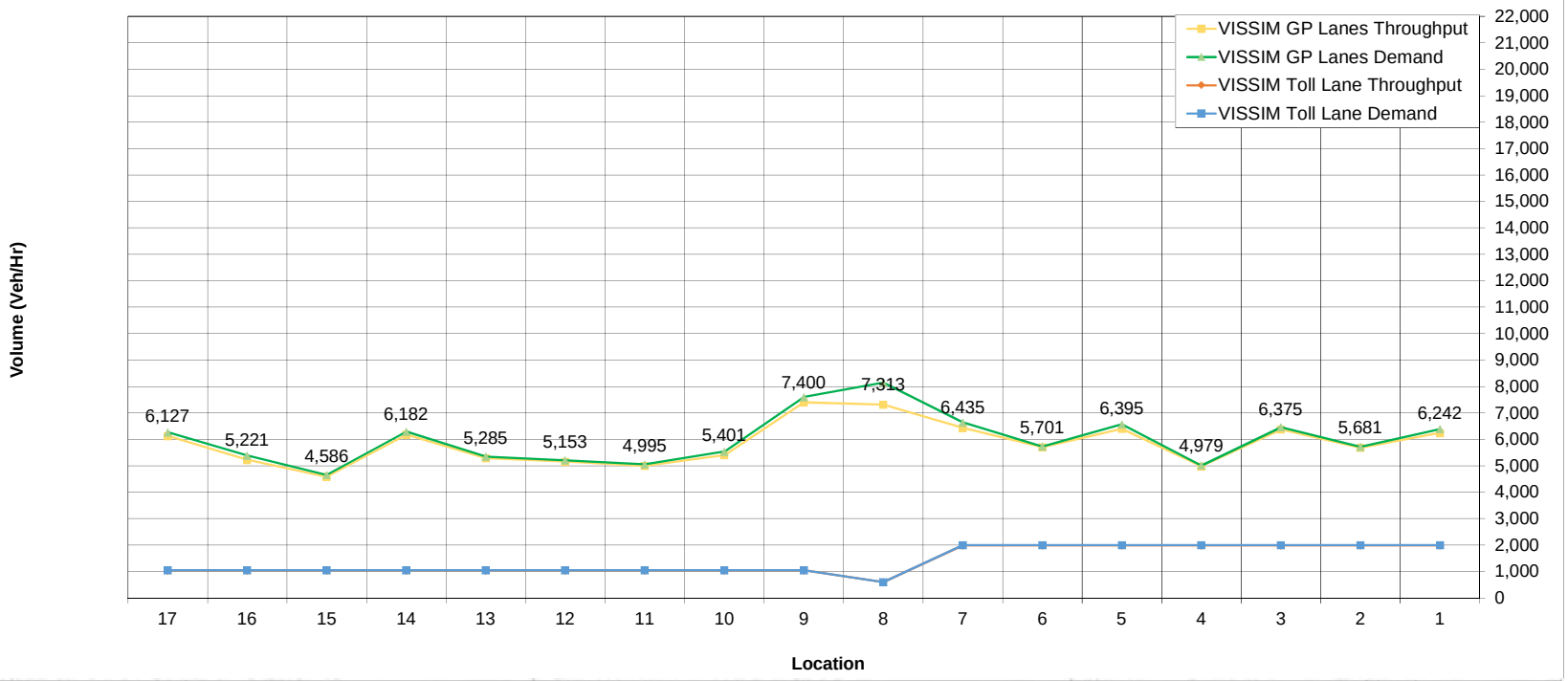
Charts 4-5 PM

EB Mainline & Toll Lane Speeds

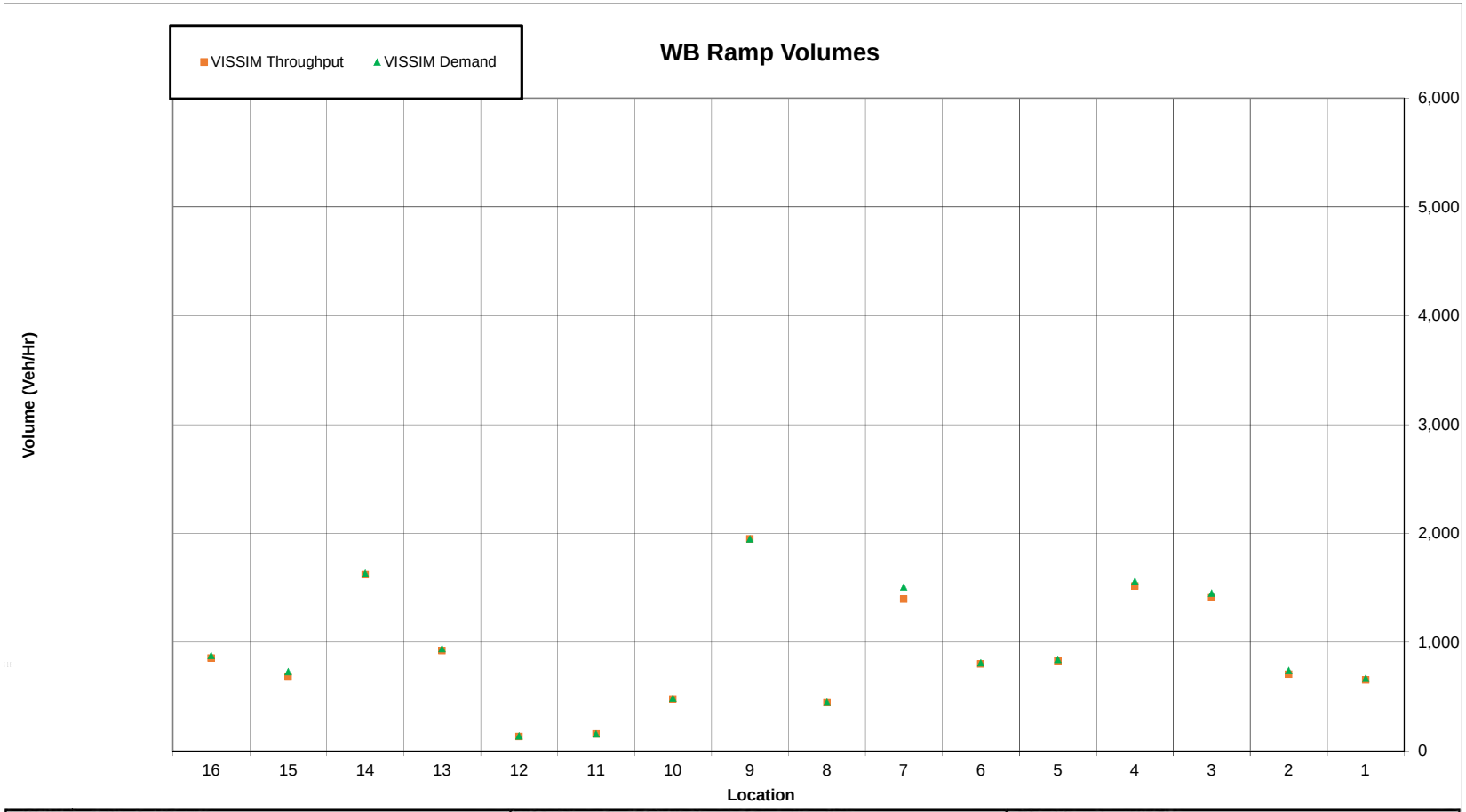


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location

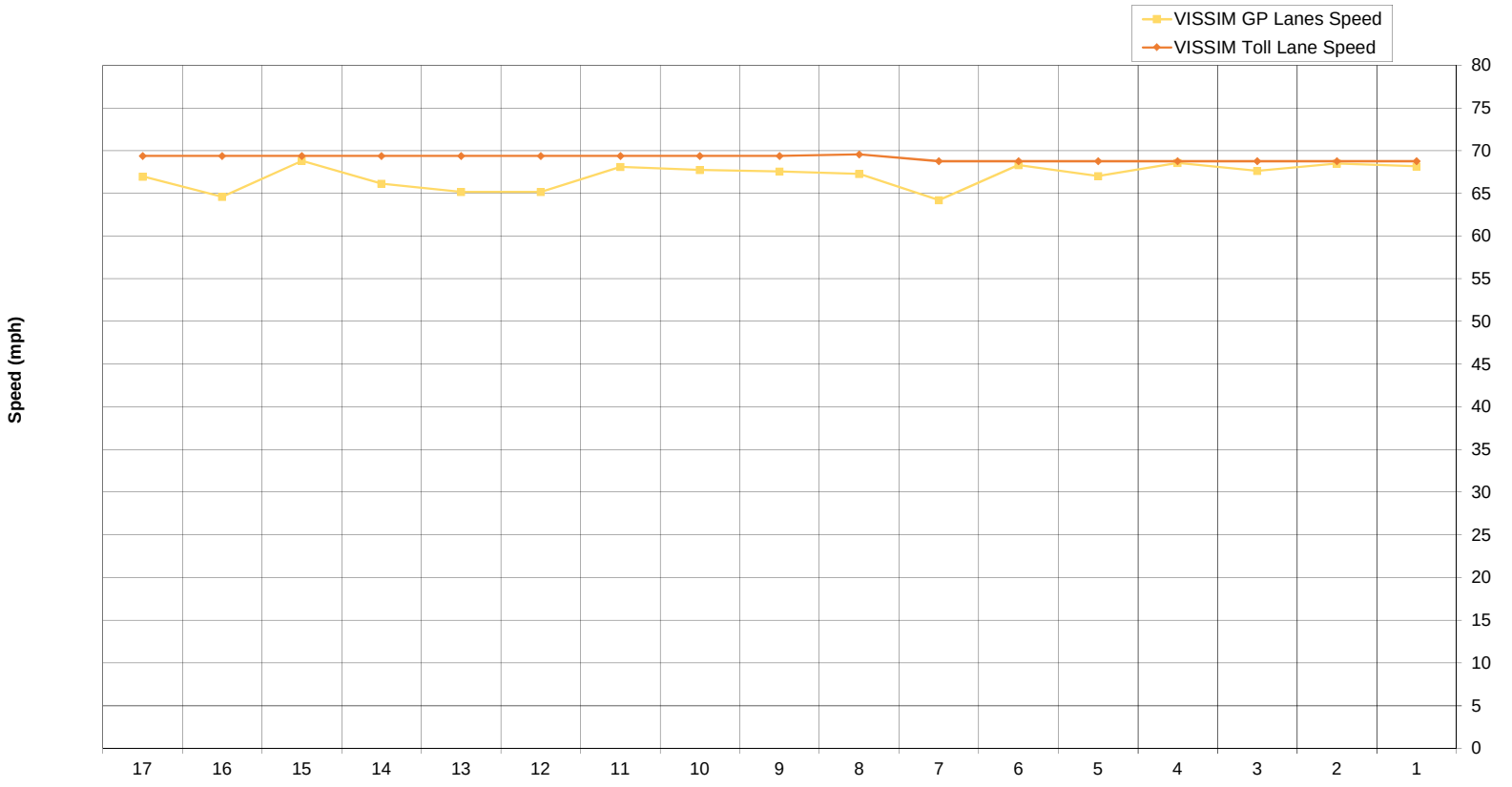


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



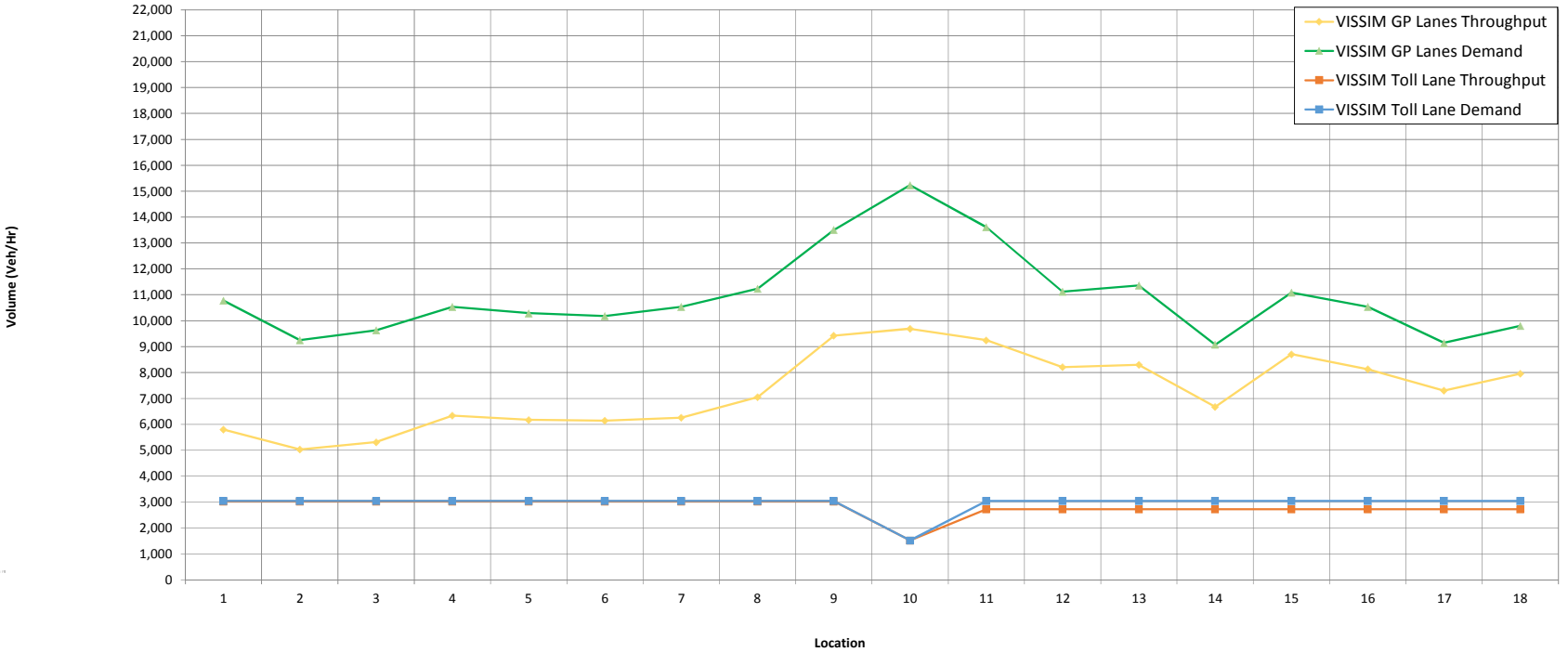
1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

WB Mainline & Toll Lane Speeds

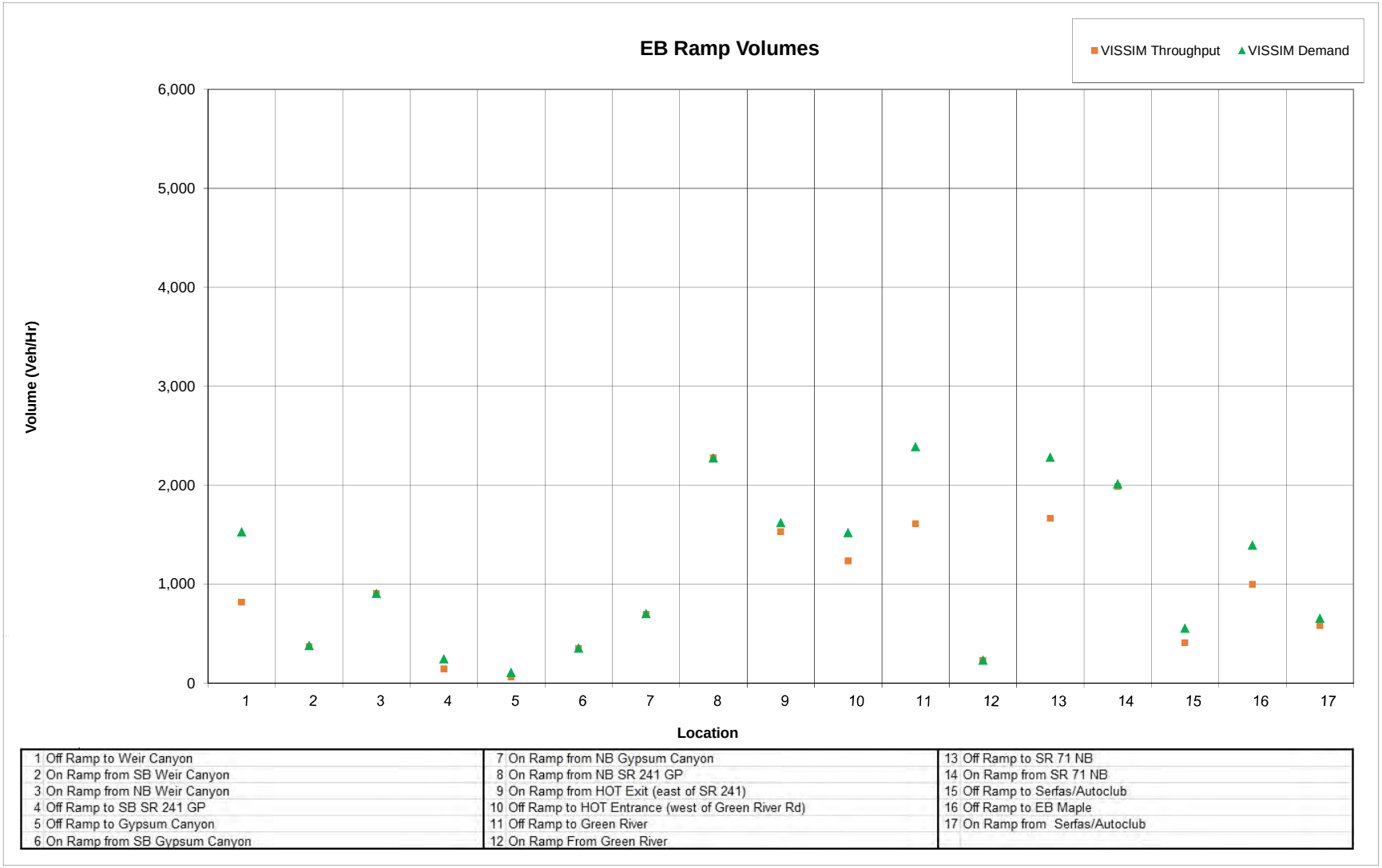


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

EB Mainline & Toll Lane Vehicle Volume by Location

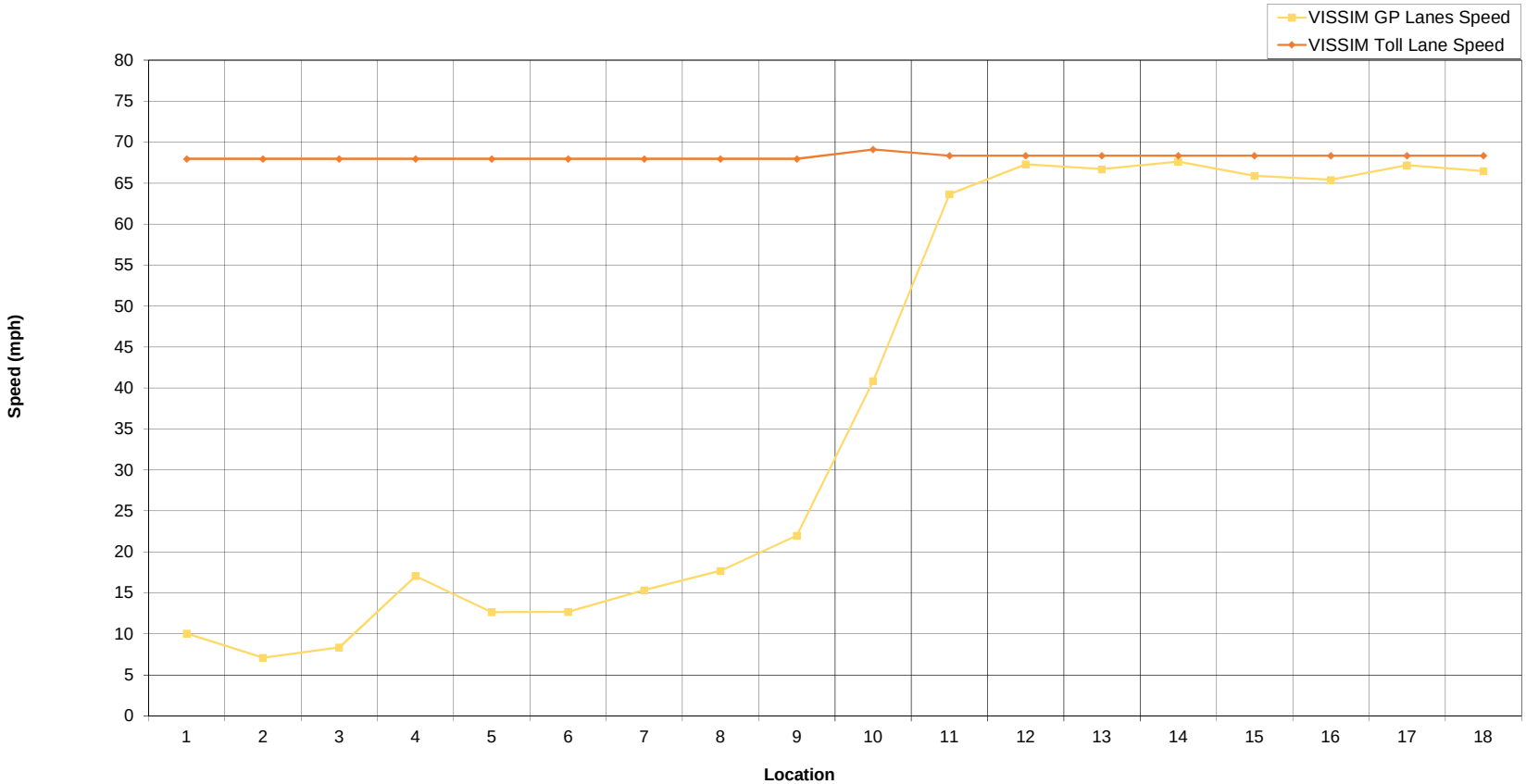


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



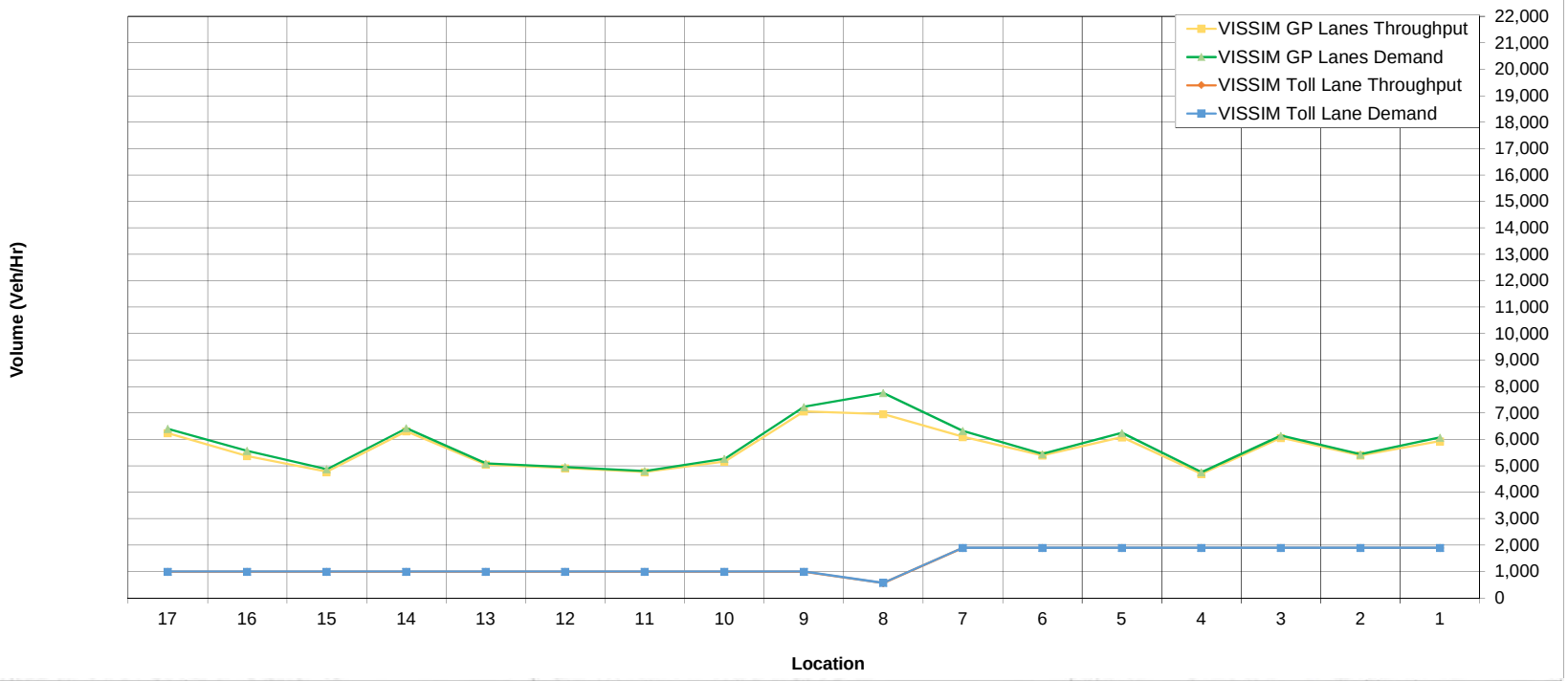
1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 NB
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from SR 71 NB
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 Off Ramp to Serfas/Autoclub
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	12 On Ramp From Green River	

EB Mainline & Toll Lane Speeds

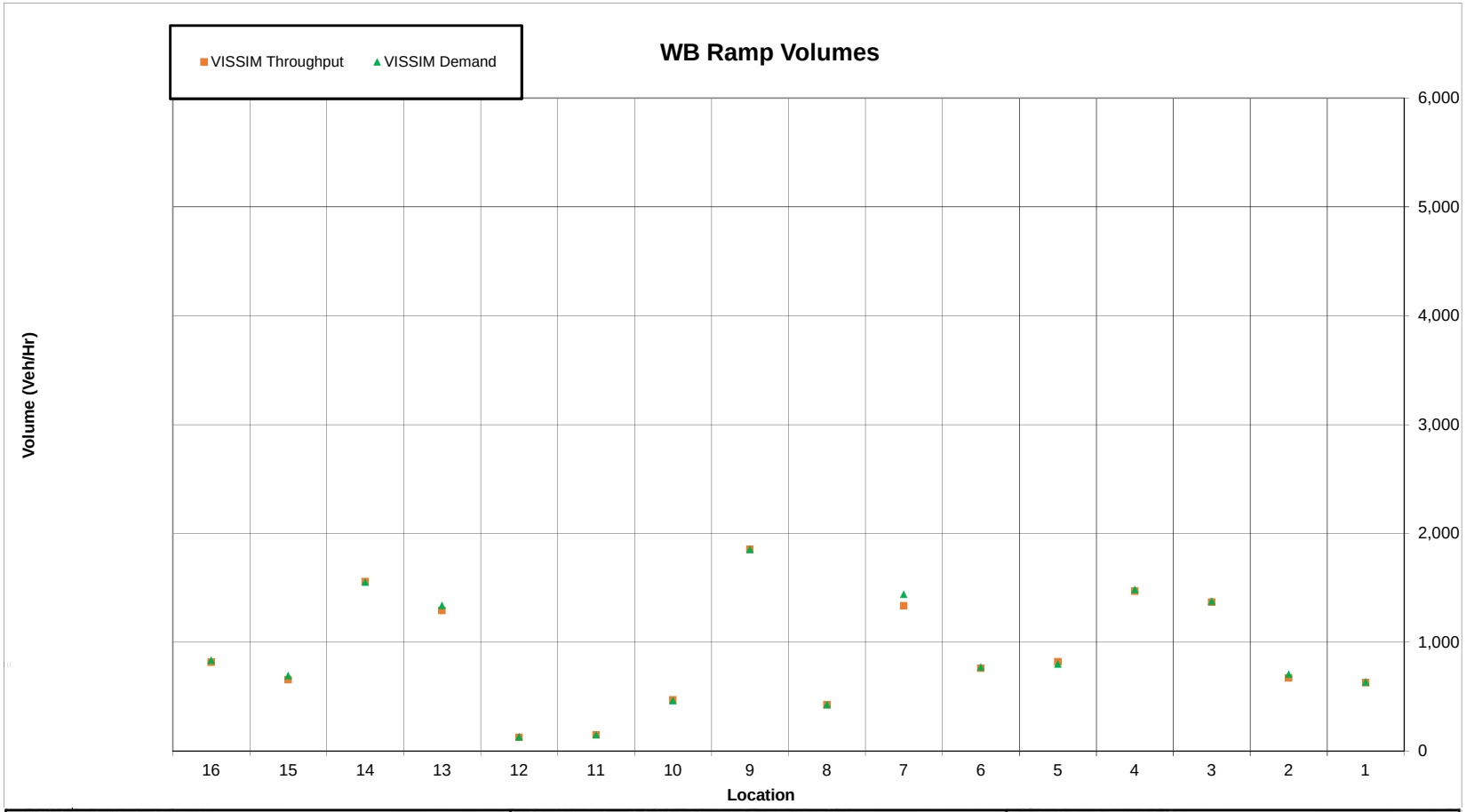


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location



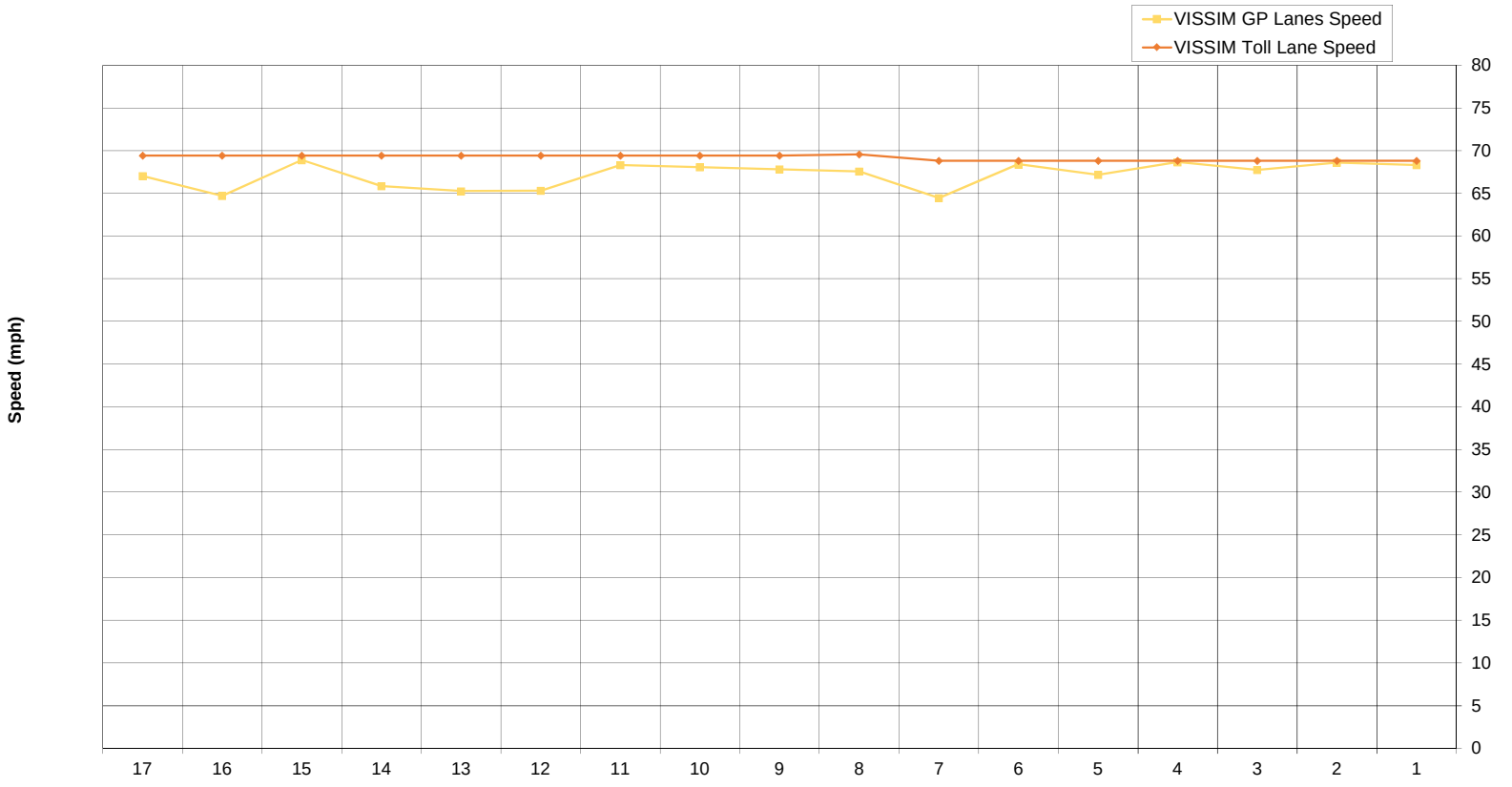
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

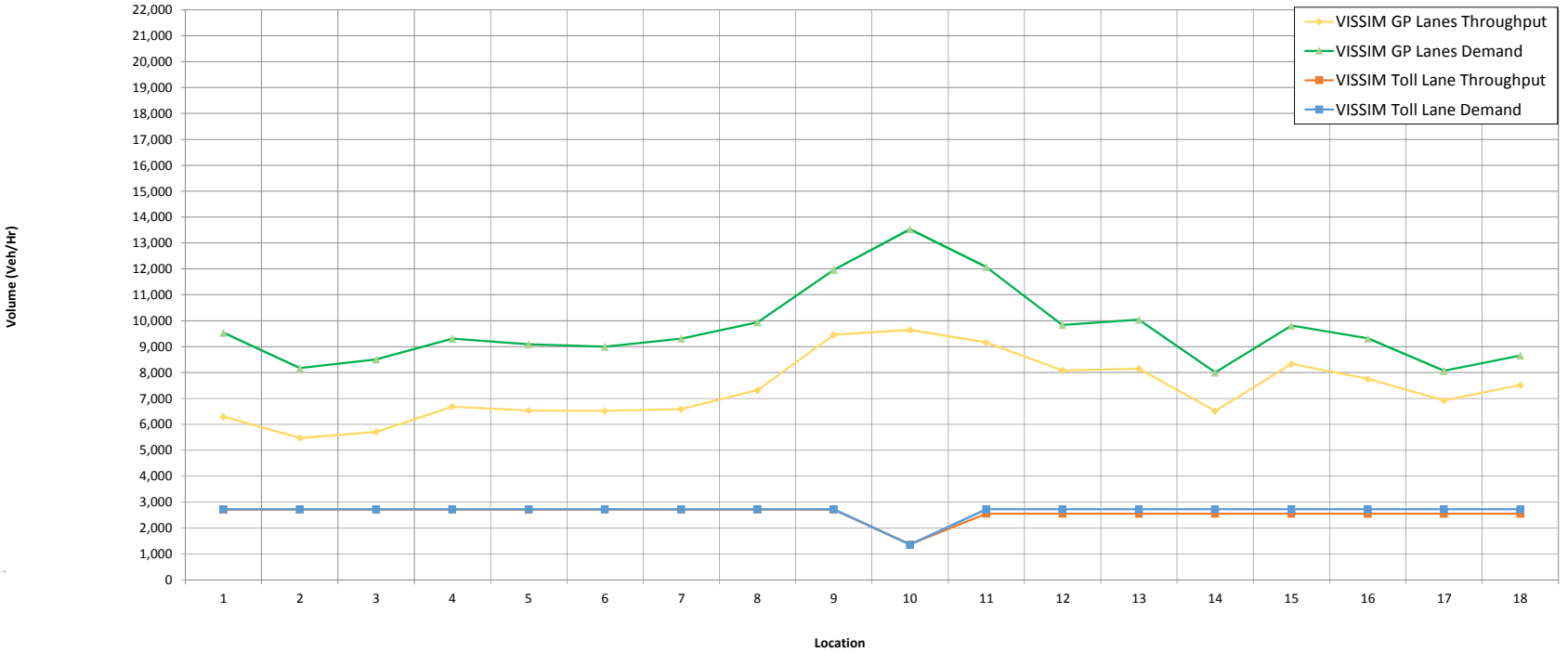
Charts 5-6 PM

WB Mainline & Toll Lane Speeds

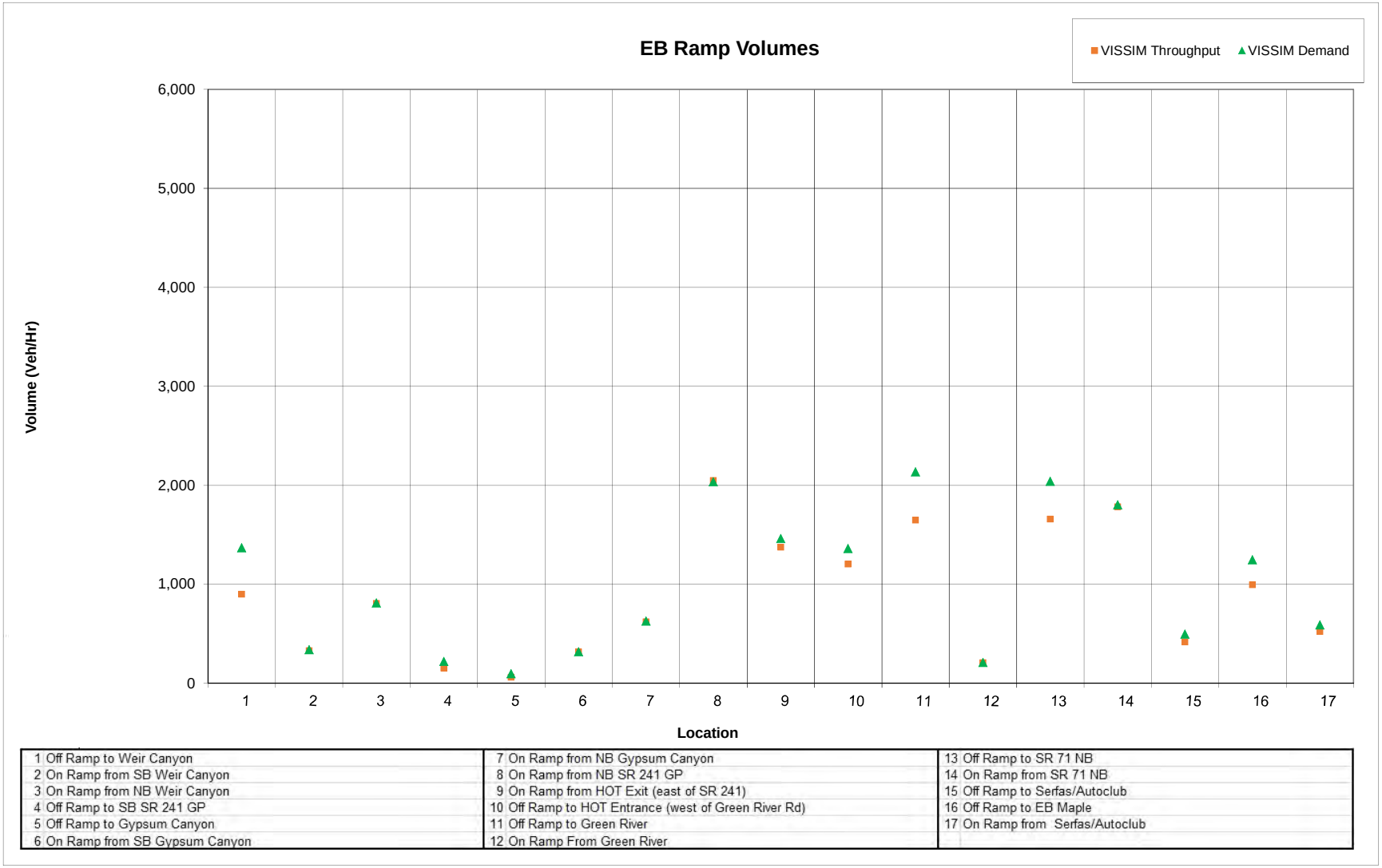


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

EB Mainline & Toll Lane Vehicle Volume by Location

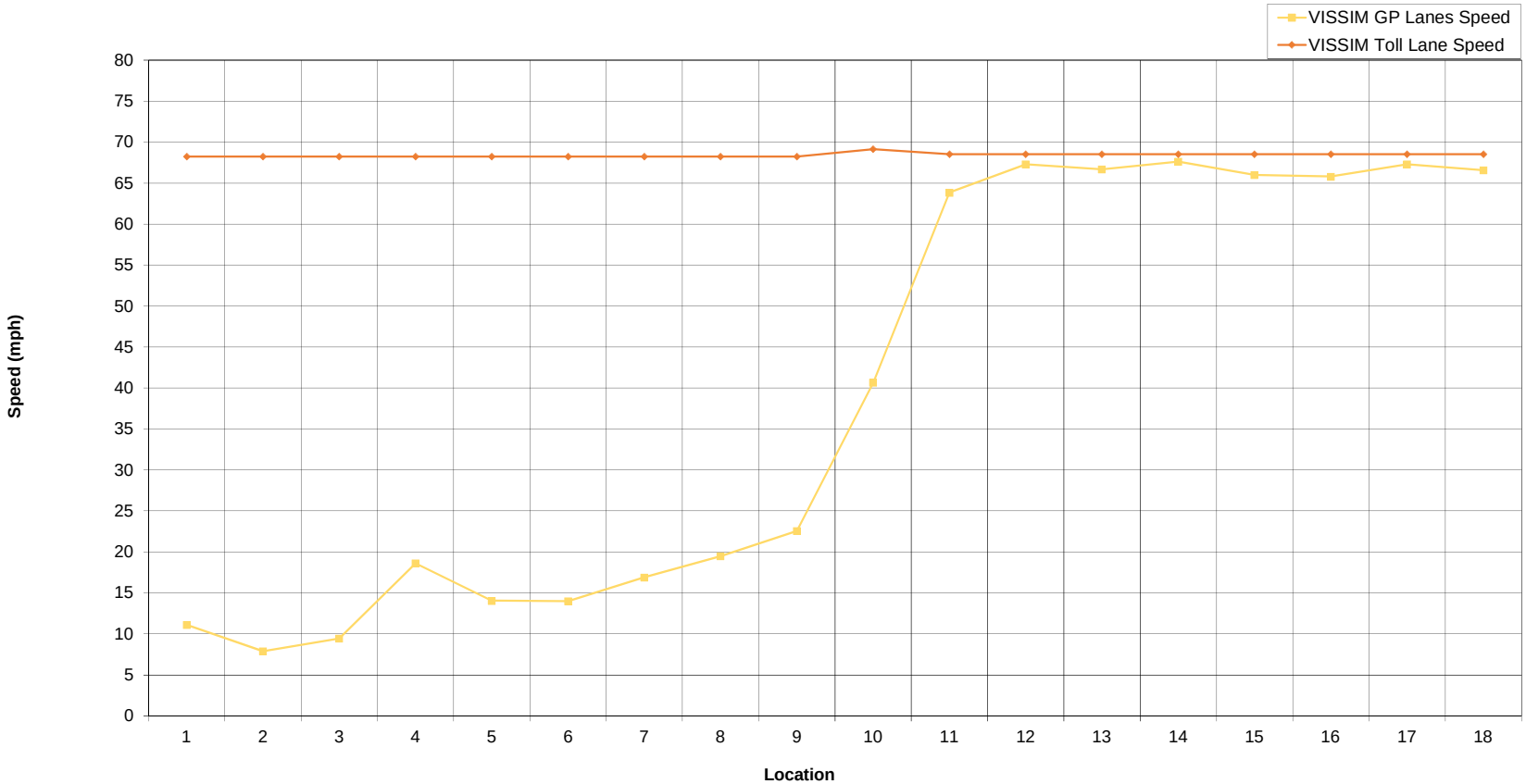


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



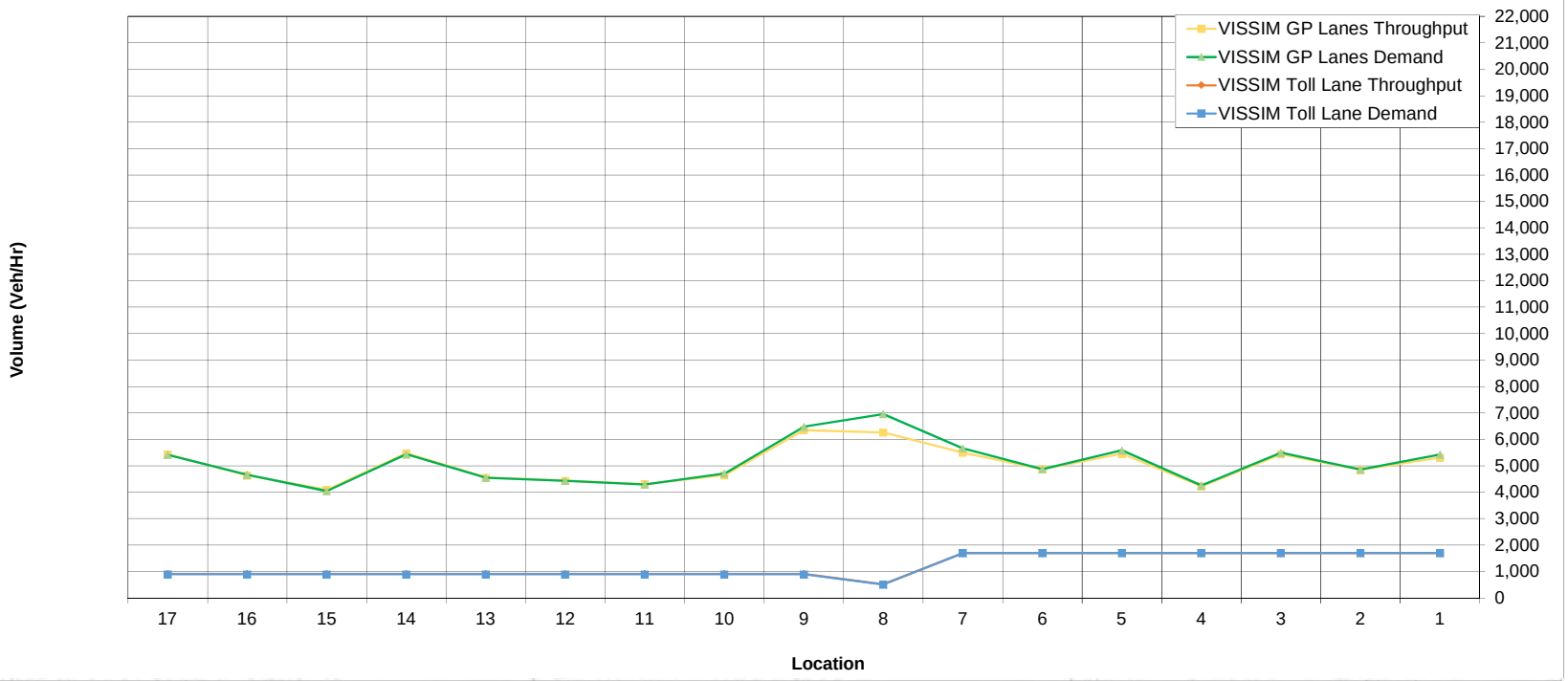
1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 NB
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from SR 71 NB
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 Off Ramp to Serfas/Autoclub
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	12 On Ramp From Green River	

EB Mainline & Toll Lane Speeds

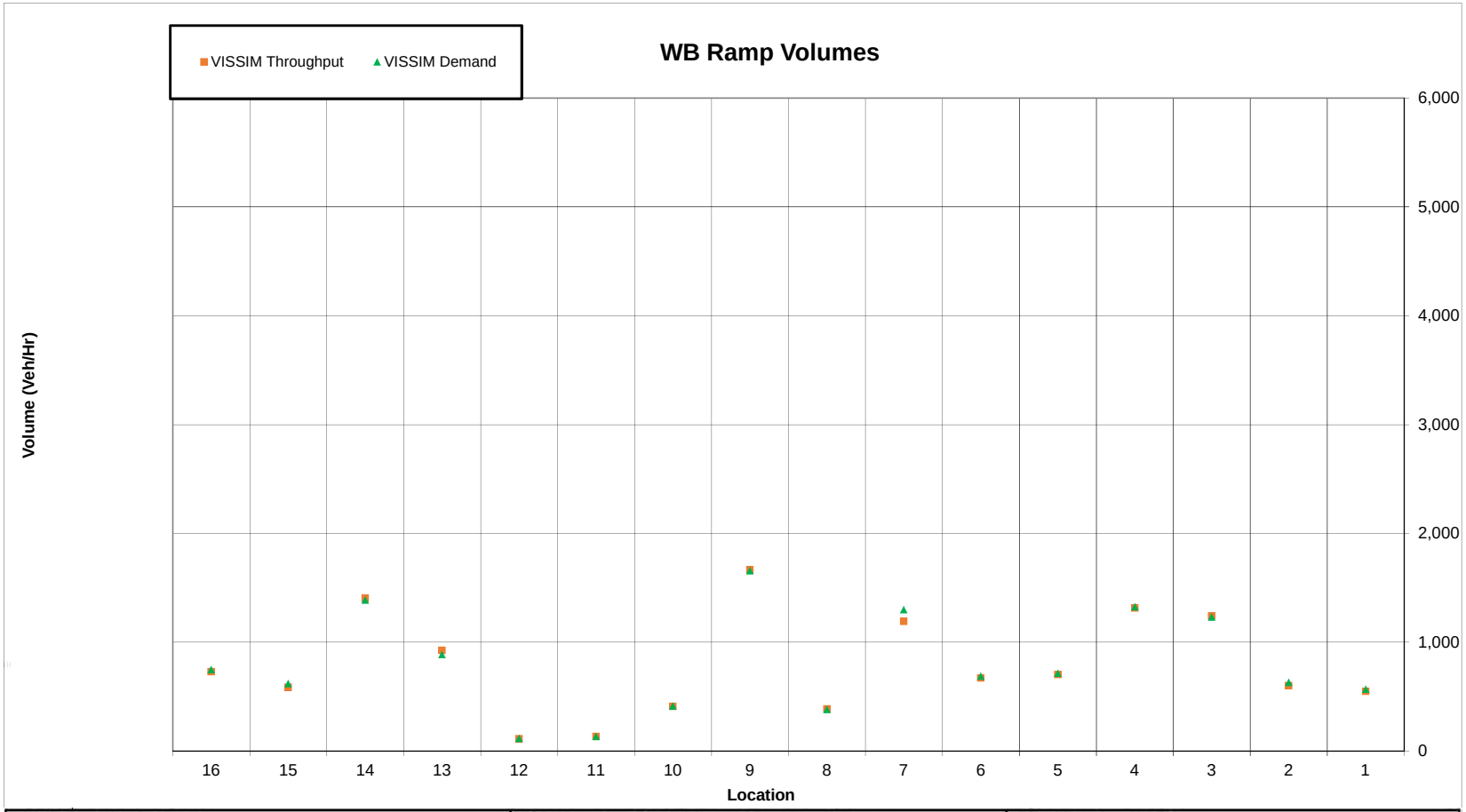


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location



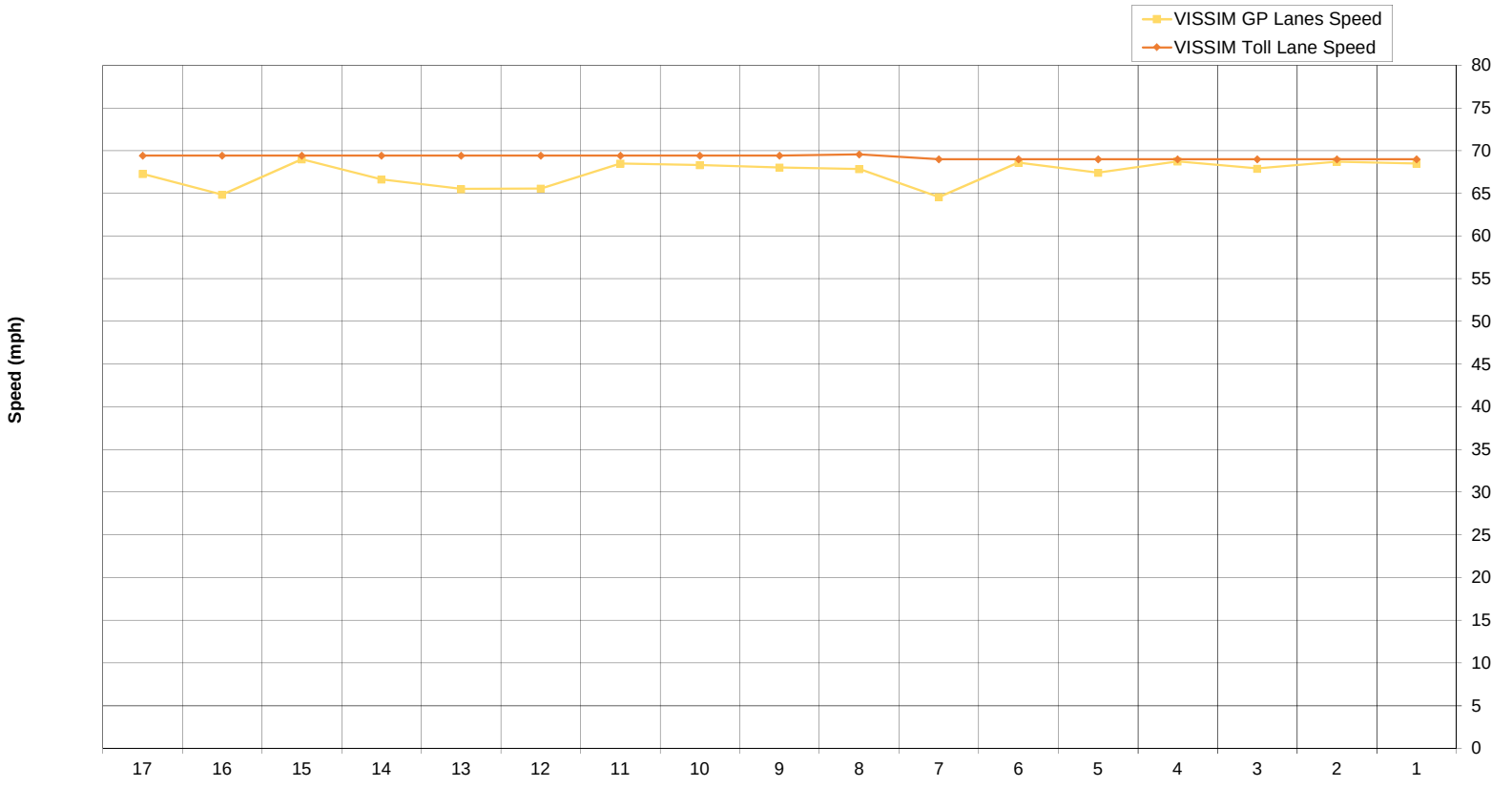
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

Charts 6-7 PM

WB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

Appendix D

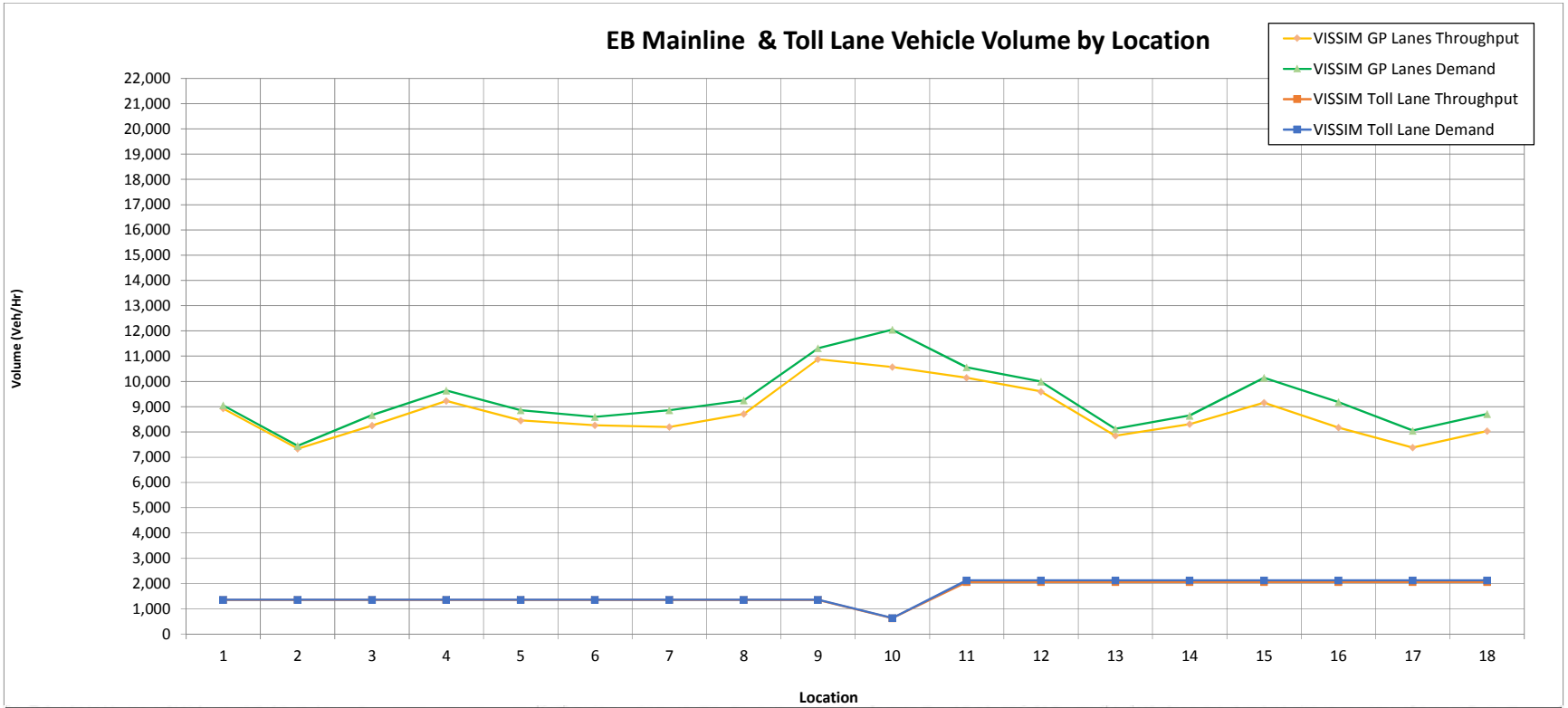
VISSIM Summary of Results
2040 No Build Conditions

VISSIM Model Summary - 2040 No Build - AM
Network Summary Statistics

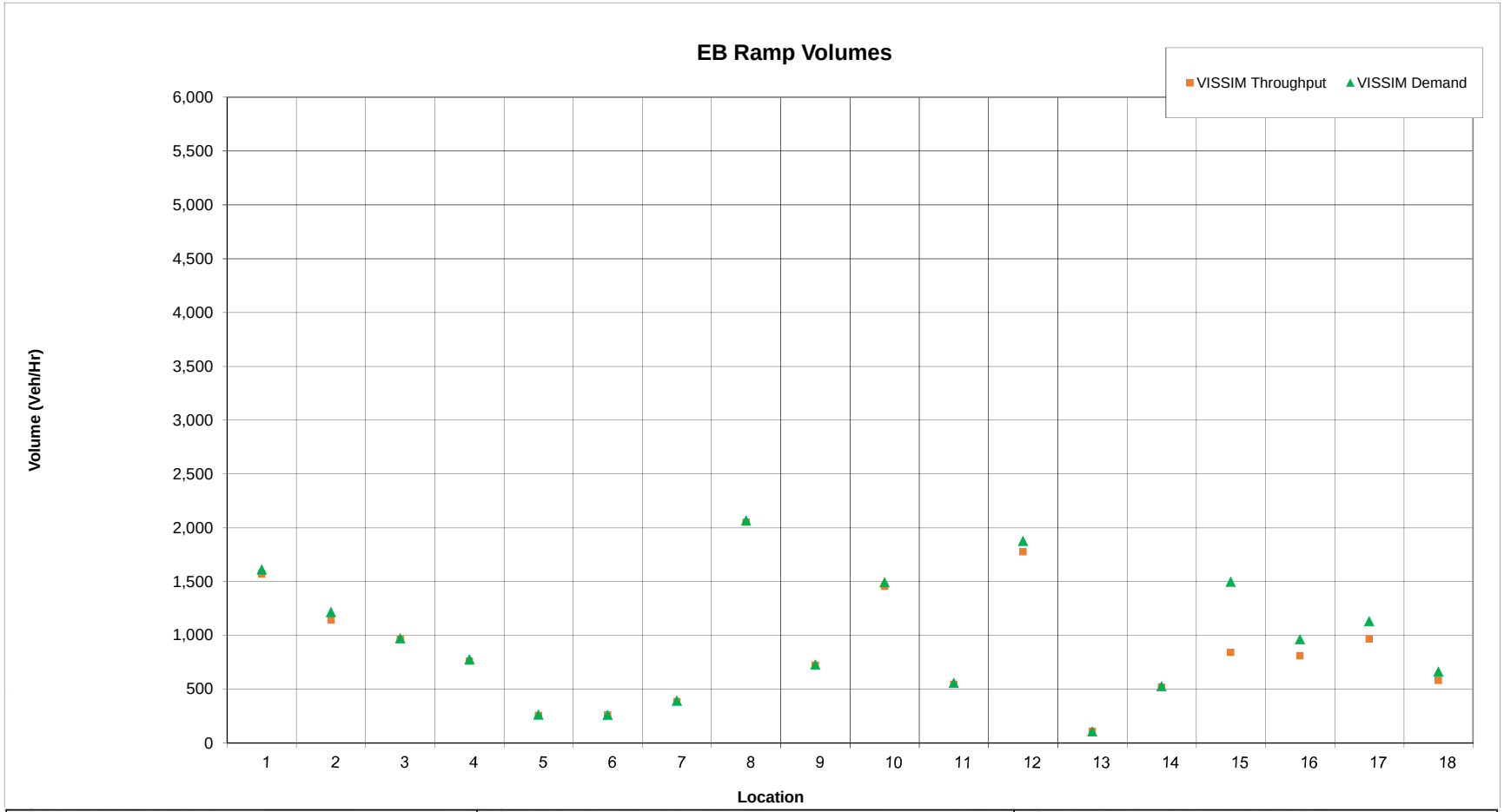
Parameter			2040 No Project	2017 No Project	Difference
Total Vehicle Demand (3 Hr)			119,605	100,741	18,864
Total number of vehicles that did not reach their desitination			10,264	9,016	1,247
Totla number of vehicles that have reached their destination			109,342	91,725	17,617
Total vehicle-miles traveled (VMT)			939,671	796,551	143,120
Total travel time, All Vehicle Types (VHT)			27,641	23,068	4,572
Average speed [mph], All Vehicle Types			34.0	34.5	-0.5
Average delay time per vehicle [mins], All Vehicle Types			7.00	6.83	0.17

VISSIM Model Summary - 2040 No Build - AM
Travel Time Results

#	Origin	#	Destination	p Ke	Hide Travel Time Segments Seg 1	Seg 2	Seg 3	2017 AM No Build VISSIM Travel Time (Minutes) 6-7 AM	7-8 AM	7-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	9.7	12.6	13.7
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	9.5	12.4	13.5
		5	SR 241 SB south of SR 91	3	1001			7.9	10.7	12.0
		7	SR 71 NB north of SR 91	4	1002	1003	1004	11.0	13.9	15.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.7	8.7	8.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.3	8.3	8.3
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.0	10.0	9.9
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	22.8	21.2	16.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	20.8	19.3	15.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	23.2	21.8	17.8
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	12	1010			8.5	8.0	5.7
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	15.0	14.5	13.2
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	15.5	15.0	14.7
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.3	7.3	7.3
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.1	11.1	11.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	10.9	10.9	10.9
		7	SR 71 NB north of SR 91	20	1007	1003	1004	12.4	12.4	12.4
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	39.6	56.0	59.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	37.6	54.2	58.4
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			23.5	38.6	44.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	40.1	56.6	60.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a



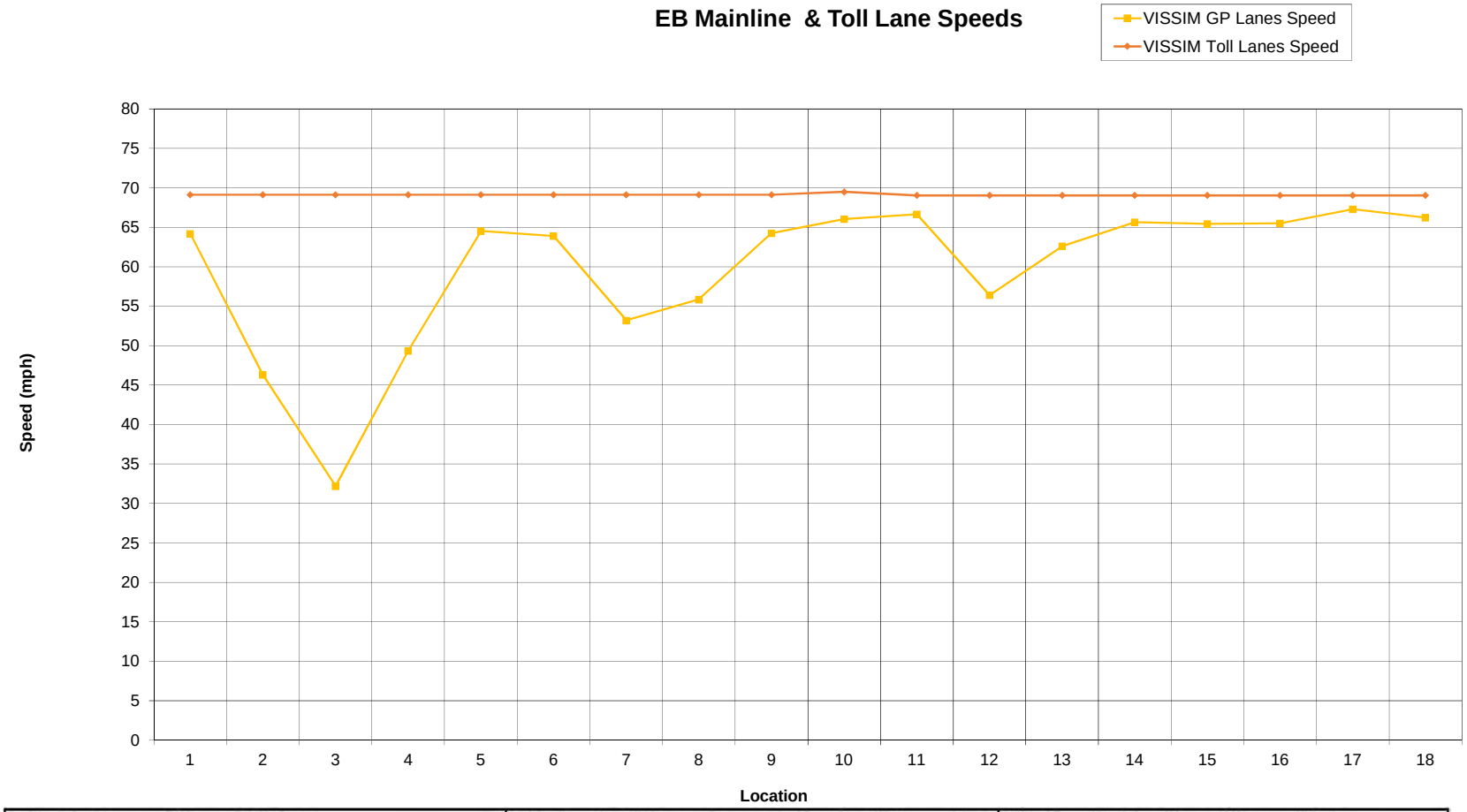
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR-71 to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	On Ramp from Green River to On Ramp from SR-71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to On Ramp from Managed Lanes	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	On Ramp from Managed Lanes to Off Ramp to Managed Lanes	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	Off Ramp to Managed Lanes to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71	18	On Ramp from Serfas/Autoclub to End of Study Area



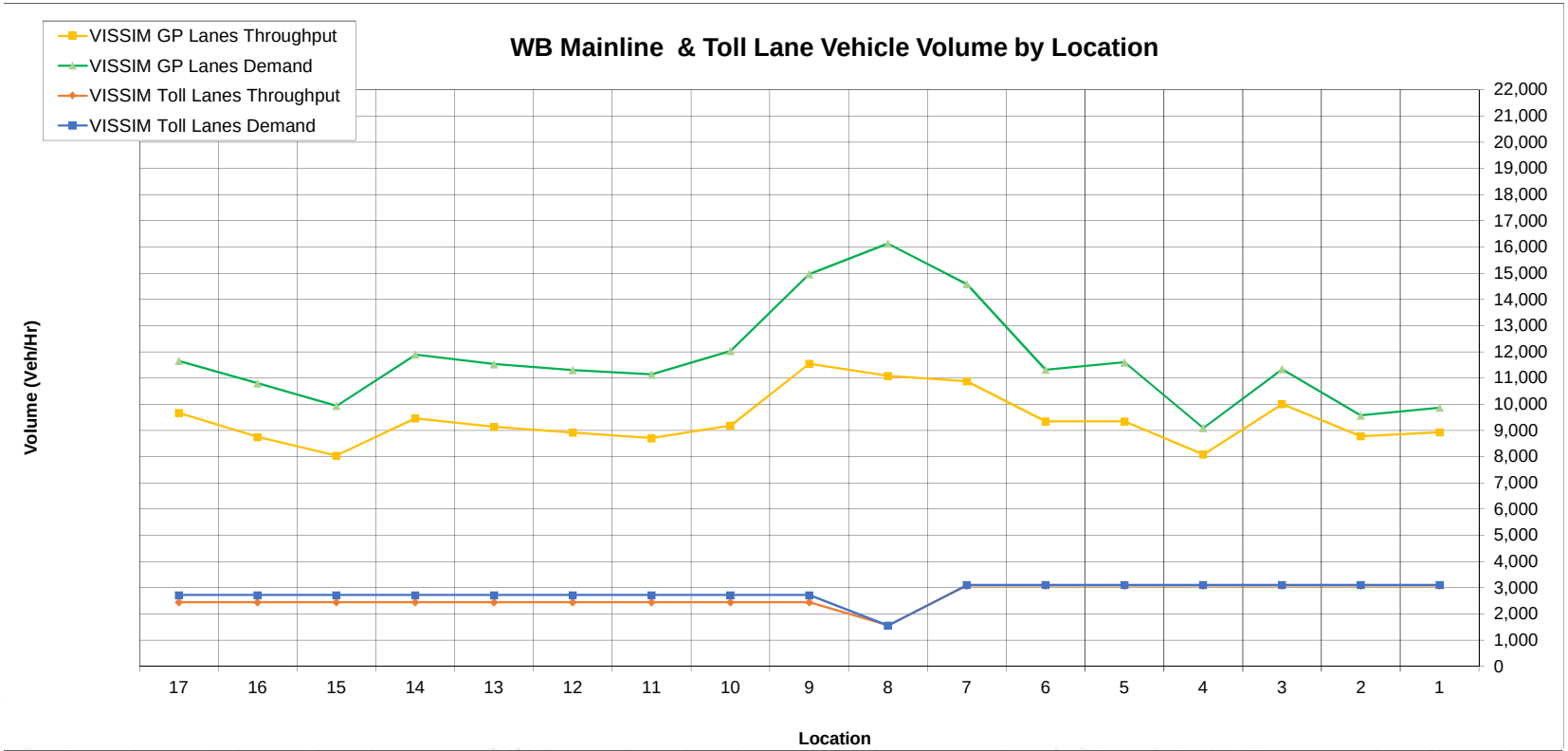
1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 On Ramp from Green River (to SR 71 NB)
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from Green River (to SR 91 EB)
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 On Ramp from SR 71 SB
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to Serfas/Autoclub
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 Off Ramp to EB Maple
6 On Ramp from SB Gypsum Canyon	12 Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub

Charts 6-7 AM

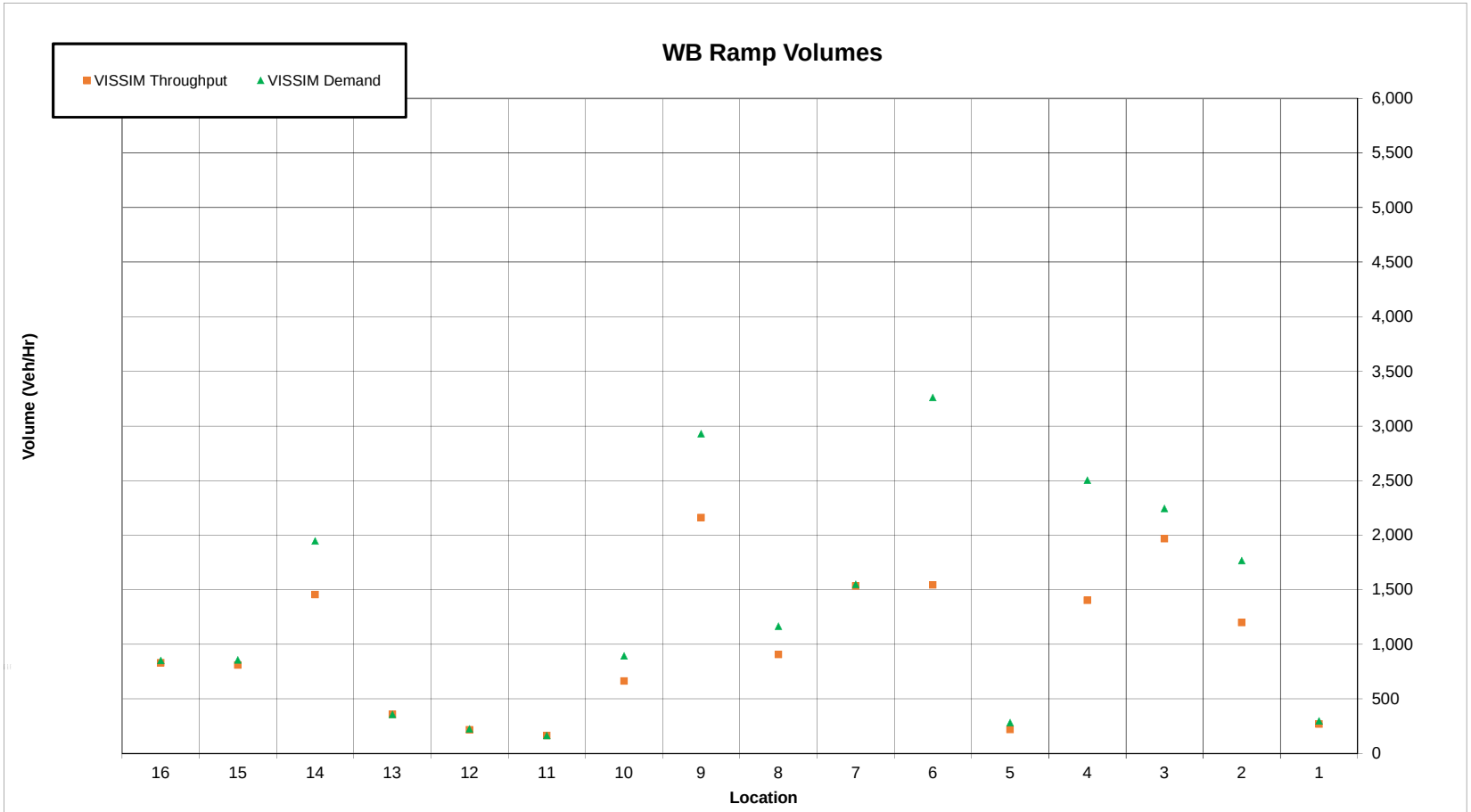
EB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

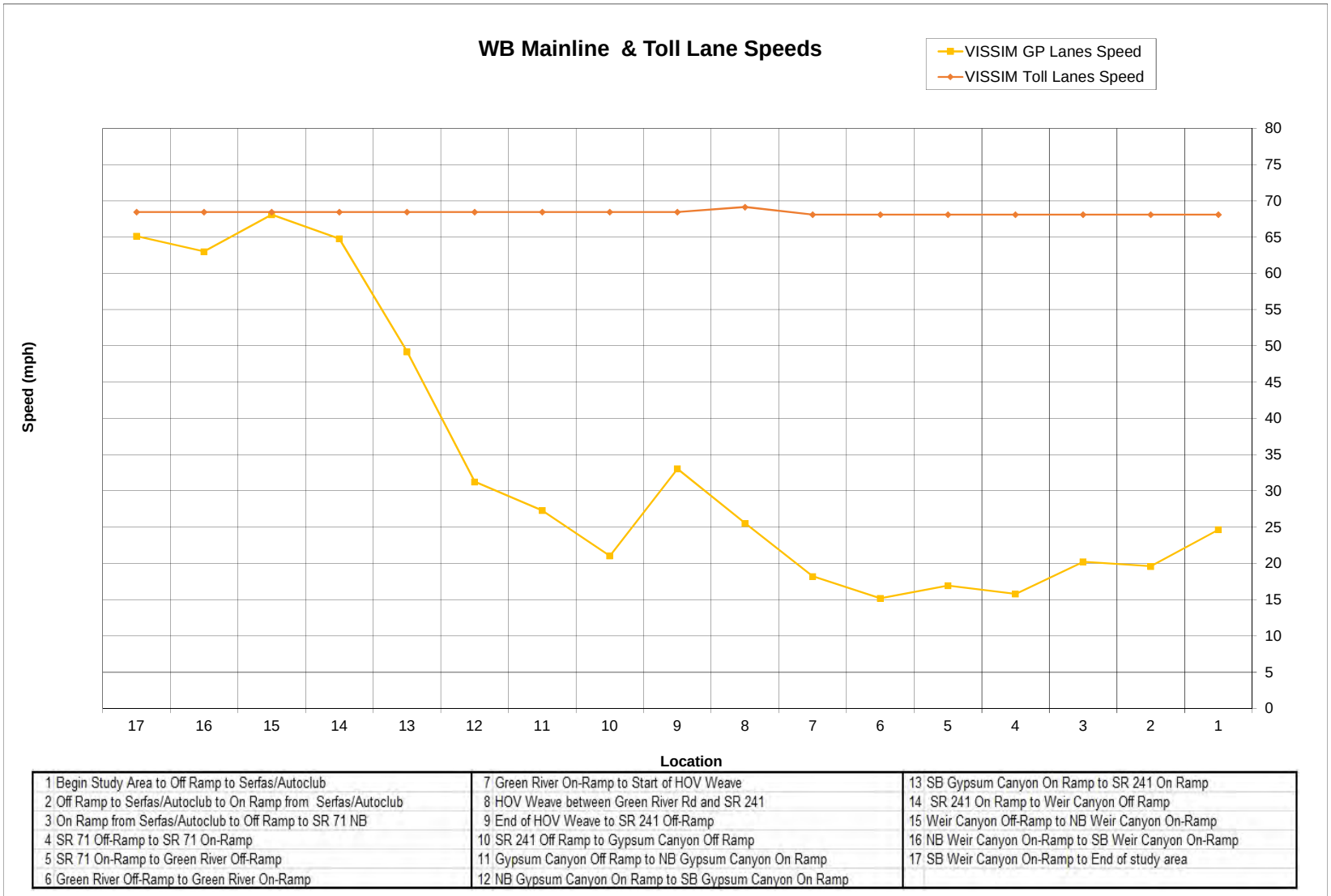


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from Managed Lanes	13 On Ramp from Gypsum Canyon SB to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from Managed Lanes to Off Ramp to Managed Lanes	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 Off Ramp to Managed Lanes to Off Ramp to SR 241	15 Off Ramp to Weir Canyon to On Ramp from Weir Canyon NB
4 Off Ramp to SR 71 to On Ramp from SR 71	10 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	16 On Ramp from Weir Canyon NB to On Ramp from Weir Canyon SB
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On Ramp from NB Gypsum Canyon (loop)	17 On Ramp from Weir Canyon SB to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from Gypsum Canyon NB to On Ramp from Gypsum Canyon SB	



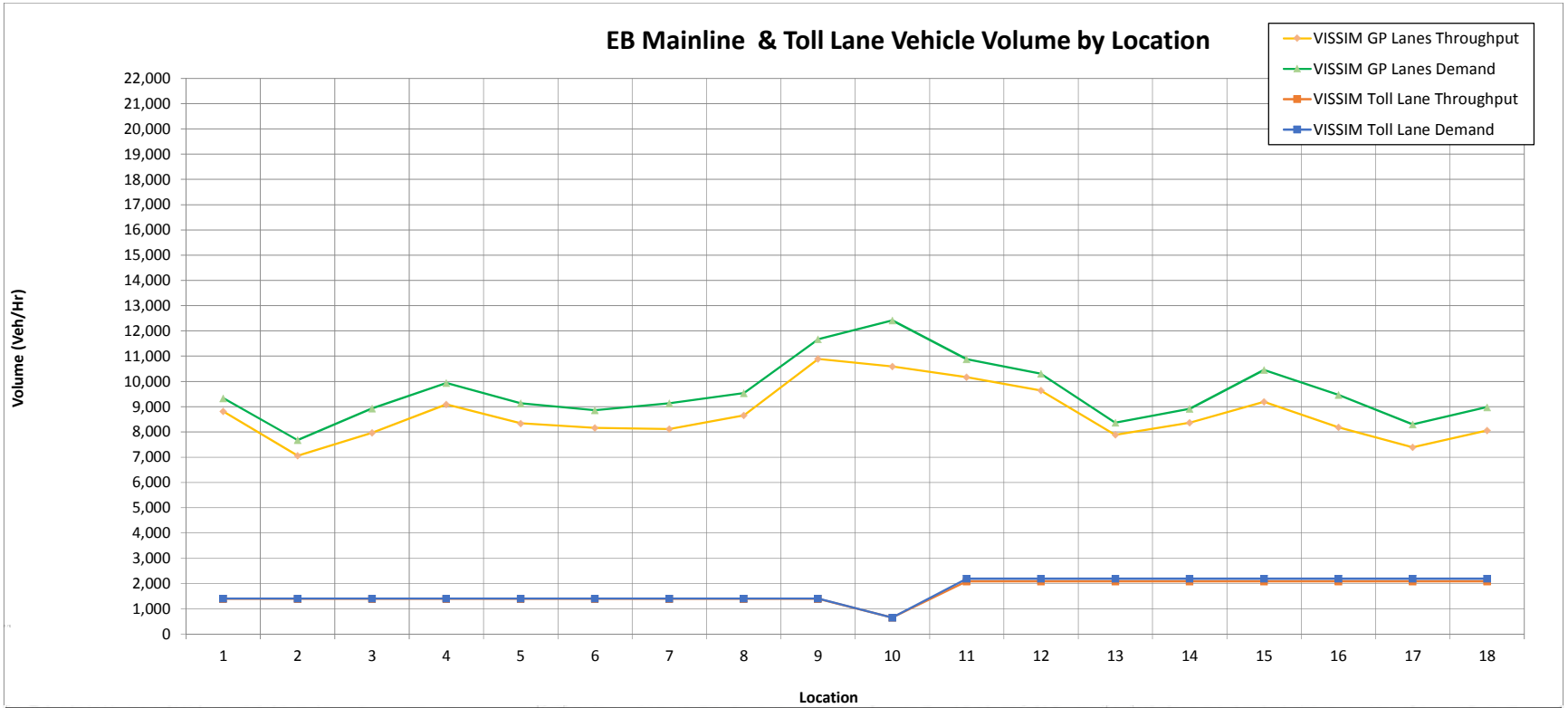
1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

Charts 6-7 AM

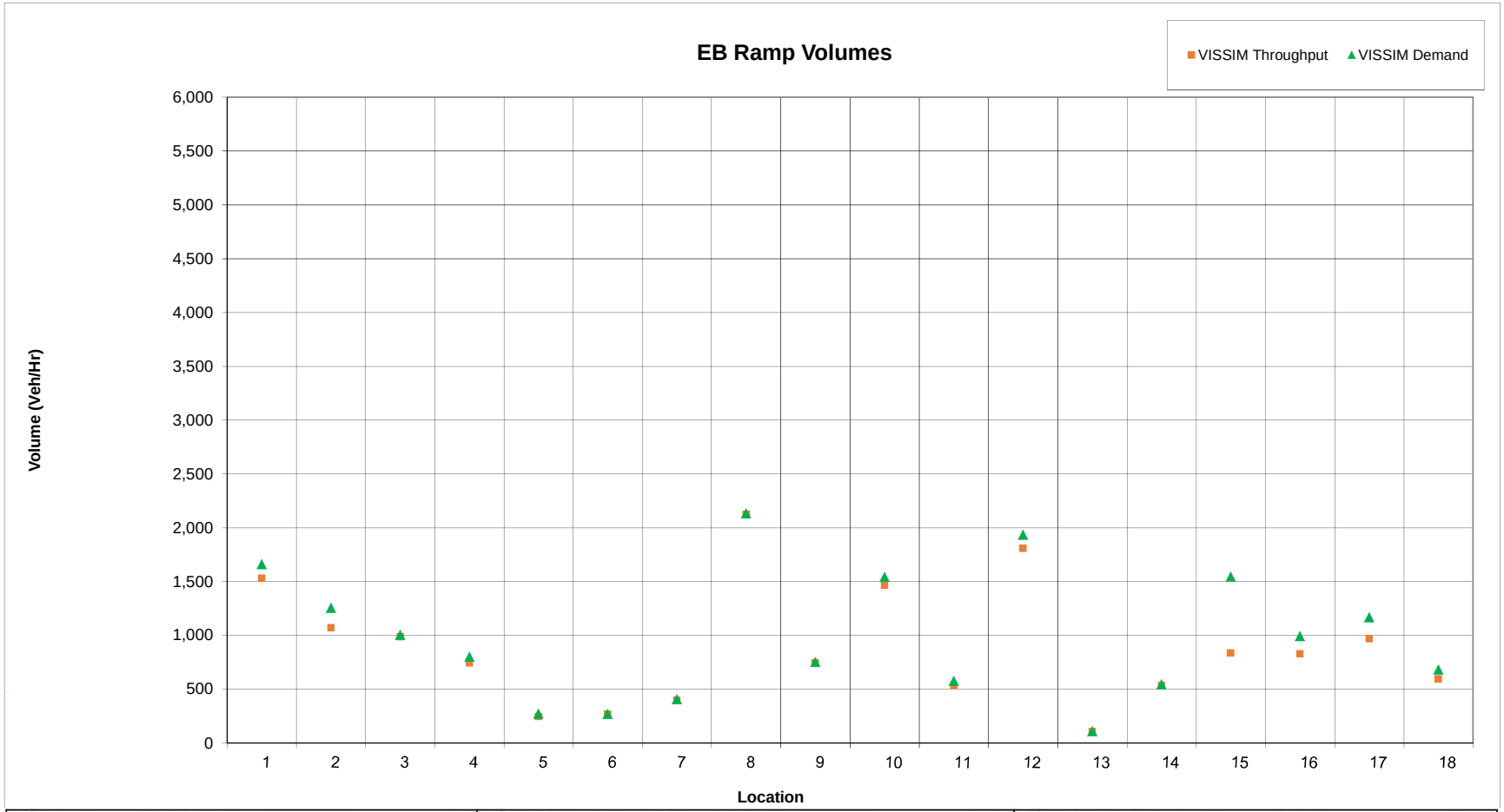


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

Charts 6-7 AM

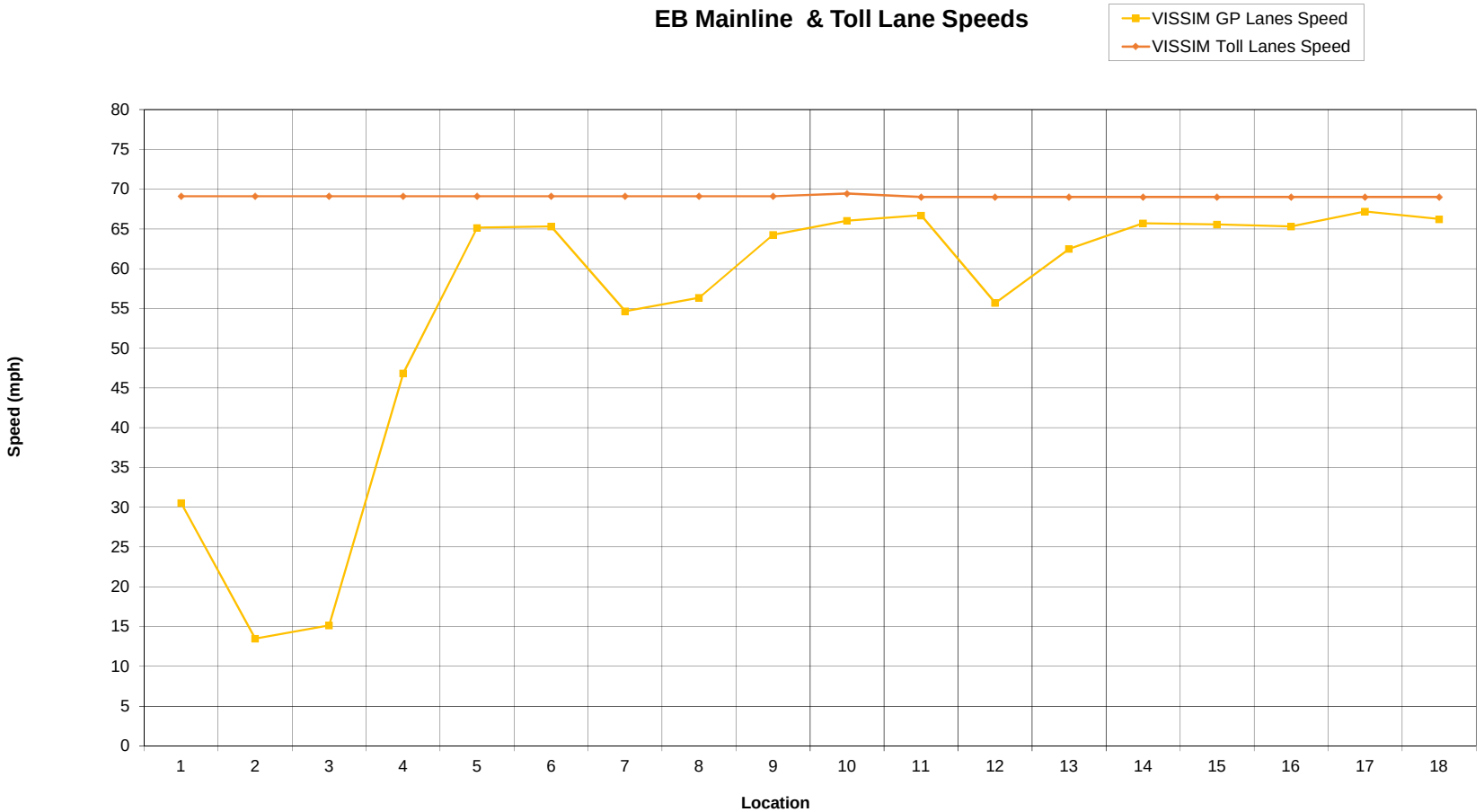


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR-71 to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	On Ramp from Green River to On Ramp from SR-71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to On Ramp from Managed Lanes	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	On Ramp from Managed Lanes to Off Ramp to Managed Lanes	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	Off Ramp to Managed Lanes to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71	18	On Ramp from Serfas/Autoclub to End of Study Area

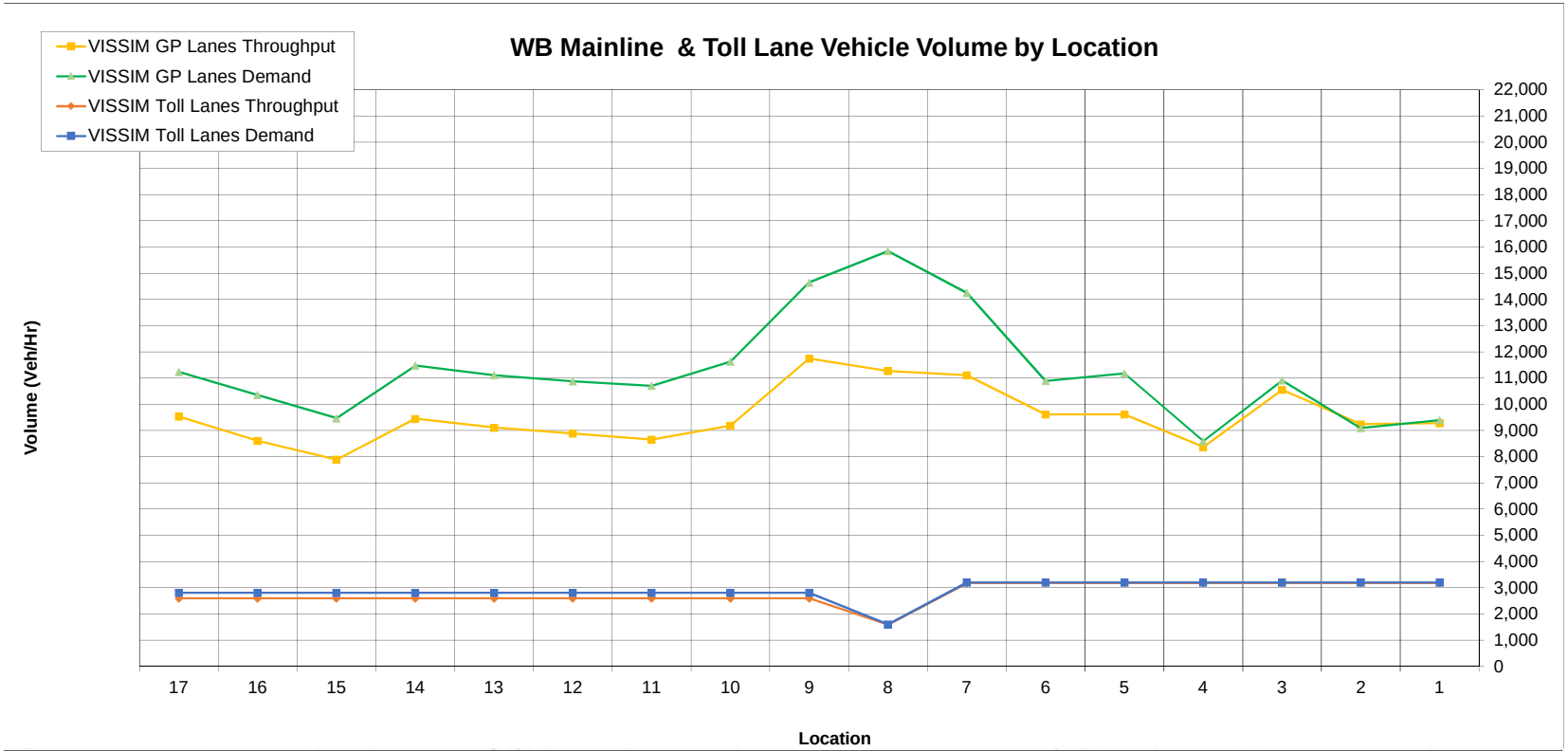


1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 On Ramp from Green River (to SR 71 NB)
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from Green River (to SR 91 EB)
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 On Ramp from SR 71 SB
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to Serfas/Autoclub
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 Off Ramp to EB Maple
6 On Ramp from SB Gypsum Canyon	12 Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub

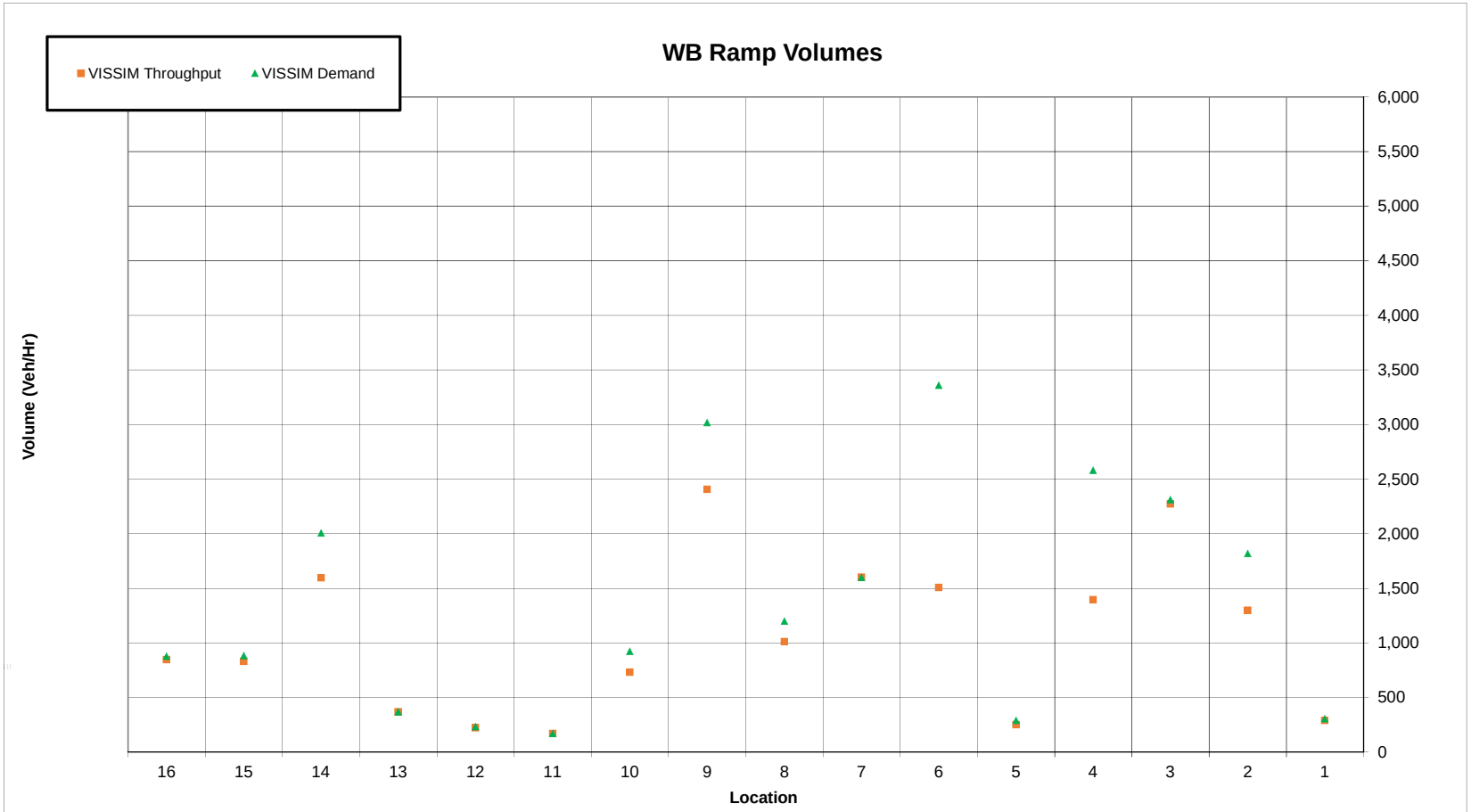
EB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



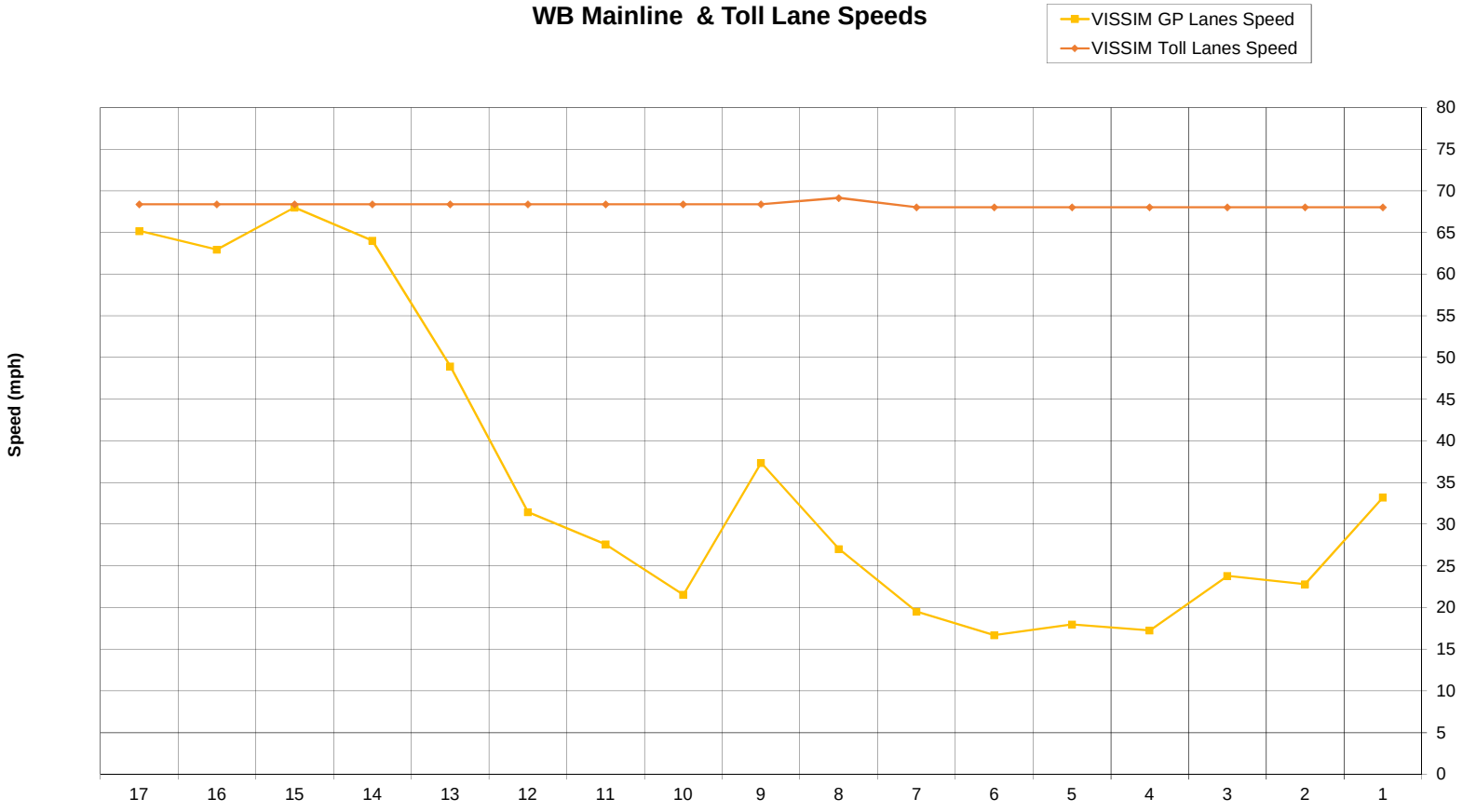
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from Managed Lanes	13 On Ramp from Gypsum Canyon SB to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from Managed Lanes to Off Ramp to Managed Lanes	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 Off Ramp to Managed Lanes to Off Ramp to SR 241	15 Off Ramp to Weir Canyon to On Ramp from Weir Canyon NB
4 Off Ramp to SR 71 to On Ramp from SR 71	10 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	16 On Ramp from Weir Canyon NB to On Ramp from Weir Canyon SB
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On Ramp from NB Gypsum Canyon (loop)	17 On Ramp from Weir Canyon SB to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from Gypsum Canyon NB to On Ramp from Gypsum Canyon SB	



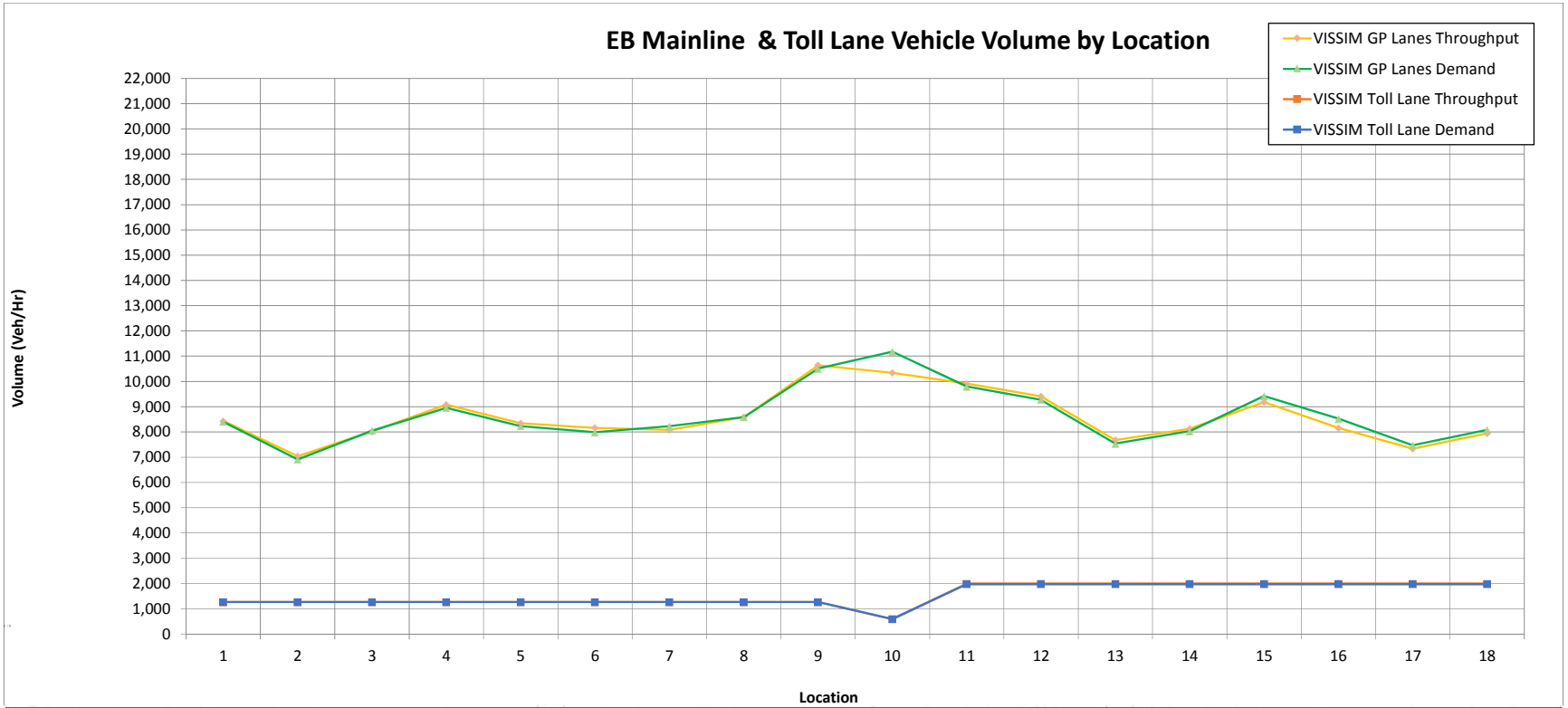
1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

Charts 7-8 AM

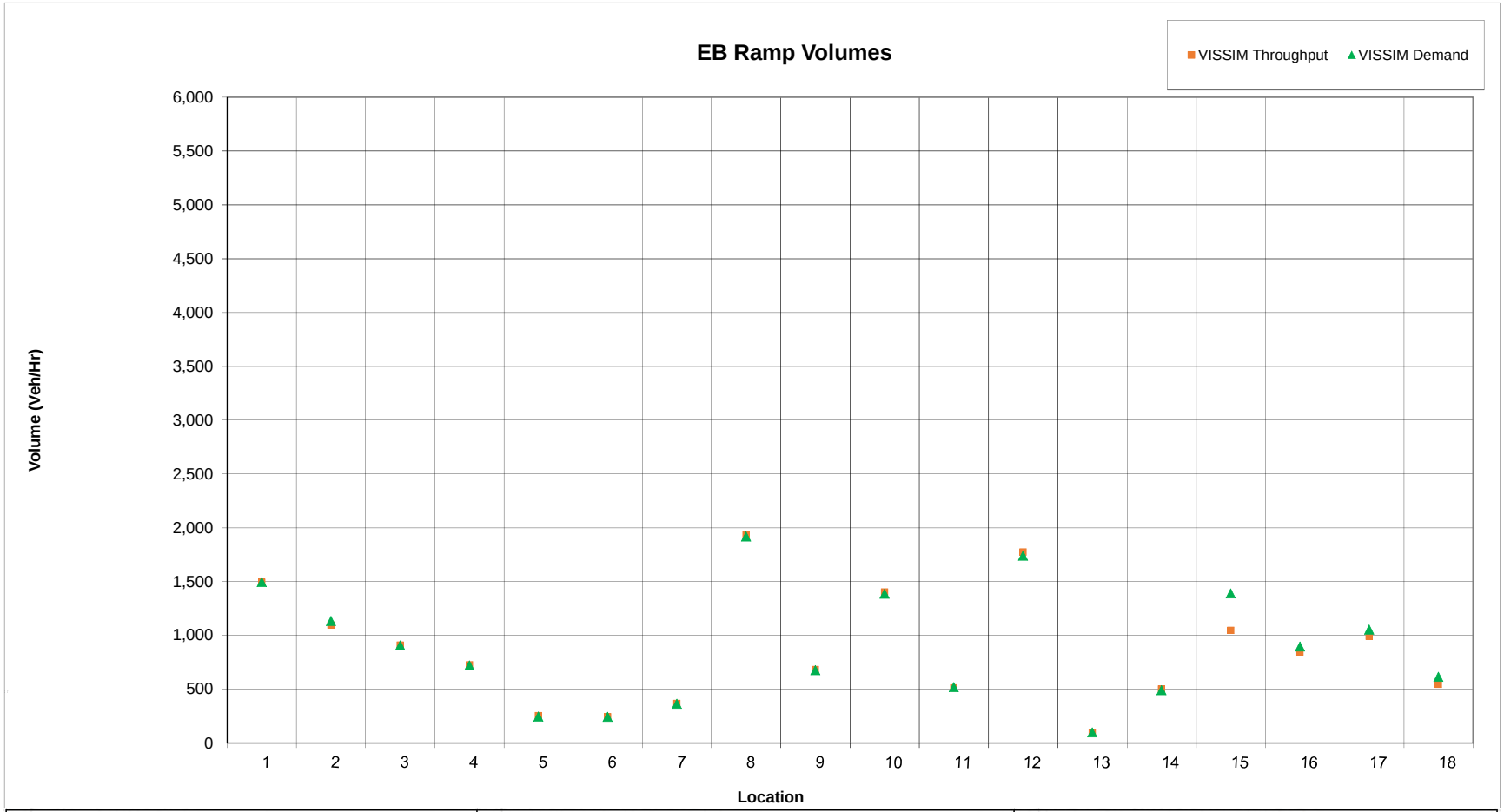
WB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

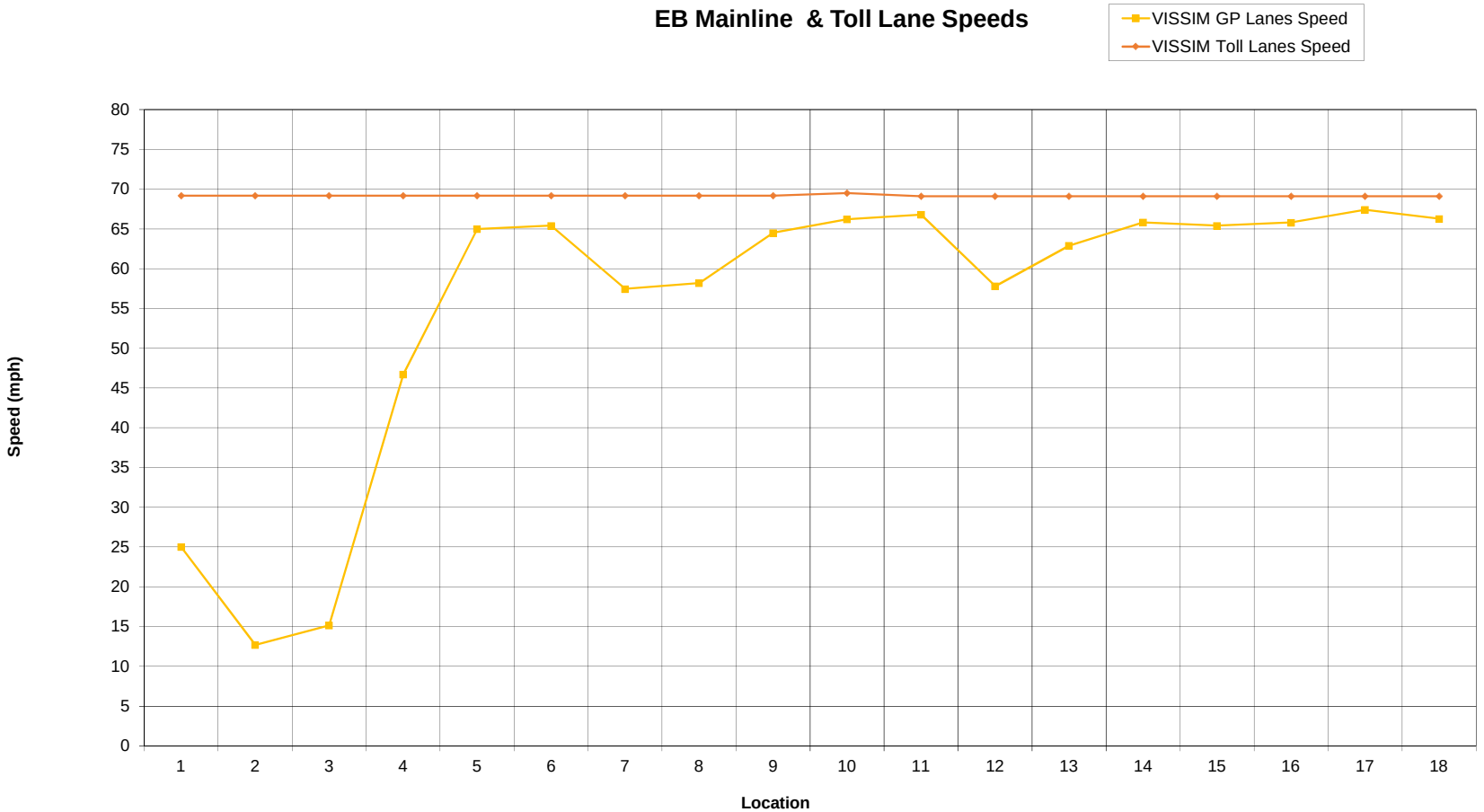


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR-71 to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	On Ramp from Green River to On Ramp from SR-71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to On Ramp from Managed Lanes	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	On Ramp from Managed Lanes to Off Ramp to Managed Lanes	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	Off Ramp to Managed Lanes to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71	18	On Ramp from Serfas/Autoclub to End of Study Area

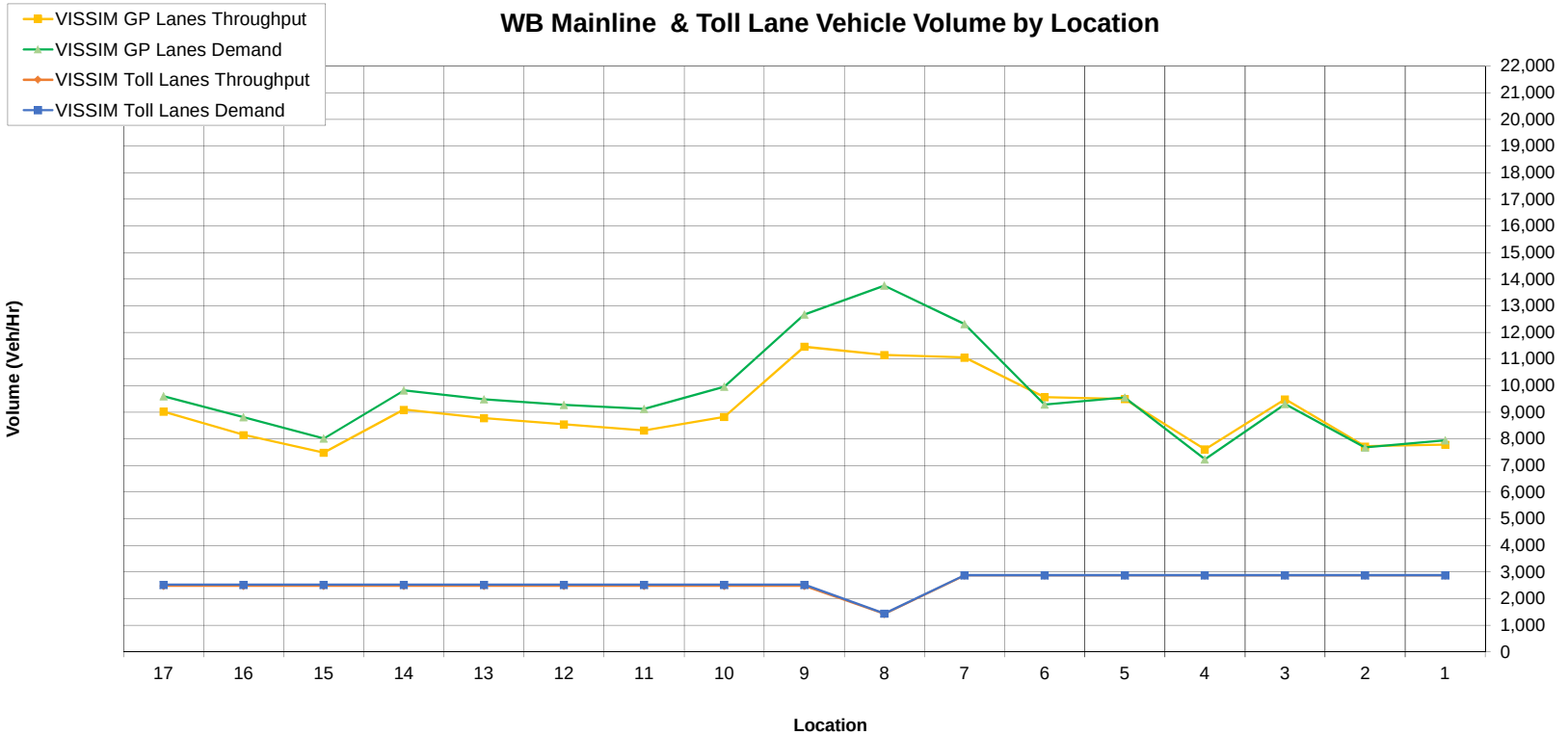


1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 On Ramp from Green River (to SR 71 NB)
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from Green River (to SR 91 EB)
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 On Ramp from SR 71 SB
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to Serfas/Autoclub
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 Off Ramp to EB Maple
6 On Ramp from SB Gypsum Canyon	12 Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub

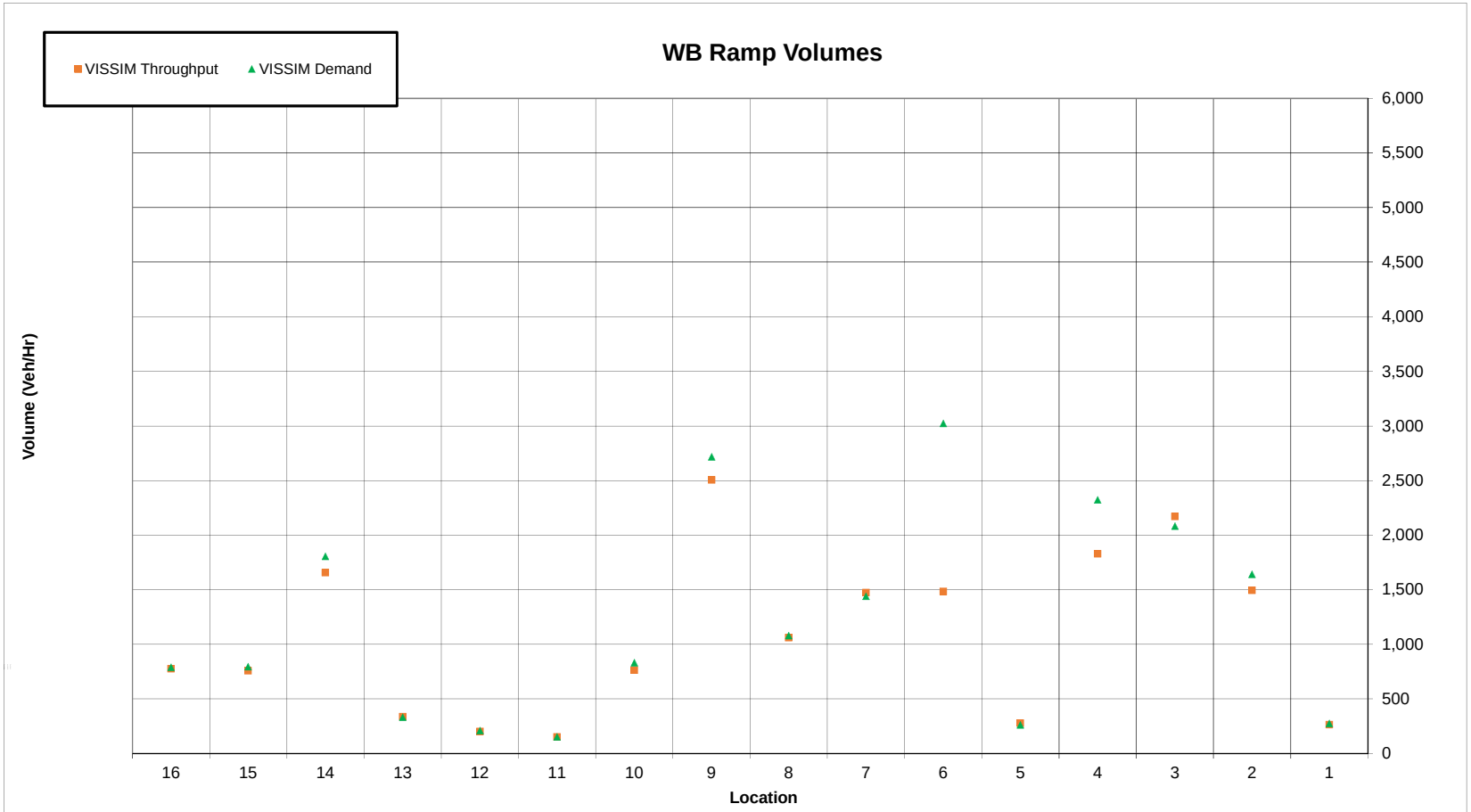
EB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



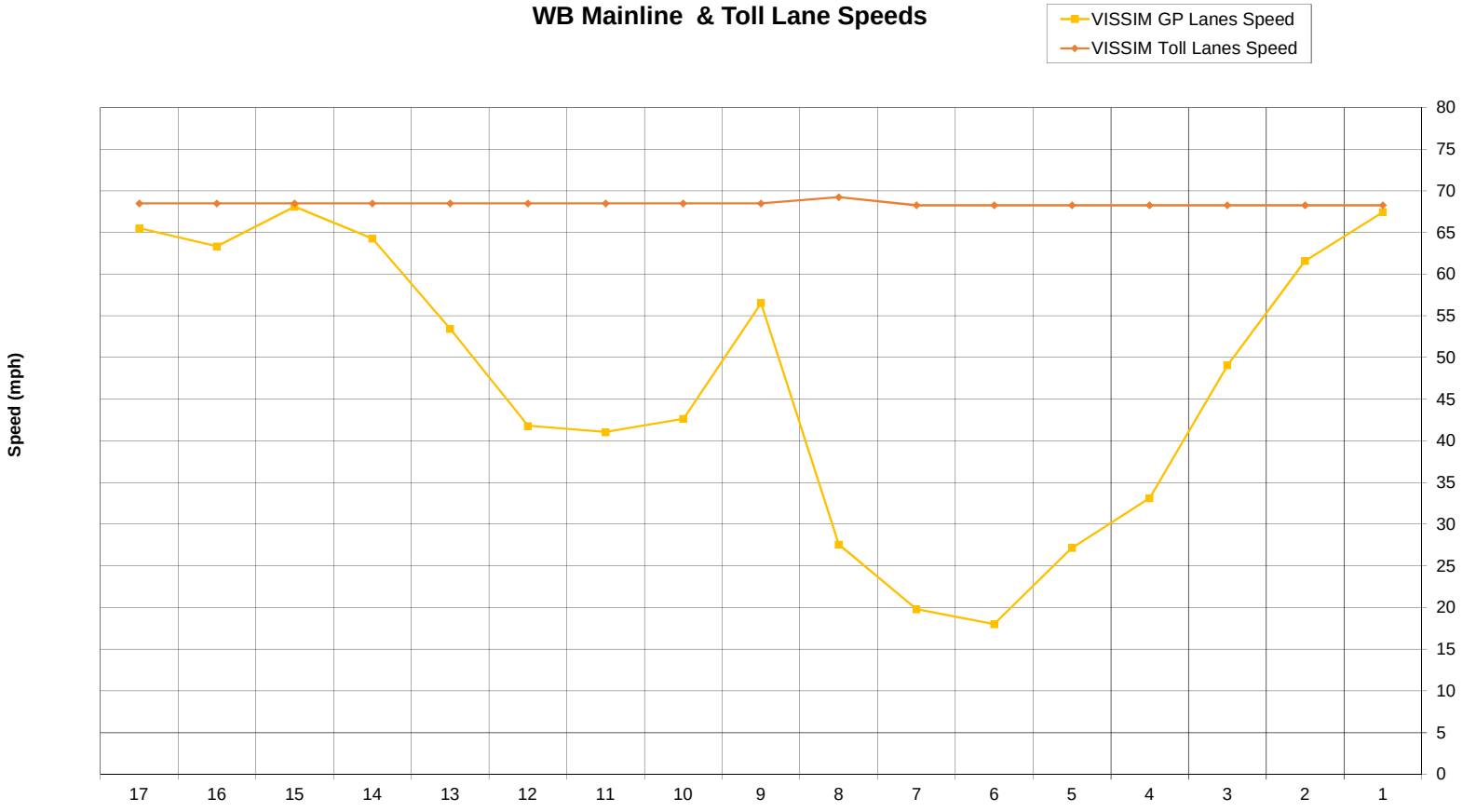
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from Managed Lanes	13 On Ramp from Gypsum Canyon SB to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from Managed Lanes to Off Ramp to Managed Lanes	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 Off Ramp to Managed Lanes to Off Ramp to SR 241	15 Off Ramp to Weir Canyon to On Ramp from Weir Canyon NB
4 Off Ramp to SR 71 to On Ramp from SR 71	10 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	16 On Ramp from Weir Canyon NB to On Ramp from Weir Canyon SB
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On Ramp from NB Gypsum Canyon (loop)	17 On Ramp from Weir Canyon SB to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from Gypsum Canyon NB to On Ramp from Gypsum Canyon SB	



1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

Charts 8-9 AM

WB Mainline & Toll Lane Speeds



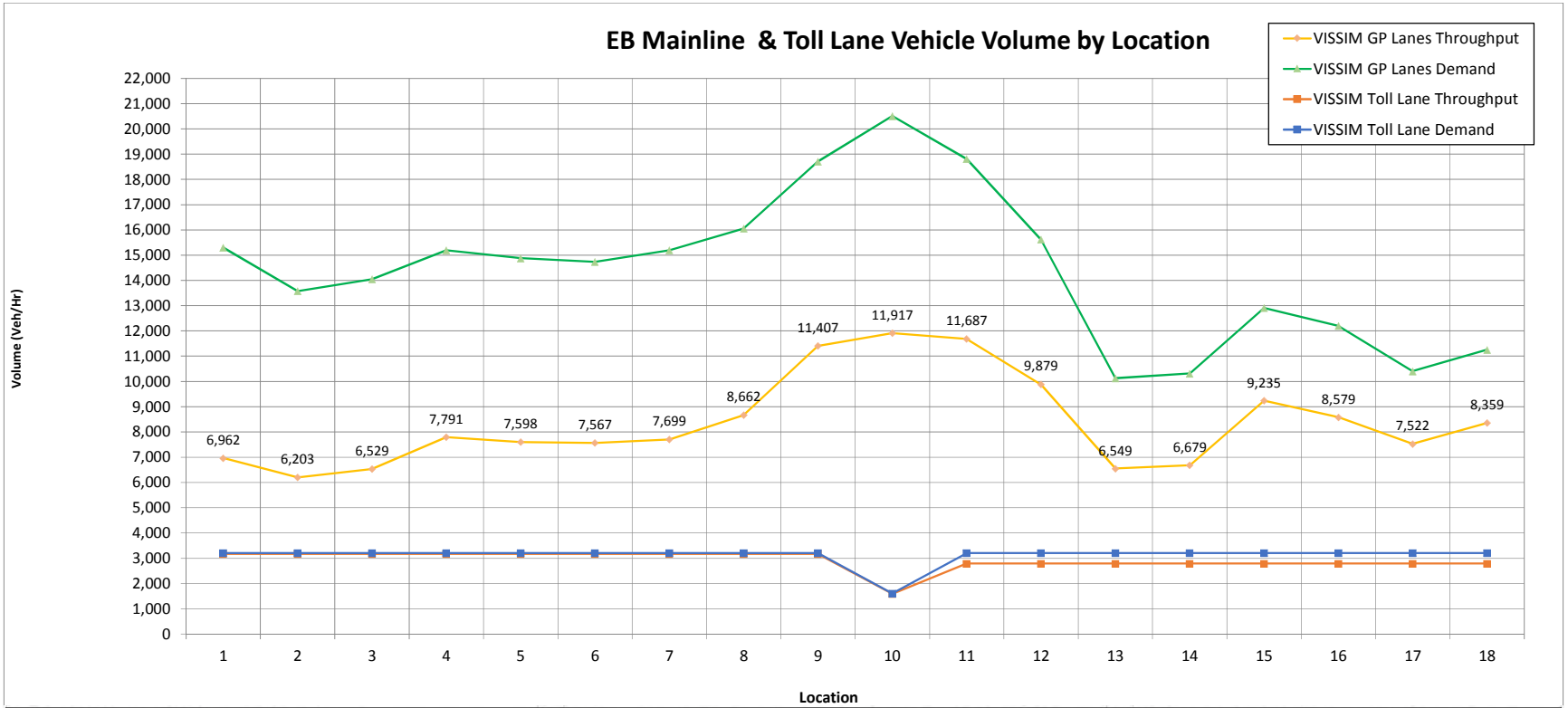
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

VISSIM Model Summary - 2040 No Build - PM Peak Period
Network Summary Statistics

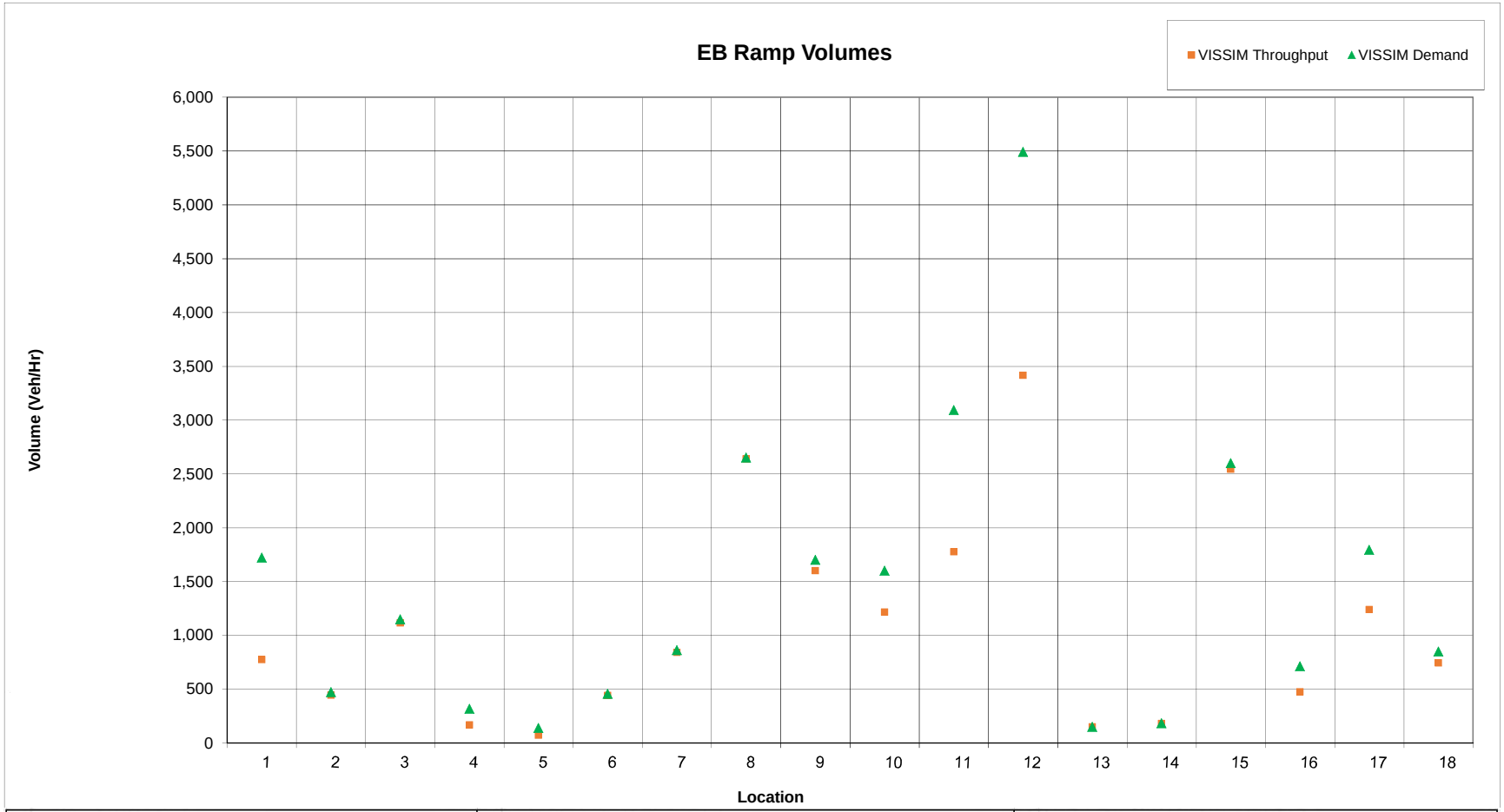
Parameter			2040 No Project	2017 No Project	Difference
Total Vehicle Demand (4 Hr)			168,494	141,937	26,557
Total number of vehicles that did not reach their desitination			26,918	20,812	6,106
Totla number of vehicles that have reached their destination			141,576	121,125	20,451
Total vehicle-miles traveled (VMT)			1,173,727	1,014,001	159,725
Total travel time, All Vehicle Types (VHT)			26,063	26,278	-215
Average speed [mph], All Vehicle Types			45.1	38.6	6.5
Average delay time per vehicle [mins], All Vehicle Types			3.45	5.27	-1.82

VISSIM Model Summary - 2040 No Build - PM Peak Period
Network Summary Statistics

#	Origin	#	Destination	) Ke	Hide Travel Time Seg 1	Seg 2	Seg 3	2040 PM No Build VISSIM Travel Time (Minutes) 3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	19.8	20.3	20.9	20.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	19.7	20.3	20.8	20.5
		5	SR 241 SB south of SR 91	3	1001			14.7	14.7	14.6	14.3
		7	SR 71 NB north of SR 91	4	1002	1003	1004	21.2	21.8	22.3	22.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.8	9.2	9.7	9.9
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.4	8.4	8.4	8.4
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.2	10.6	11.2	11.4
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	8.7	8.7	8.7	8.5
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	8.6	8.6	8.6	8.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	11.0	11.1	11.0	10.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	12	1010			5.0	5.0	5.0	5.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	8.6	8.7	8.6	8.5
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4	8.3
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	11.0	11.0	11.0	10.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a	n/a
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.2	7.2	7.5	7.3
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.2	11.6	12.7	12.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	11.2	11.6	12.7	12.5
		7	SR 71 NB north of SR 91	20	1007	1003	1004	12.6	13.1	14.2	14.0
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a	n/a
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a	n/a
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	10.0	10.1	10.0	9.8
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	9.9	10.0	9.9	9.8
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			5.7	5.7	5.6	5.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	12.4	12.5	12.4	12.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a	n/a

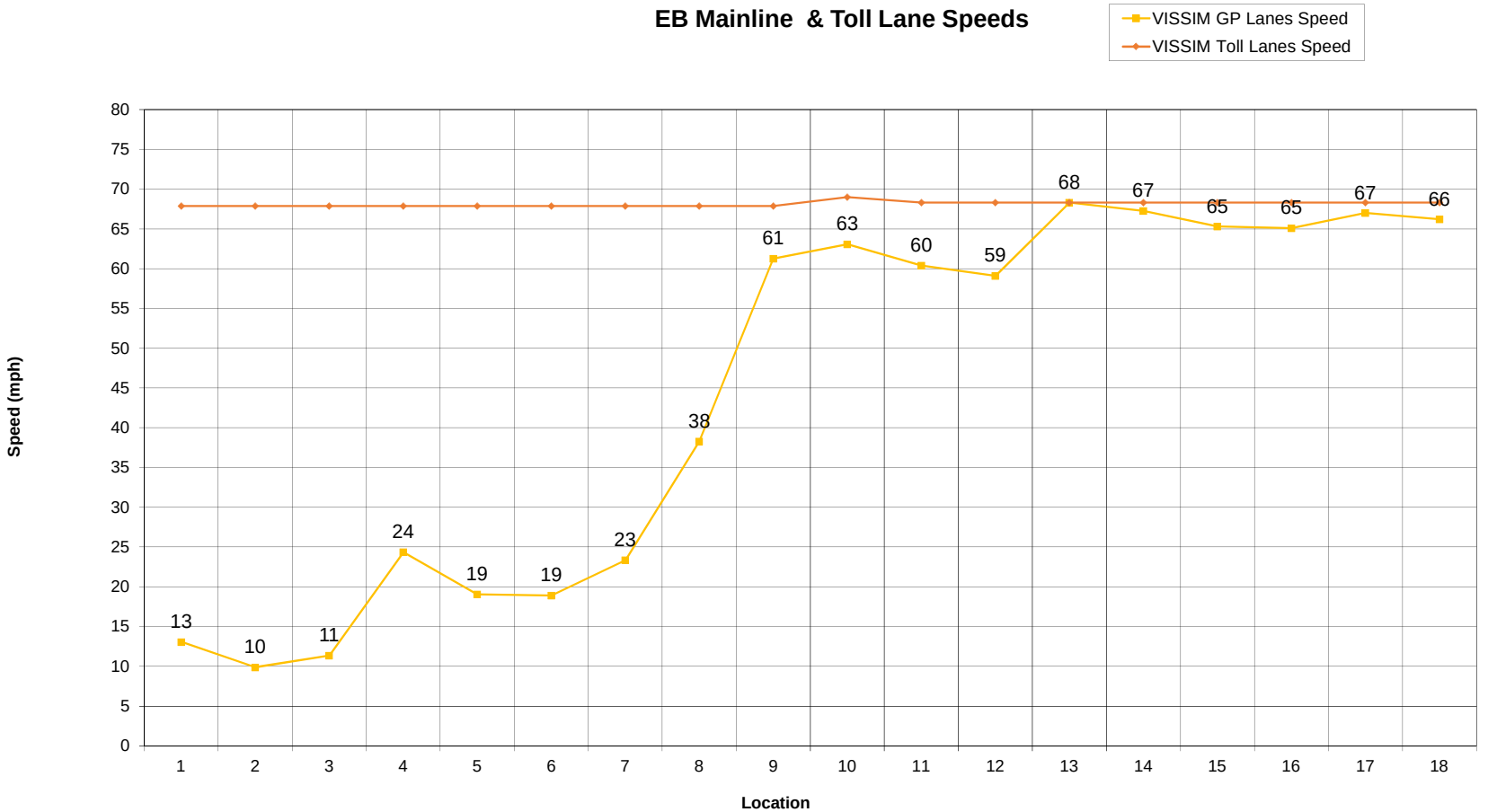


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR-71 to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	On Ramp from Green River to On Ramp from SR-71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to On Ramp from Managed Lanes	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	On Ramp from Managed Lanes to Off Ramp to Managed Lanes	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	Off Ramp to Managed Lanes to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71	18	On Ramp from Serfas/Autoclub to End of Study Area

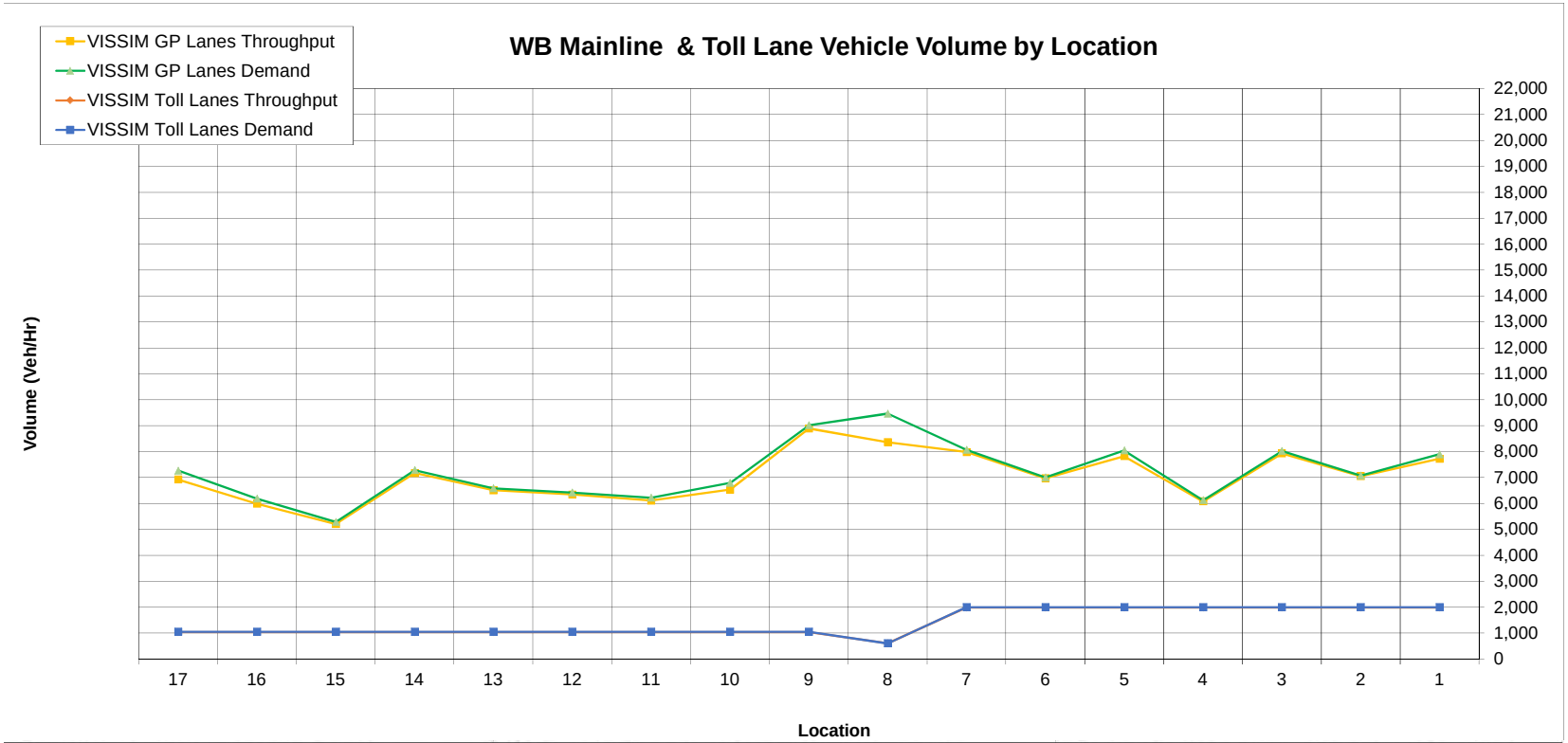


1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 On Ramp from Green River (to SR 71 NB)
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from Green River (to SR 91 EB)
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 On Ramp from SR 71 SB
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to Serfas/Autoclub
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 Off Ramp to EB Maple
6 On Ramp from SB Gypsum Canyon	12 Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub

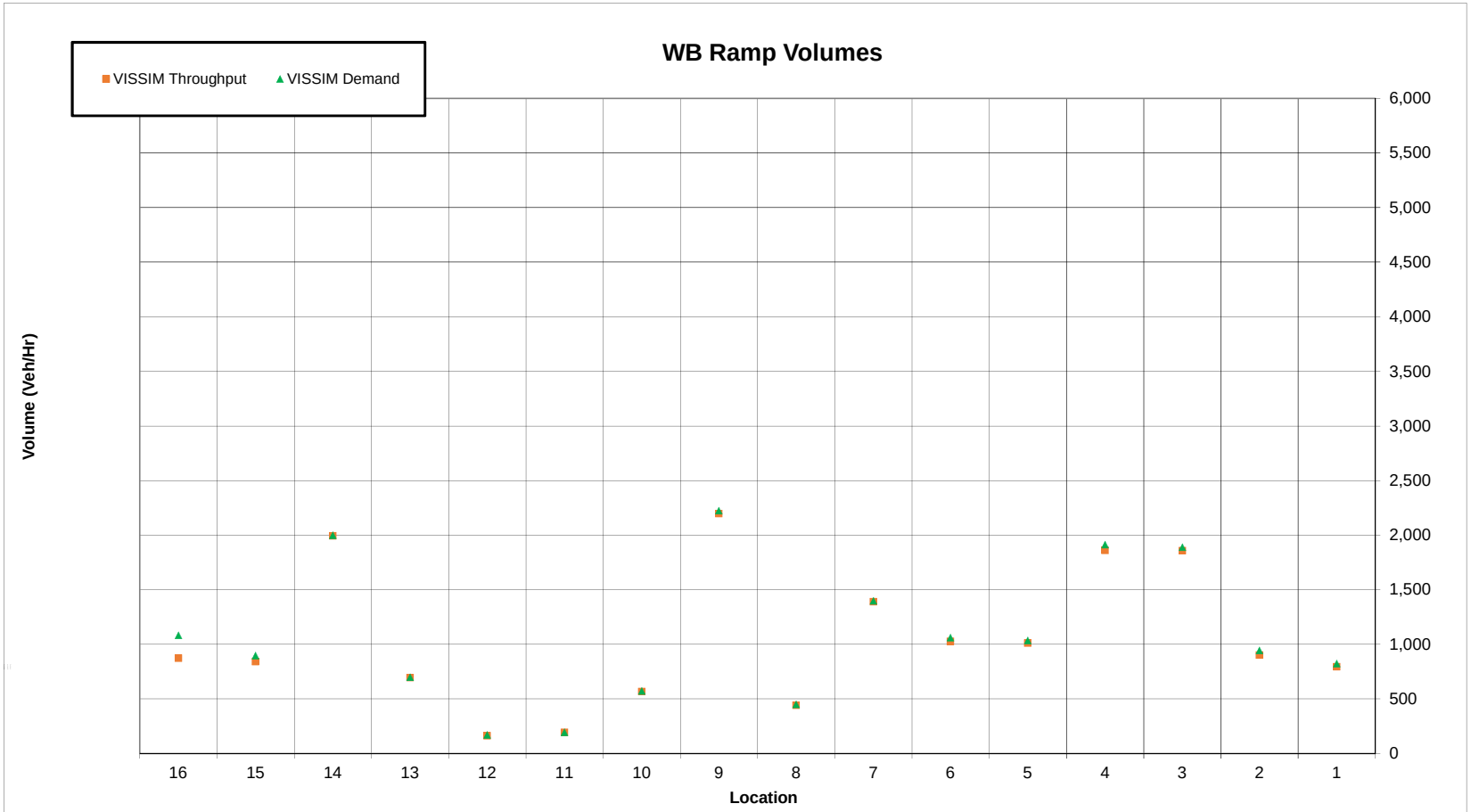
EB Mainline & Toll Lane Speeds



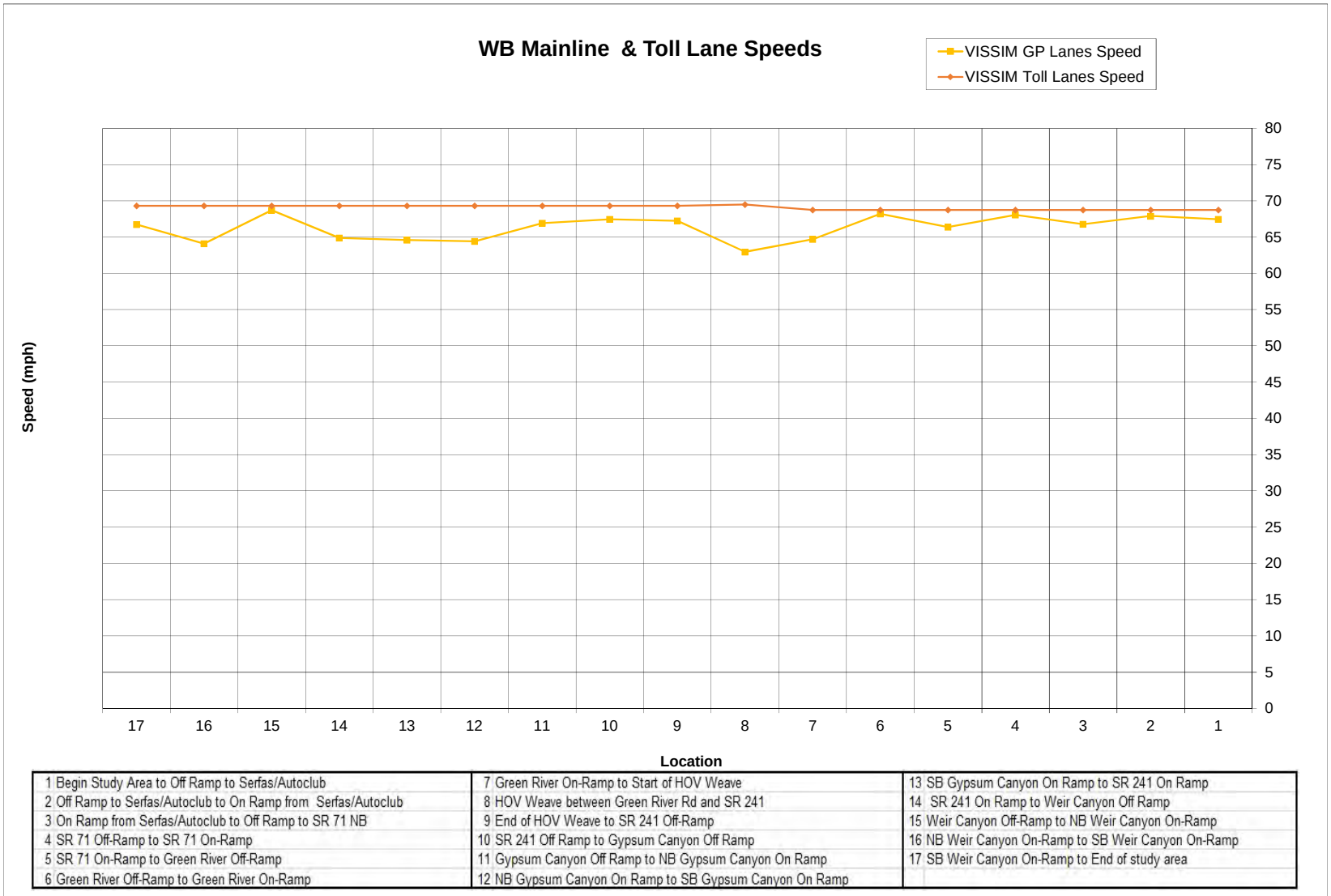
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



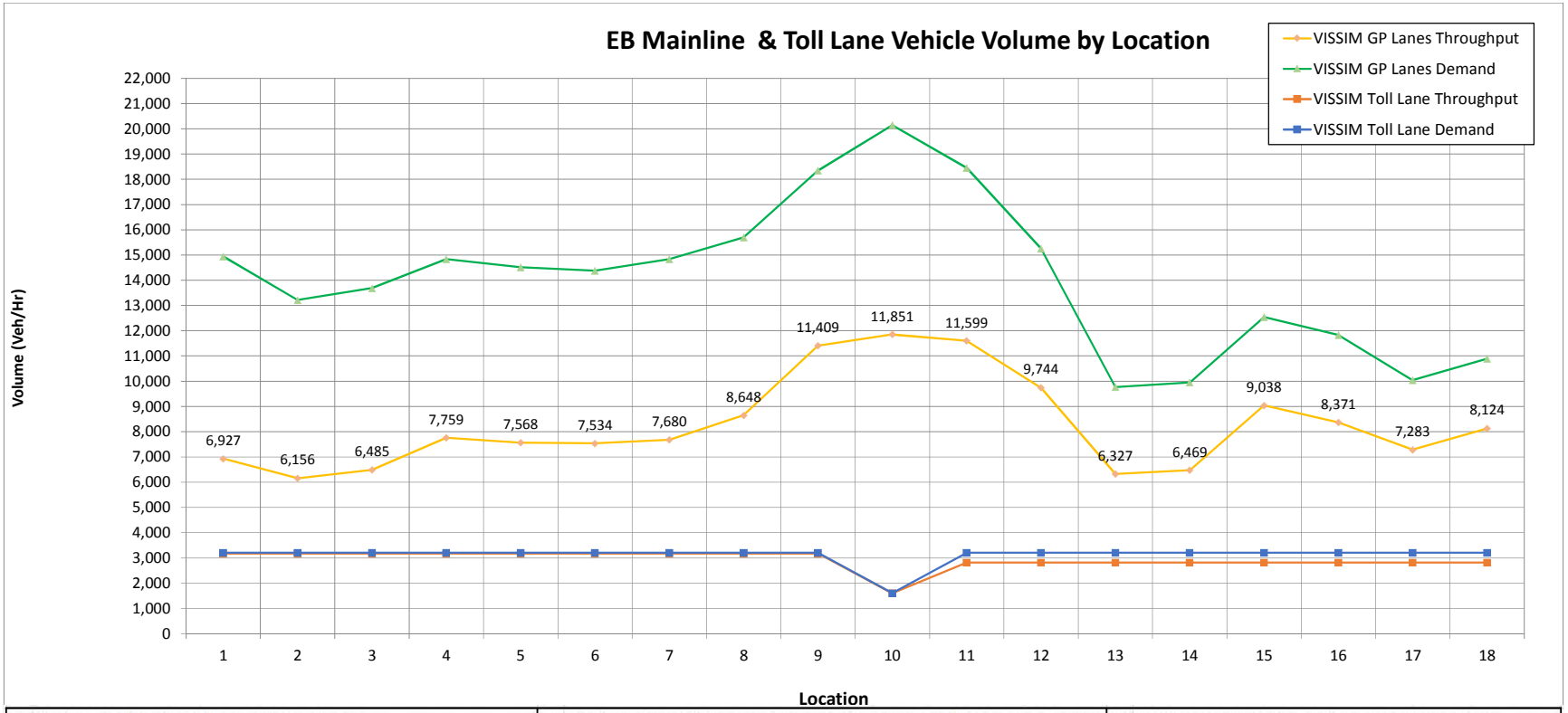
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from Managed Lanes	13 On Ramp from Gypsum Canyon SB to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from Managed Lanes to Off Ramp to Managed Lanes	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 Off Ramp to Managed Lanes to Off Ramp to SR 241	15 Off Ramp to Weir Canyon to On Ramp from Weir Canyon NB
4 Off Ramp to SR 71 to On Ramp from SR 71	10 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	16 On Ramp from Weir Canyon NB to On Ramp from Weir Canyon SB
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On Ramp from NB Gypsum Canyon (loop)	17 On Ramp from Weir Canyon SB to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from Gypsum Canyon NB to On Ramp from Gypsum Canyon SB	



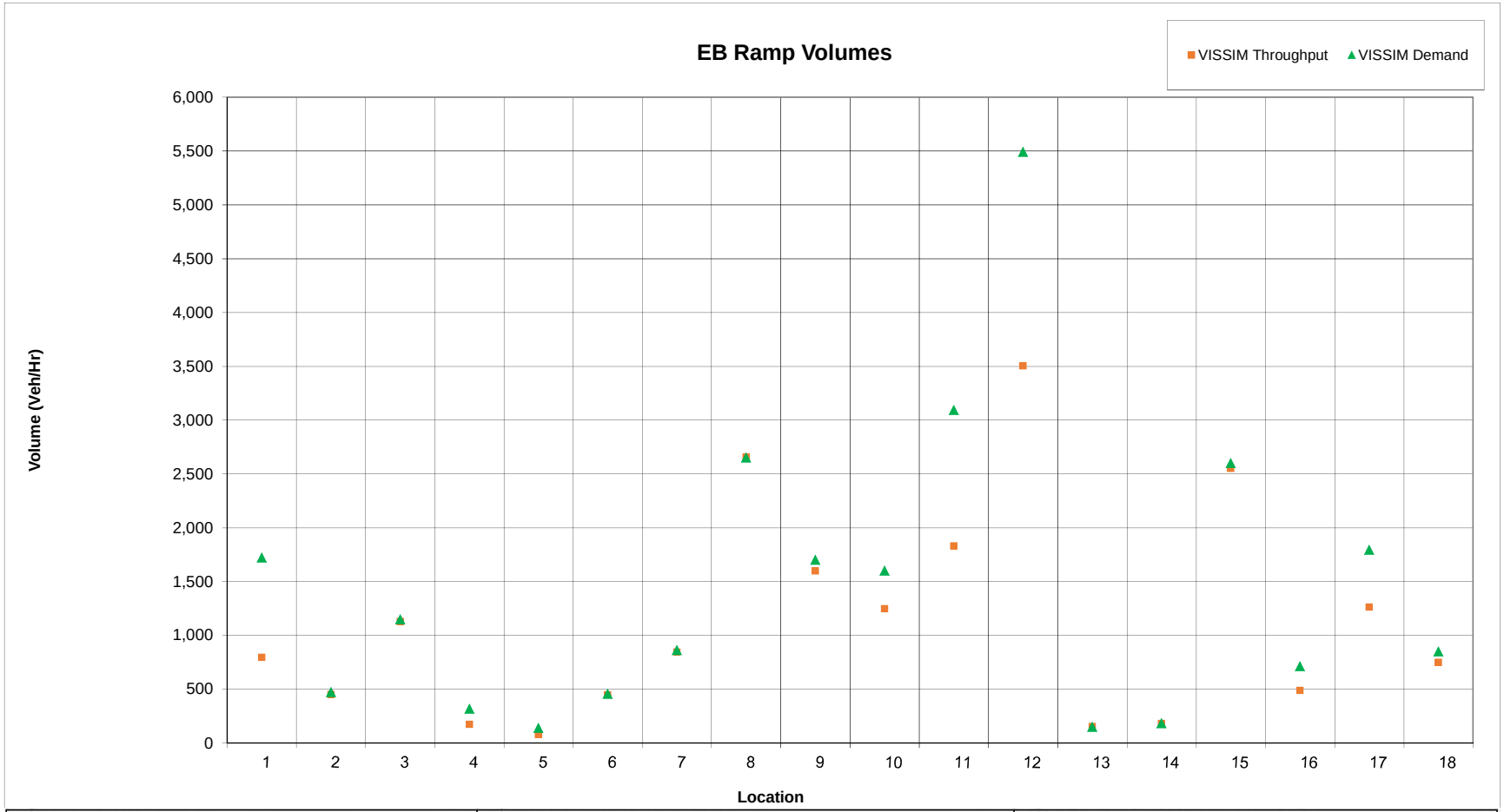
1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	



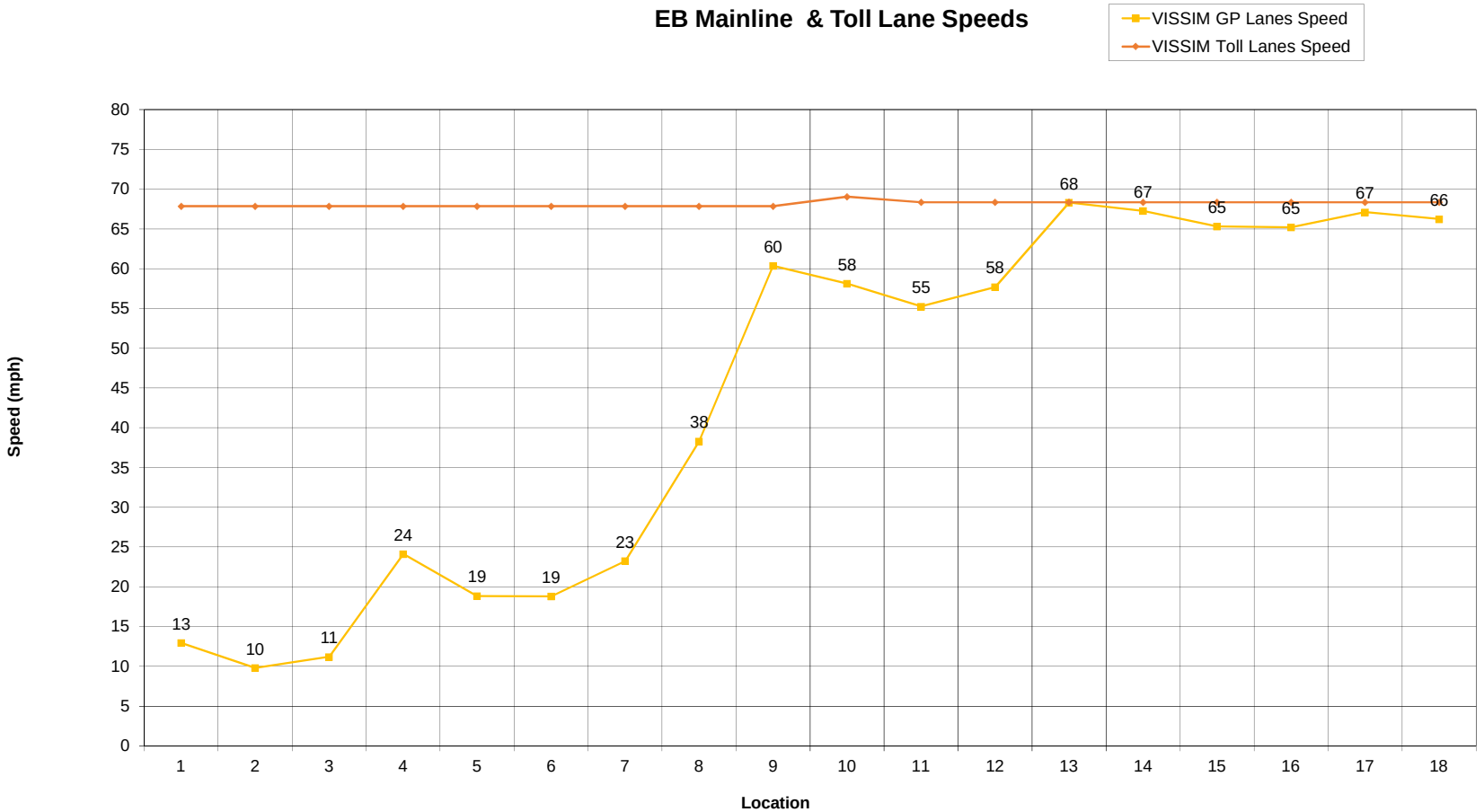
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



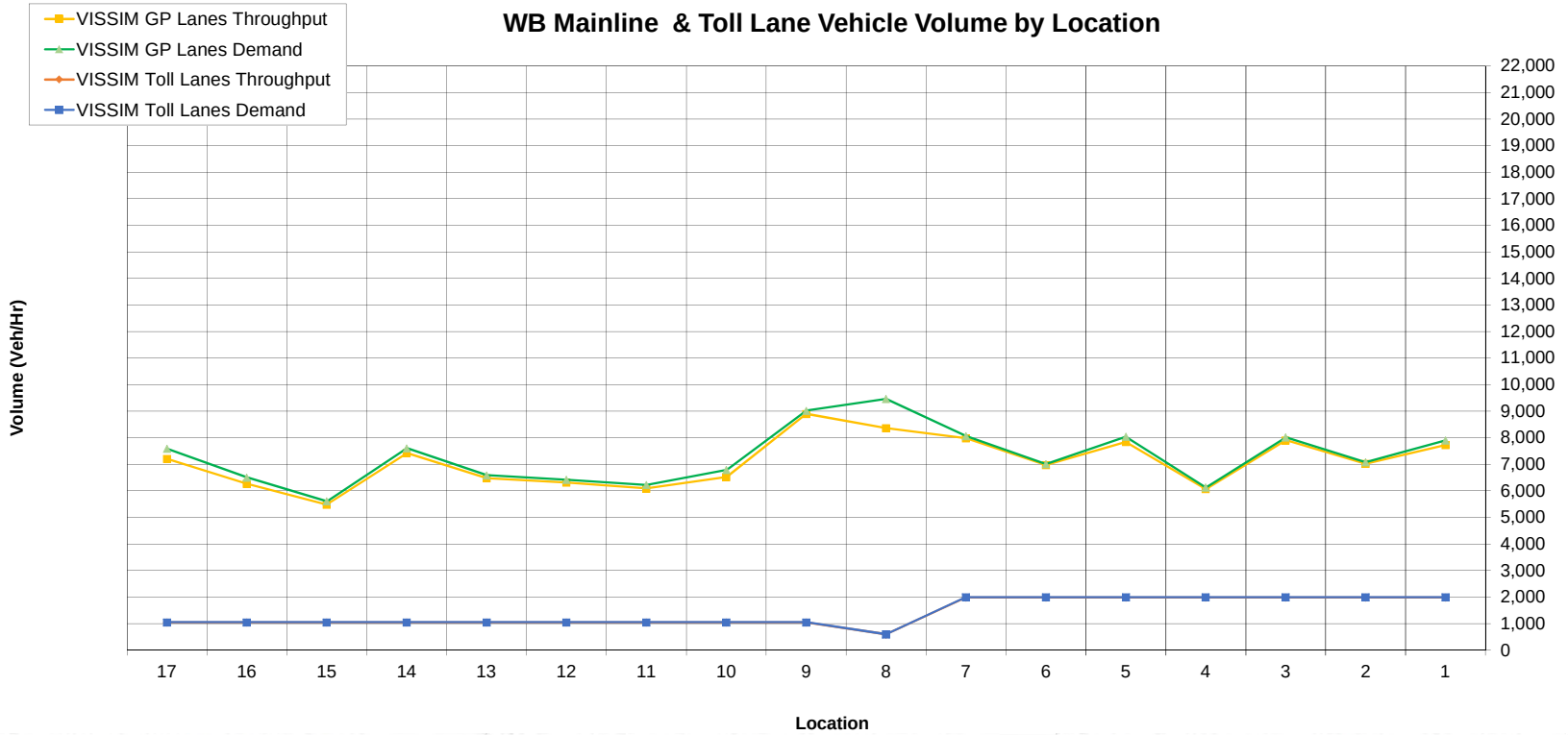
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR-71 to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	On Ramp from Green River to On Ramp from SR-71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to On Ramp from Managed Lanes	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	On Ramp from Managed Lanes to Off Ramp to Managed Lanes	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	Off Ramp to Managed Lanes to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71	18	On Ramp from Serfas/Autoclub to End of Study Area



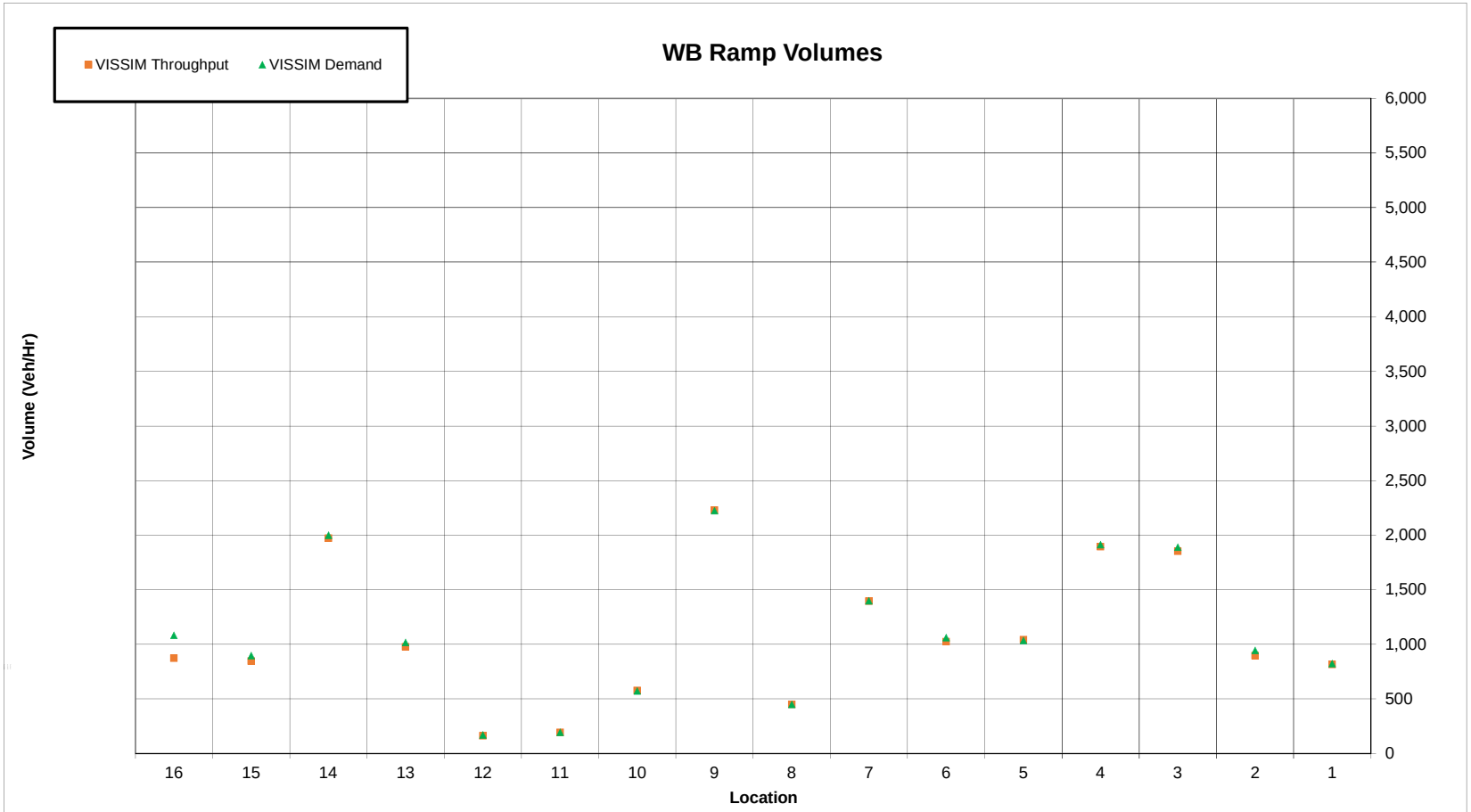
1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 On Ramp from Green River (to SR 71 NB)
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from Green River (to SR 91 EB)
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 On Ramp from SR 71 SB
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to Serfas/Autoclub
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 Off Ramp to EB Maple
6 On Ramp from SB Gypsum Canyon	12 Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



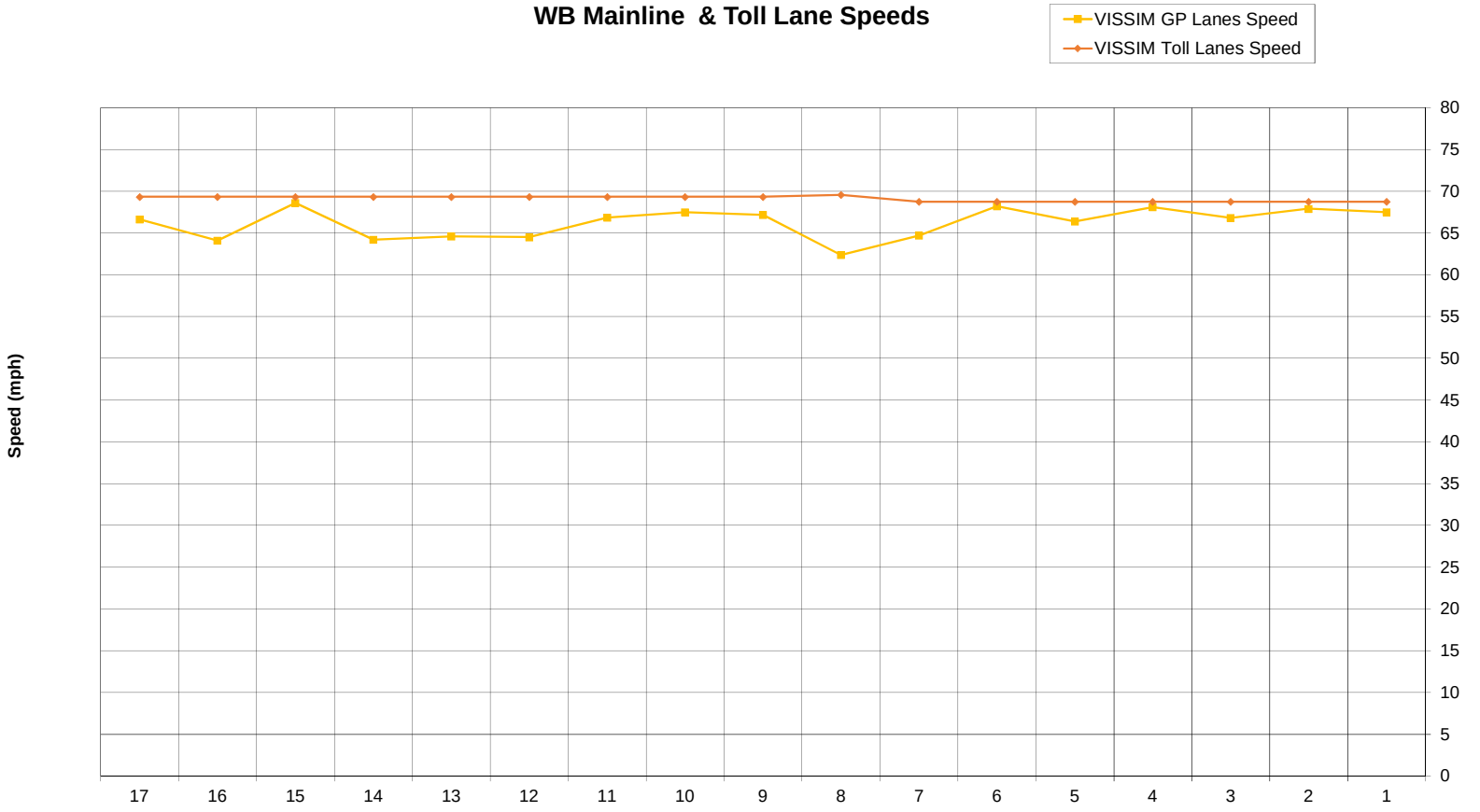
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from Managed Lanes	13 On Ramp from Gypsum Canyon SB to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from Managed Lanes to Off Ramp to Managed Lanes	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 Off Ramp to Managed Lanes to Off Ramp to SR 241	15 Off Ramp to Weir Canyon to On Ramp from Weir Canyon NB
4 Off Ramp to SR 71 to On Ramp from SR 71	10 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	16 On Ramp from Weir Canyon NB to On Ramp from Weir Canyon SB
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On Ramp from NB Gypsum Canyon (loop)	17 On Ramp from Weir Canyon SB to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from Gypsum Canyon NB to On Ramp from Gypsum Canyon SB	



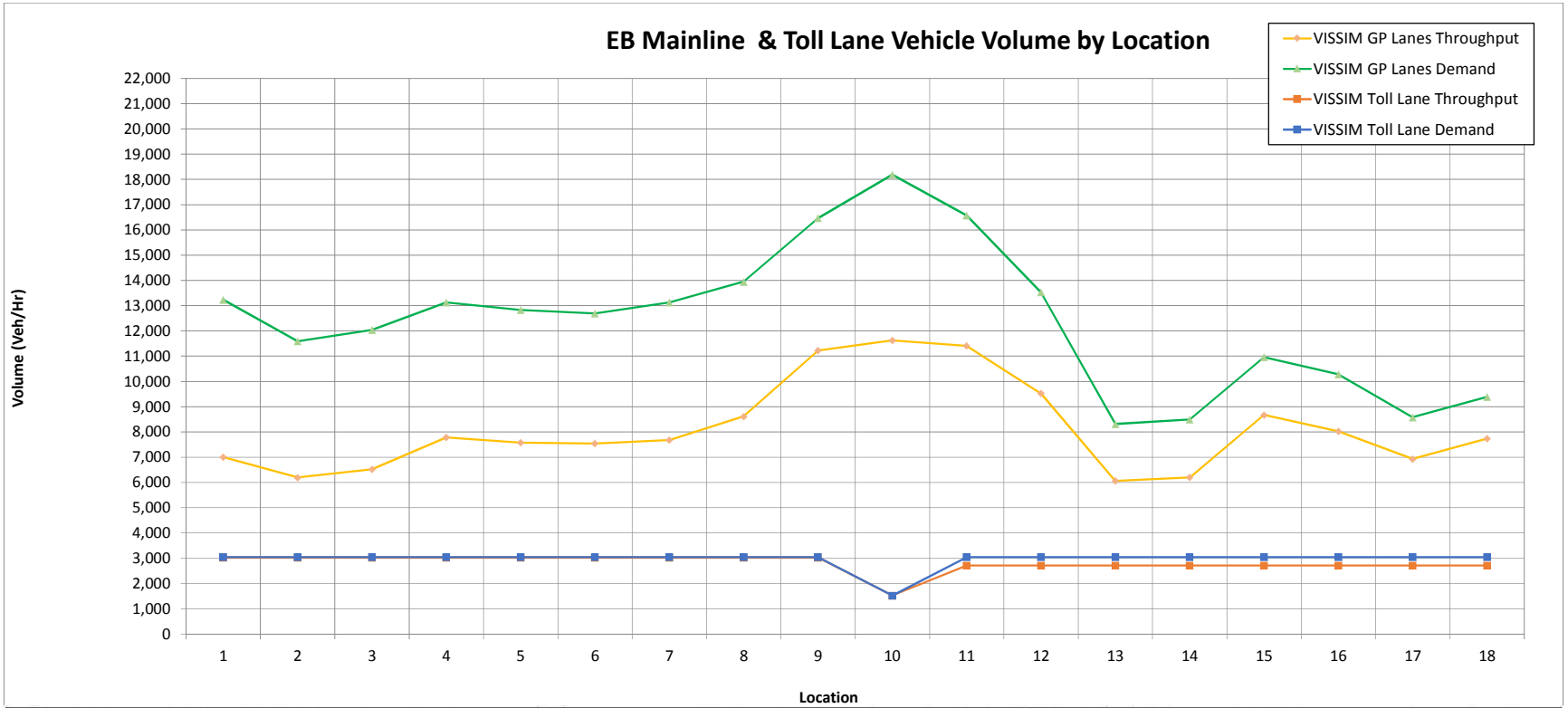
1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

Charts 4-5 PM

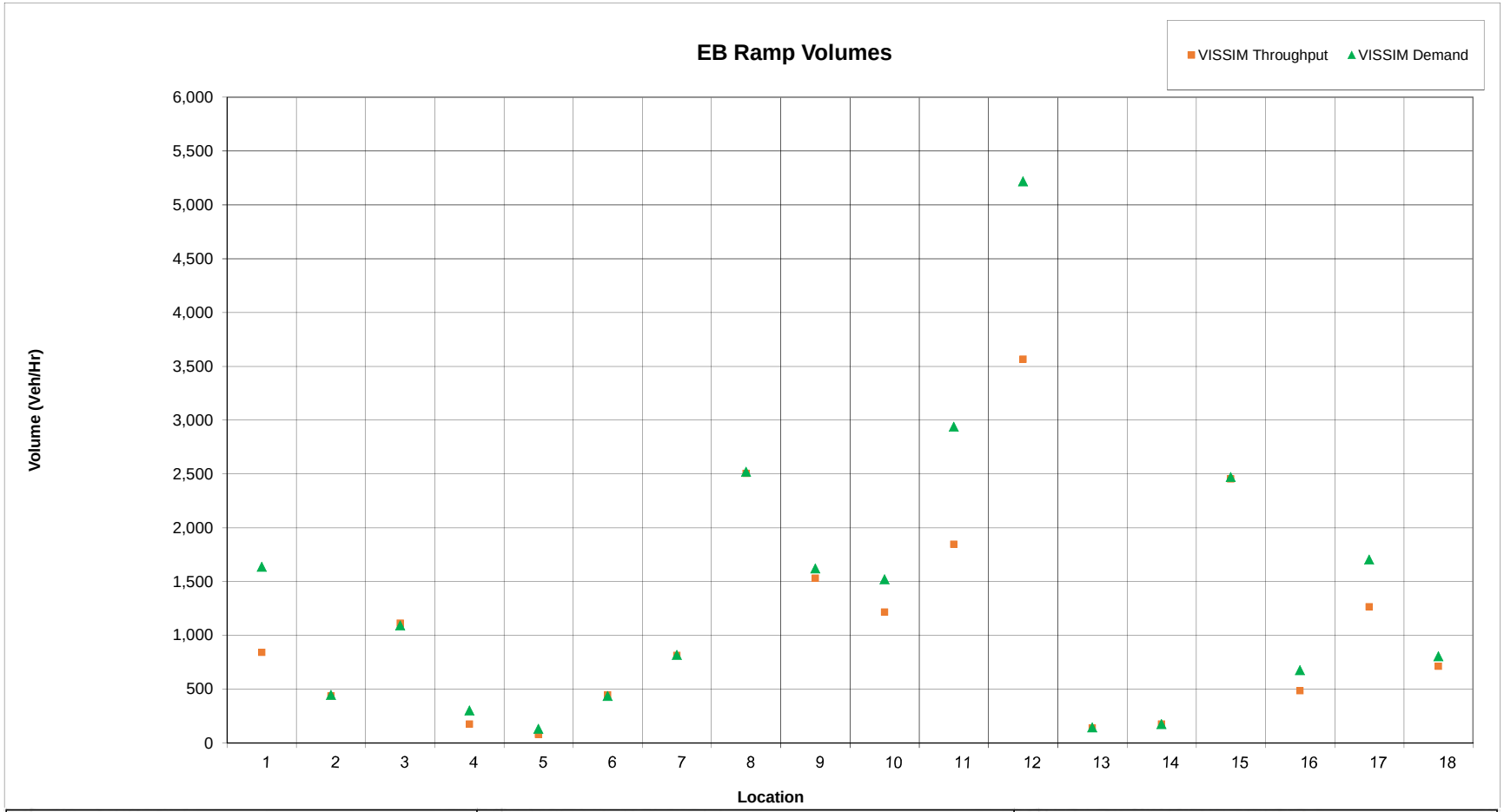
WB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

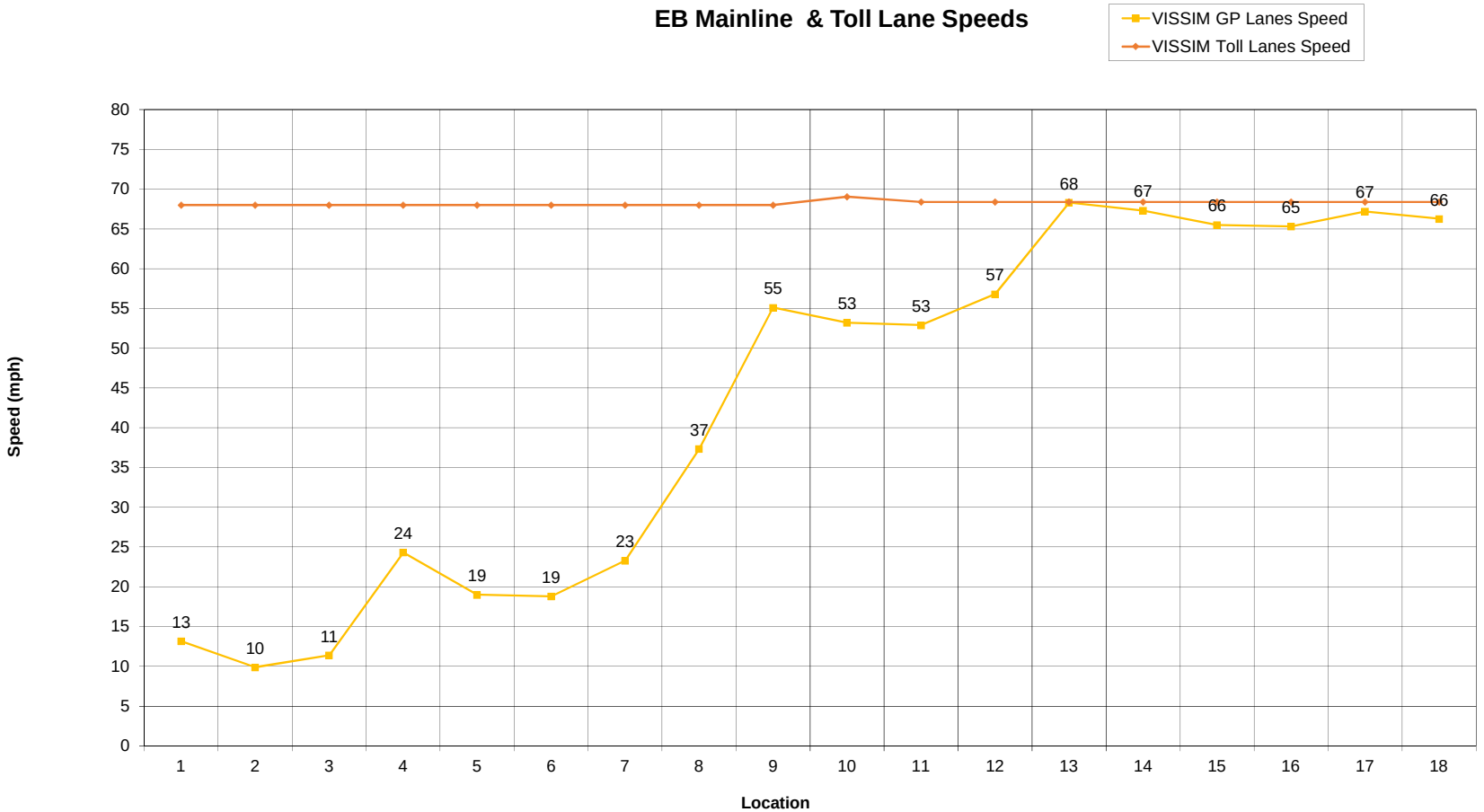


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR-71 to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	On Ramp from Green River to On Ramp from SR-71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to On Ramp from Managed Lanes	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	On Ramp from Managed Lanes to Off Ramp to Managed Lanes	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	Off Ramp to Managed Lanes to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71	18	On Ramp from Serfas/Autoclub to End of Study Area

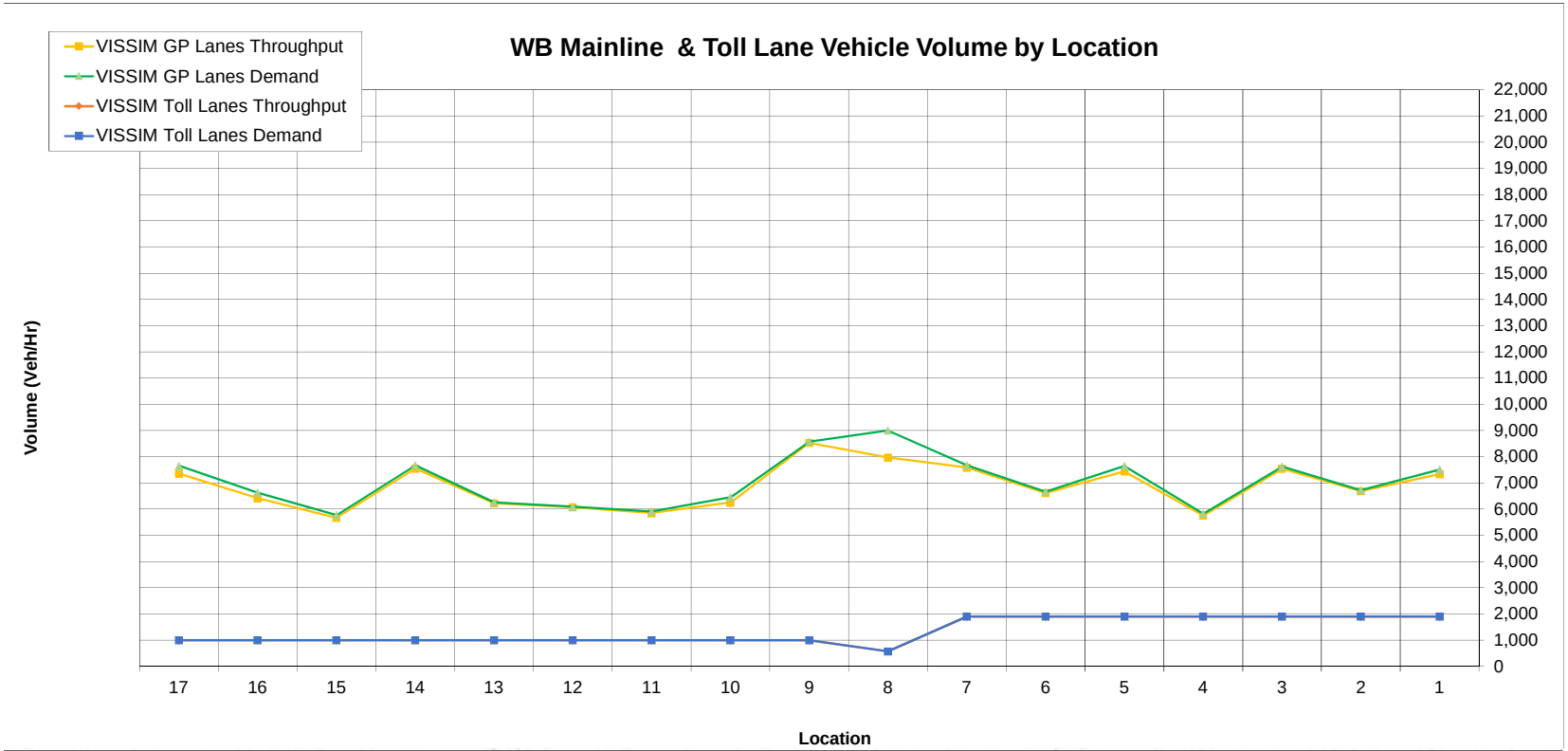


1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 On Ramp from Green River (to SR 71 NB)
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from Green River (to SR 91 EB)
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 On Ramp from SR 71 SB
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to Serfas/Autoclub
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 Off Ramp to EB Maple
6 On Ramp from SB Gypsum Canyon	12 Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub

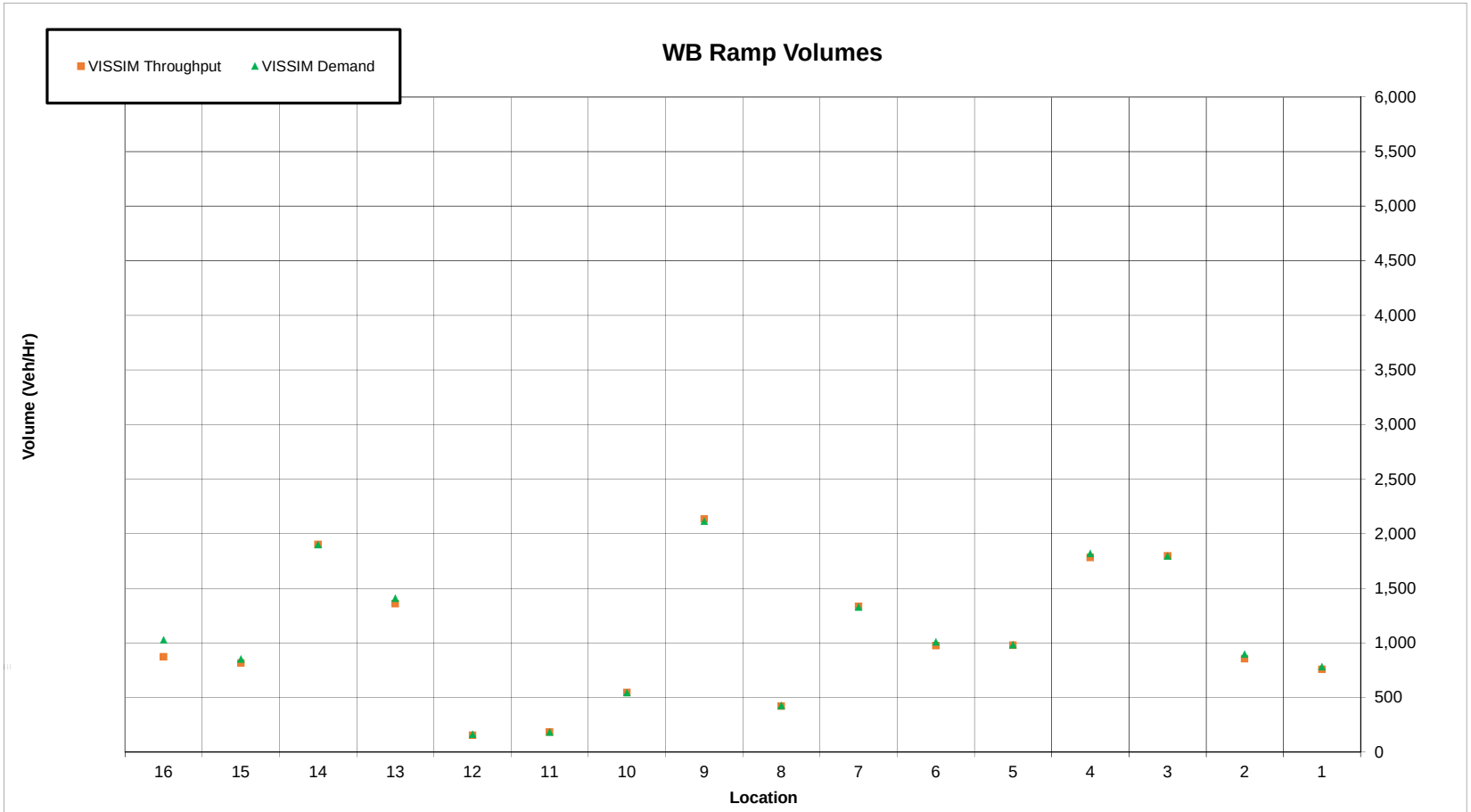
EB Mainline & Toll Lane Speeds



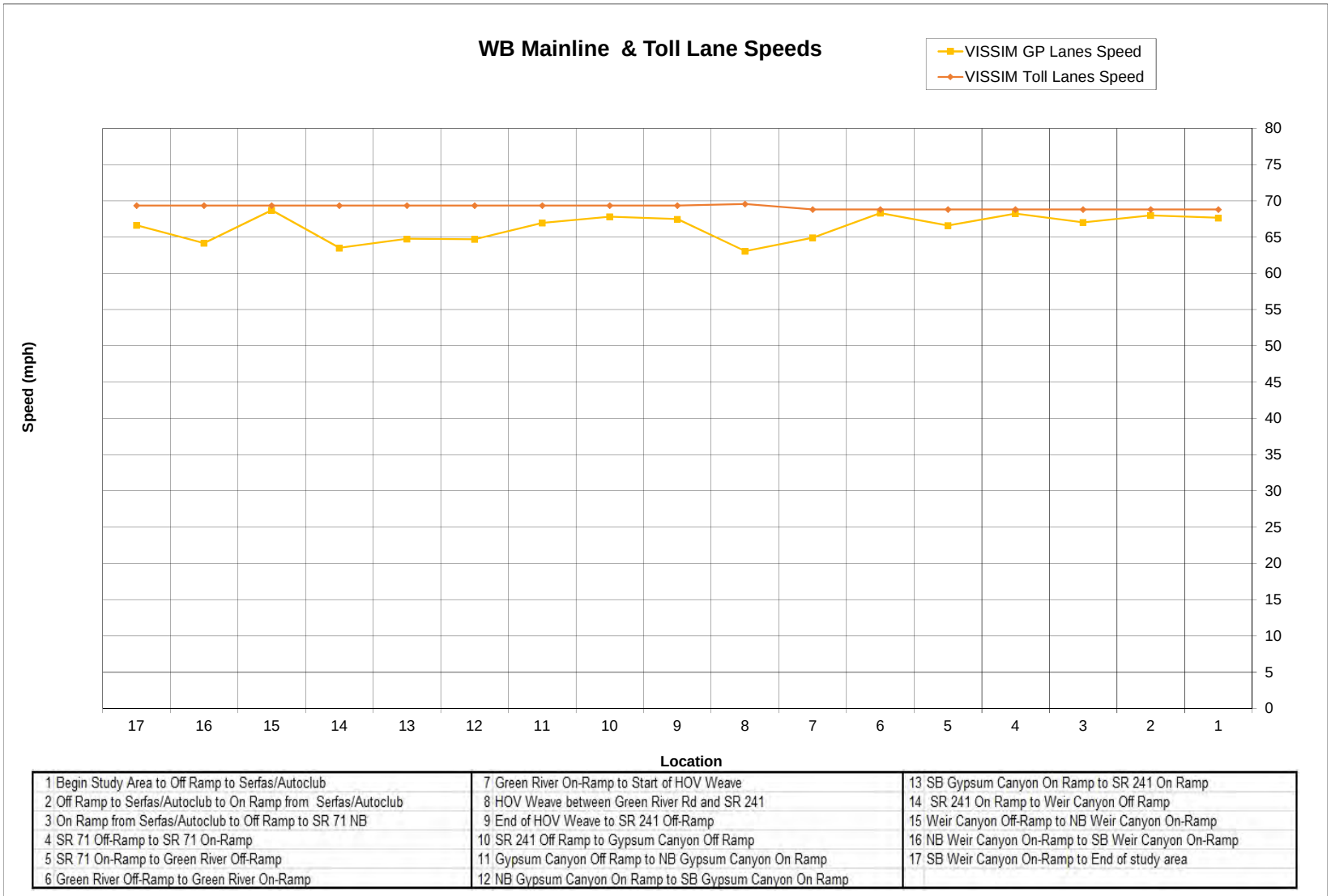
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



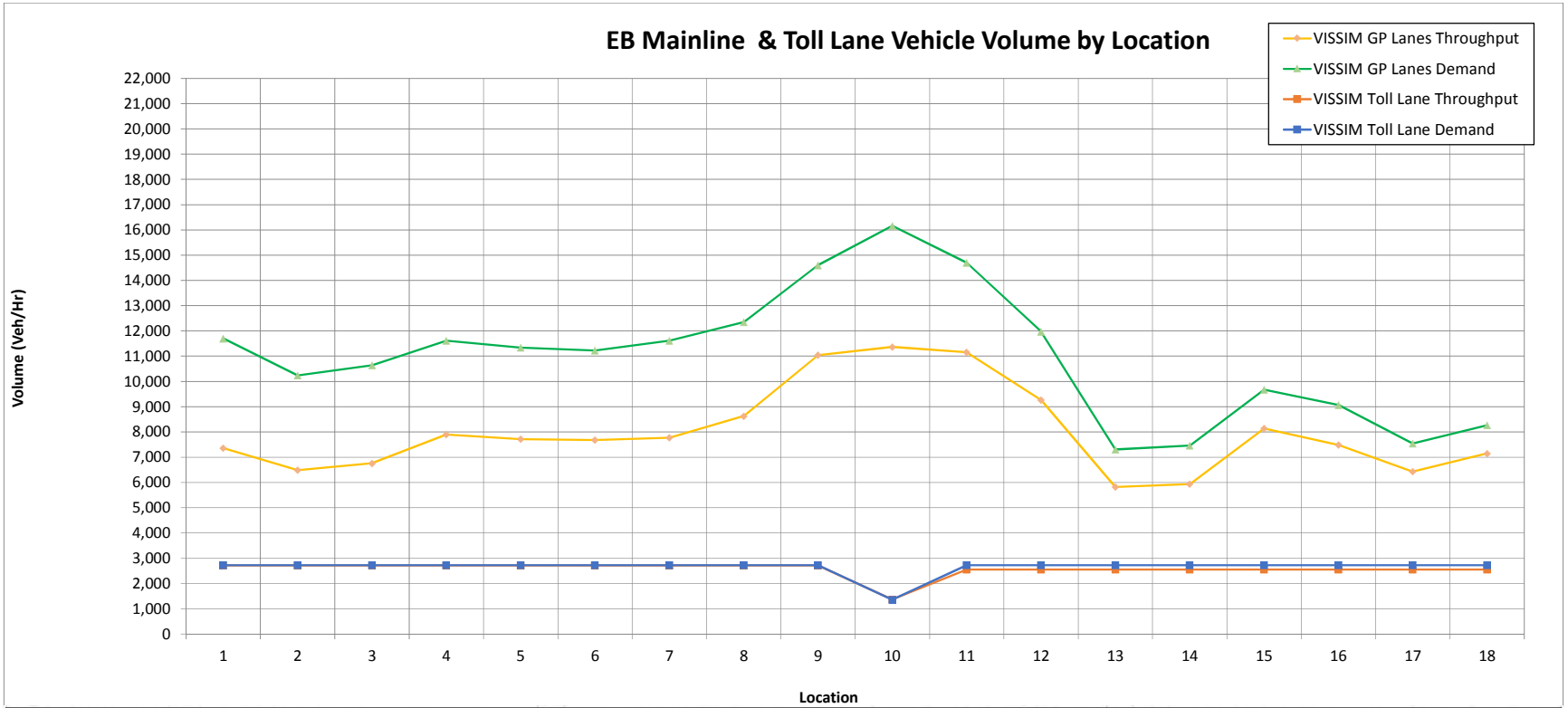
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from Managed Lanes	13 On Ramp from Gypsum Canyon SB to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from Managed Lanes to Off Ramp to Managed Lanes	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 Off Ramp to Managed Lanes to Off Ramp to SR 241	15 Off Ramp to Weir Canyon to On Ramp from Weir Canyon NB
4 Off Ramp to SR 71 to On Ramp from SR 71	10 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	16 On Ramp from Weir Canyon NB to On Ramp from Weir Canyon SB
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On Ramp from NB Gypsum Canyon (loop)	17 On Ramp from Weir Canyon SB to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from Gypsum Canyon NB to On Ramp from Gypsum Canyon SB	



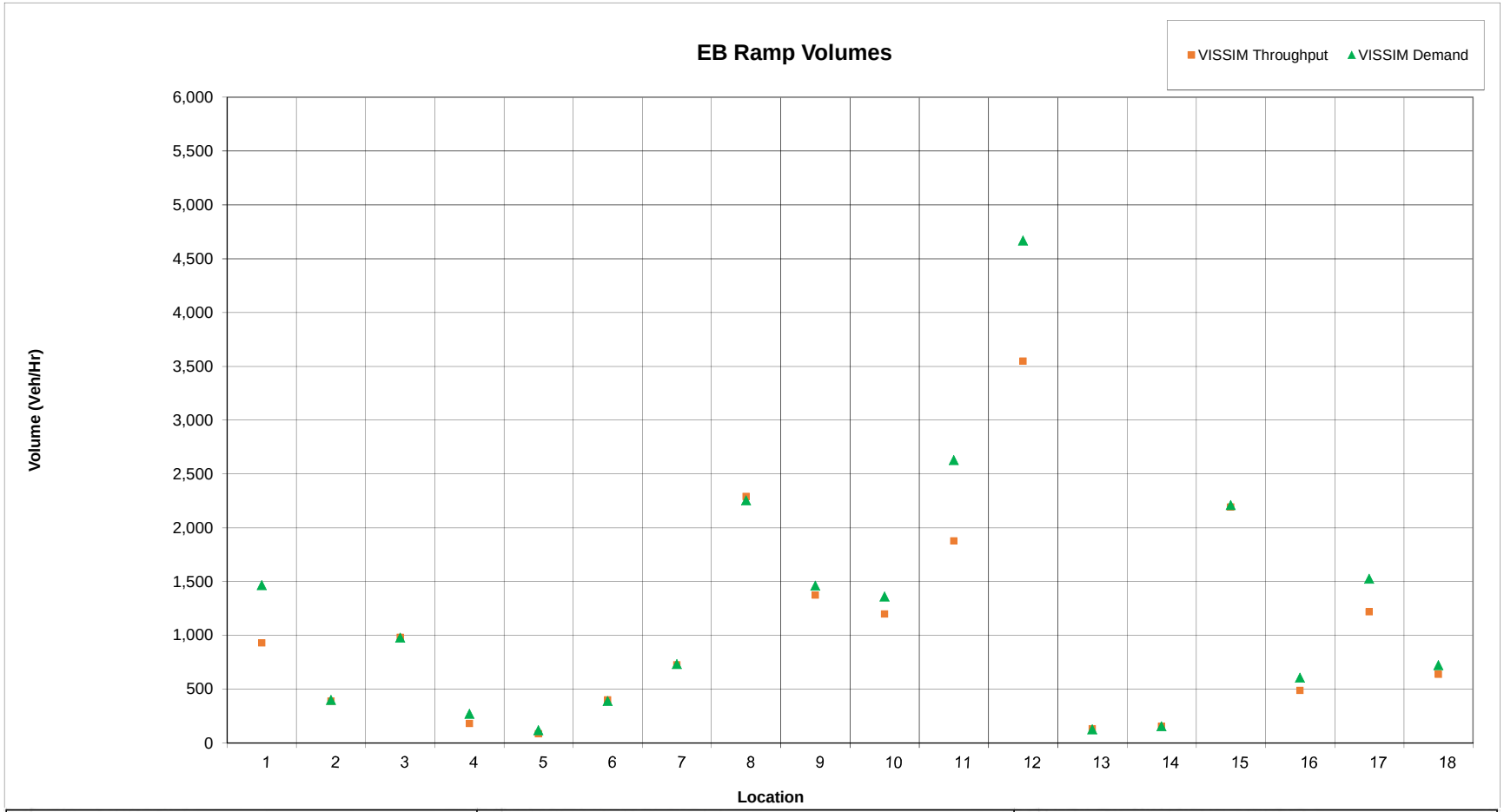
1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

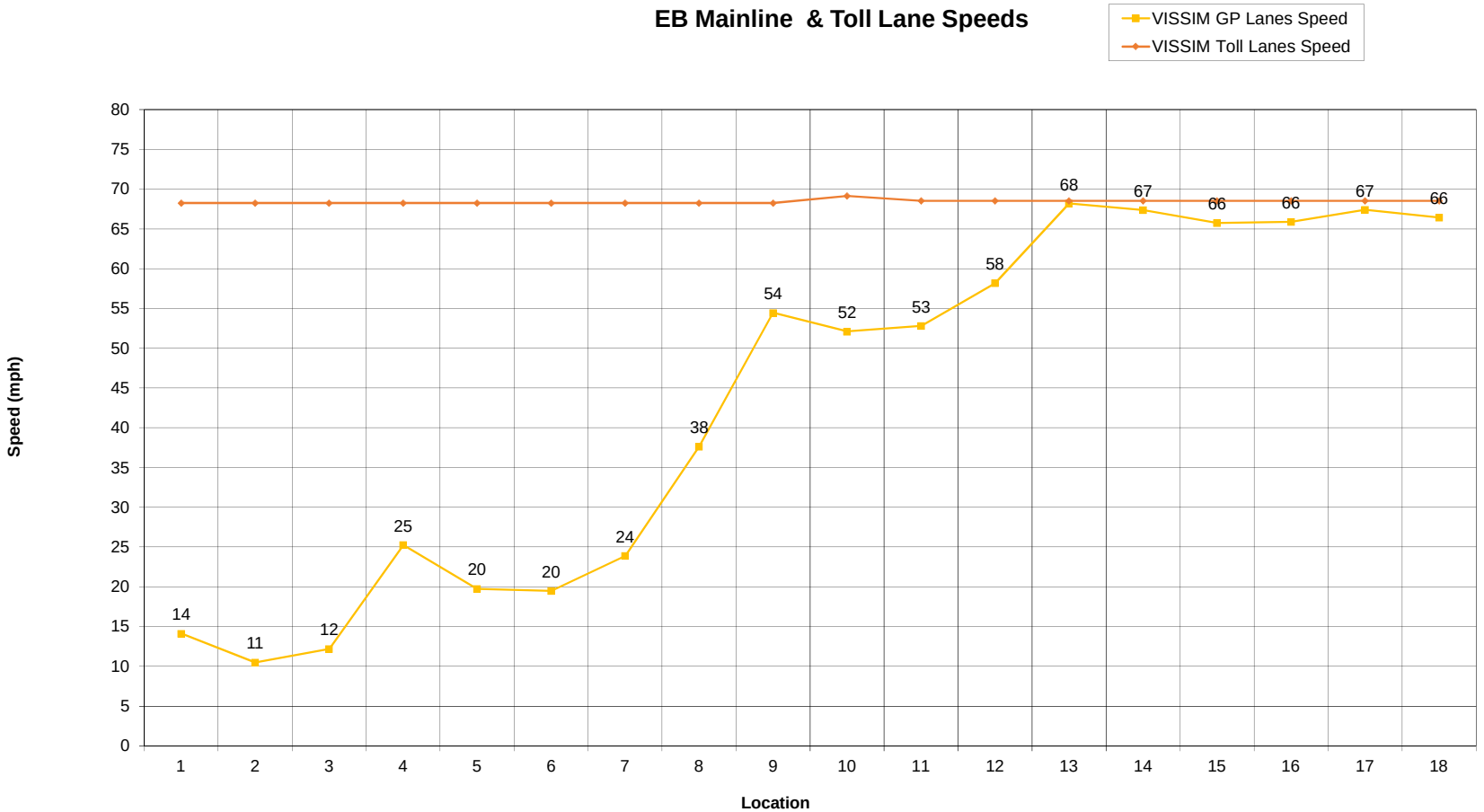


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR-71 to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14	On Ramp from Green River to On Ramp from SR-71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from NB SR 241 GP to On Ramp from Managed Lanes	15	On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10	On Ramp from Managed Lanes to Off Ramp to Managed Lanes	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11	Off Ramp to Managed Lanes to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71	18	On Ramp from Serfas/Autoclub to End of Study Area

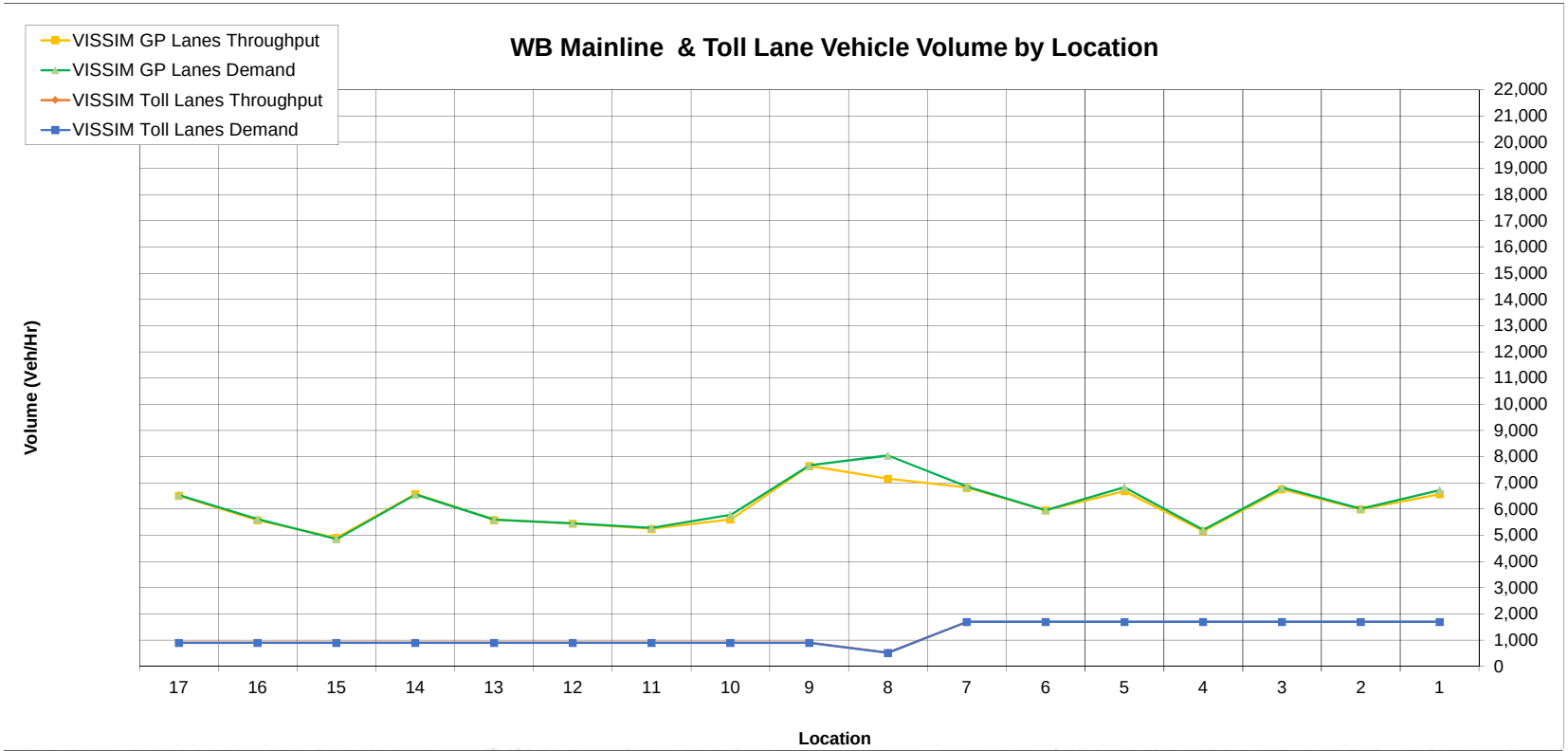


1 Off Ramp to Weir Canyon	7 On Ramp from NB Gypsum Canyon	13 On Ramp from Green River (to SR 71 NB)
2 On Ramp from SB Weir Canyon	8 On Ramp from NB SR 241 GP	14 On Ramp from Green River (to SR 91 EB)
3 On Ramp from NB Weir Canyon	9 On Ramp from HOT Exit (east of SR 241)	15 On Ramp from SR 71 SB
4 Off Ramp to SB SR 241 GP	10 Off Ramp to HOT Entrance (west of Green River Rd)	16 Off Ramp to Serfas/Autoclub
5 Off Ramp to Gypsum Canyon	11 Off Ramp to Green River	17 Off Ramp to EB Maple
6 On Ramp from SB Gypsum Canyon	12 Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub

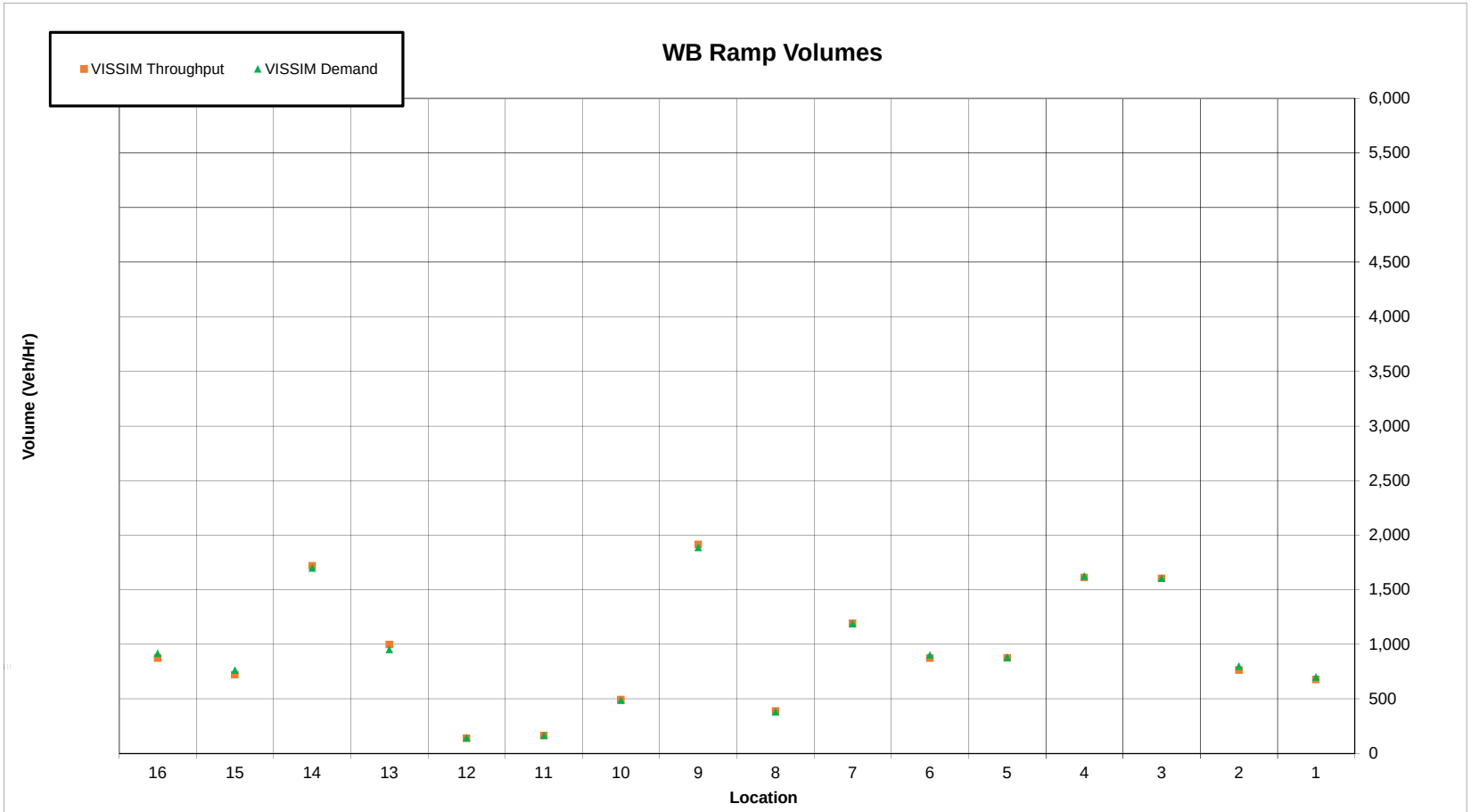
EB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

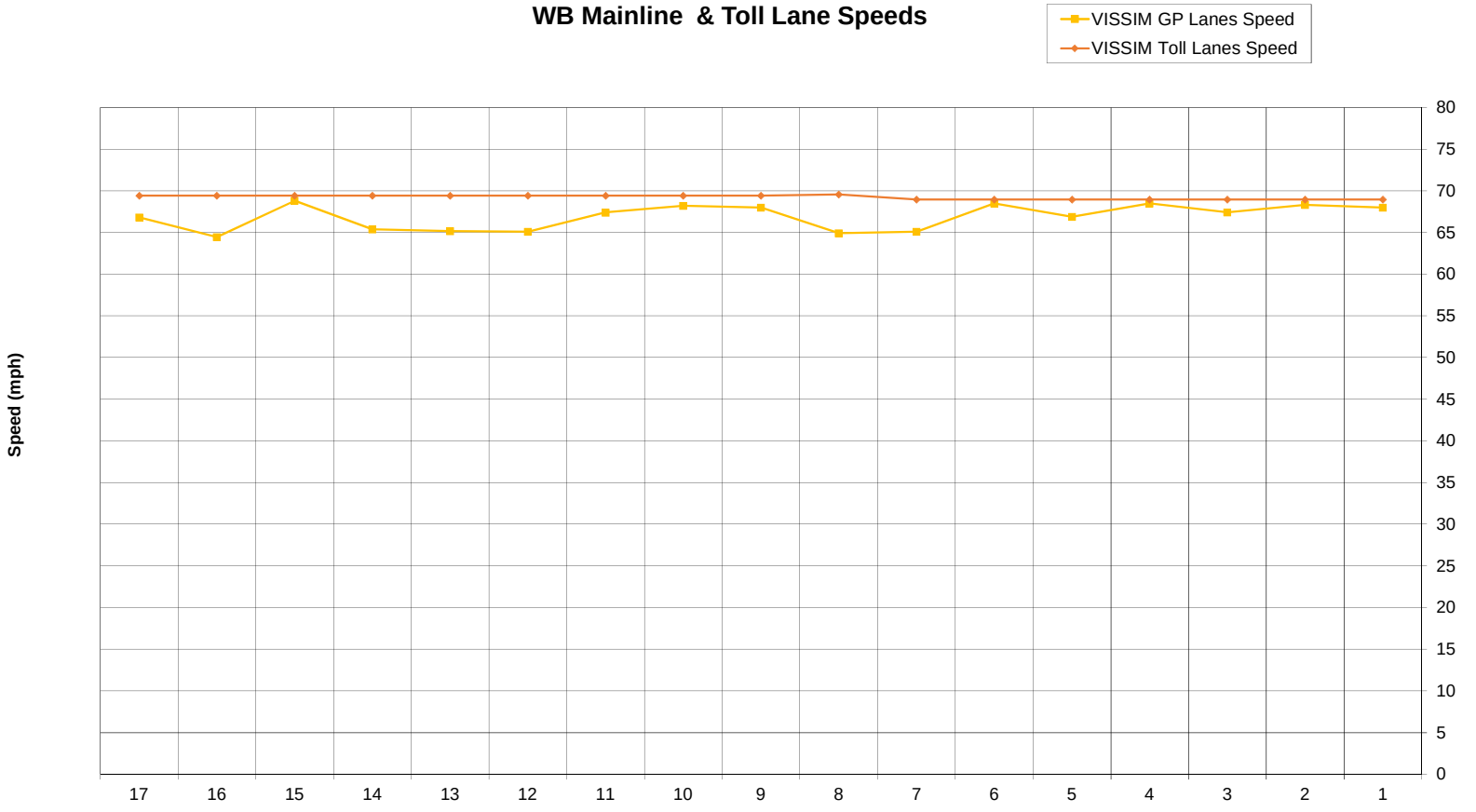


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from Managed Lanes	13 On Ramp from Gypsum Canyon SB to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from Managed Lanes to Off Ramp to Managed Lanes	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 Off Ramp to Managed Lanes to Off Ramp to SR 241	15 Off Ramp to Weir Canyon to On Ramp from Weir Canyon NB
4 Off Ramp to SR 71 to On Ramp from SR 71	10 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	16 On Ramp from Weir Canyon NB to On Ramp from Weir Canyon SB
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On Ramp from NB Gypsum Canyon (loop)	17 On Ramp from Weir Canyon SB to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from Gypsum Canyon NB to On Ramp from Gypsum Canyon SB	



1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SR 241
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 Off Ramp to Weir Canyon Rd
3 Off Ramp to SR 71	9 Off Ramp to SR 241	15 On Ramp from NB Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to Gypsum Canyon Rd	16 On Ramp from SB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 On Ramp from NB Gypsum Canyon Rd	
6 On Ramp from Green River Rd	12 On Ramp from SB Gypsum Canyon Rd	

WB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

Appendix E

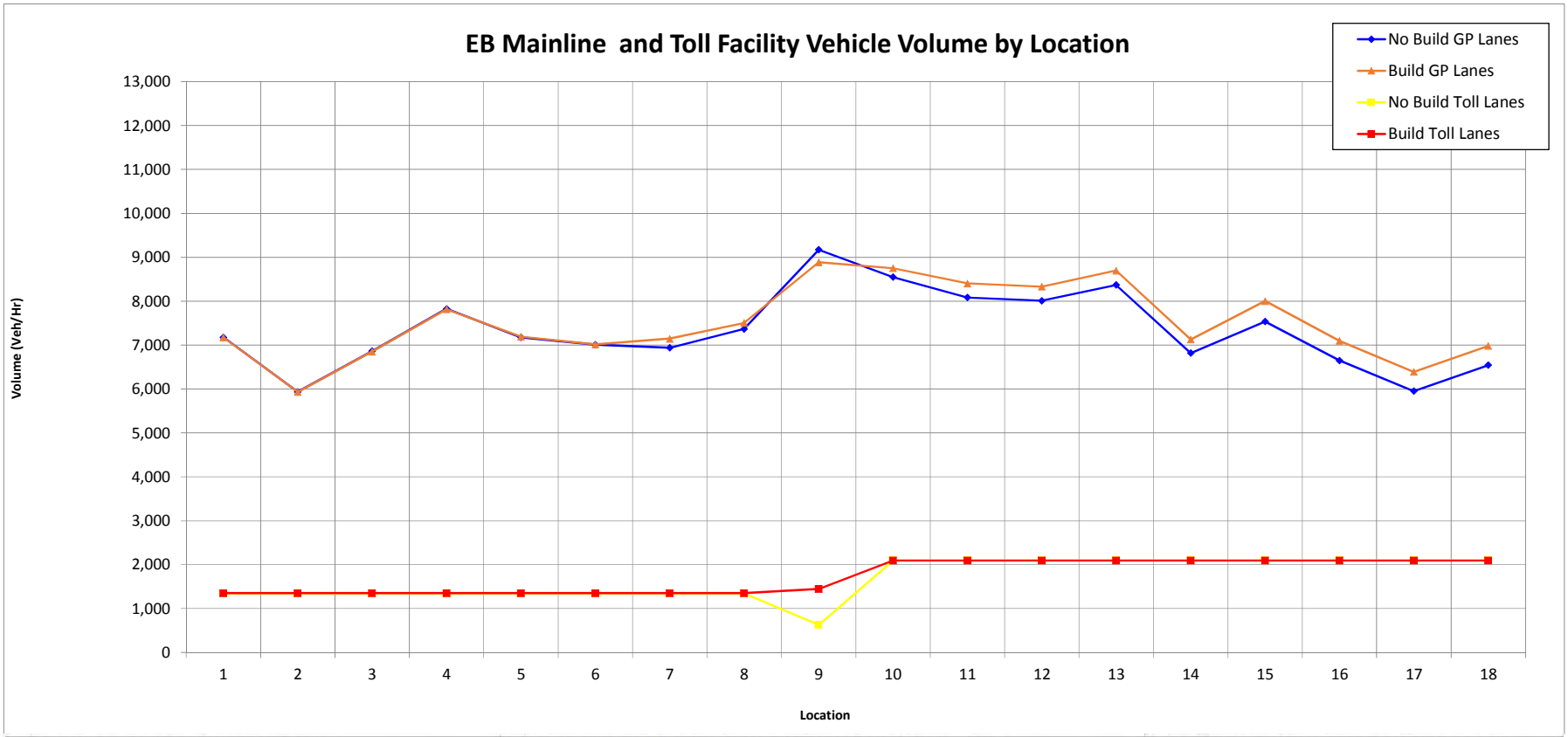
VISSIM Summary of Results
2017 Build Conditions

SR-91
Vissim Model Summary - 2017 Build Option 2 - AM
Network Summary Statistics

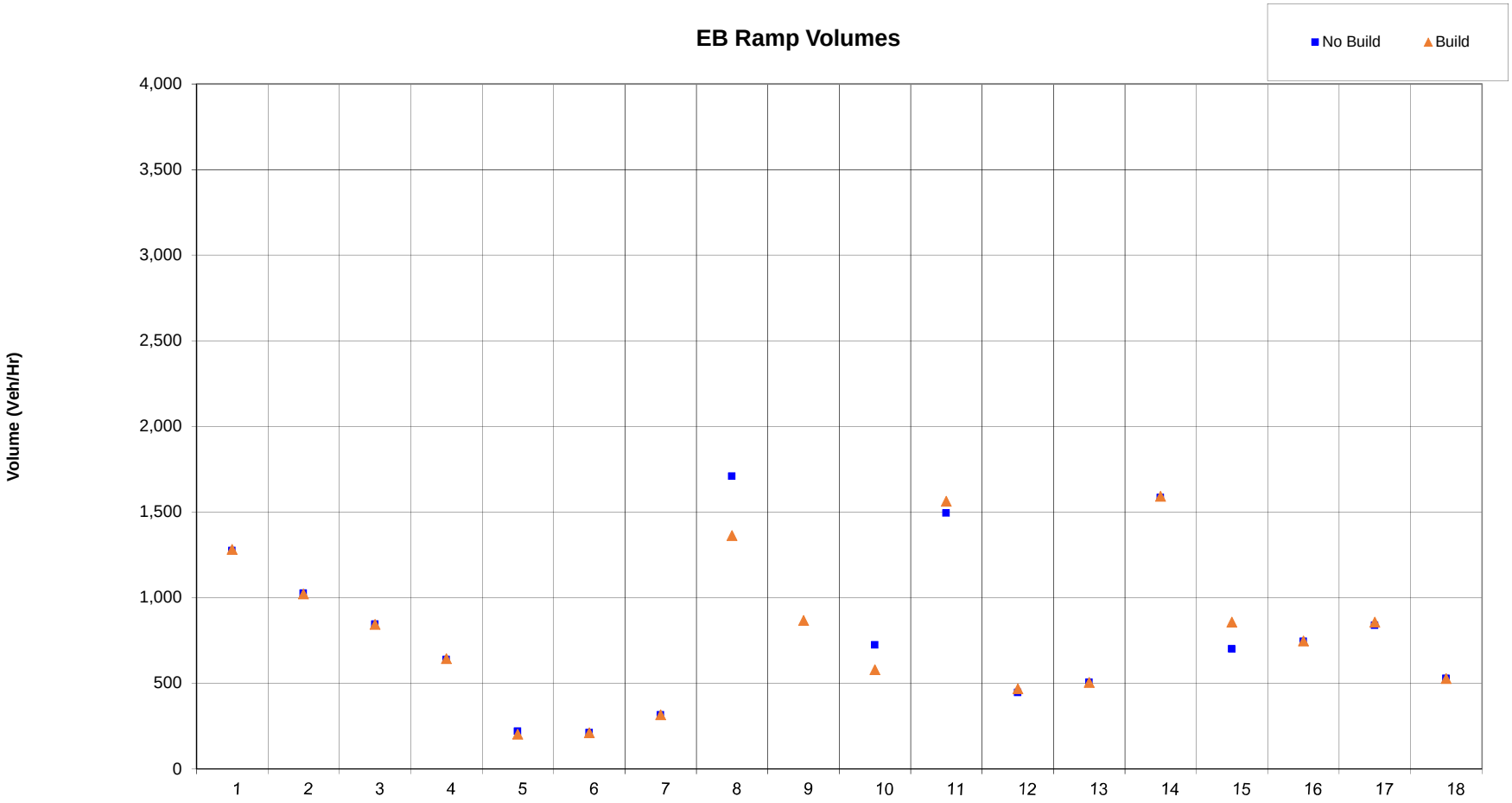
Parameter	2017 AM No Build	2017 AM Build Option 2	Difference
Total Vehicle Demand (3 Hr)	100,741	101,682	941
Total number of vehicles that did not reach their desitination	9,016	5,420	-3,597
Total number of vehicles that have reached their destination	91,725	96,262	4,538
Total vehicle-miles traveled (VMT)	796,551	845,966	49,415
Total travel time, All Vehicle Types (VHT)	23,068	21,012	-2,056
Average speed [mph], All Vehicle Types	34.5	40.3	5.7
Average delay time per vehicle [mins], All Vehicle Types	6.83	4.93	-1.90

SR-91
Vissim Model Summary - 2017 Build Option 2 - AM
Travel Time Table

#	Origin	#	Destination	p Ke	Hide Travel Time Segments Seg 1	Seg 2	Seg 3	2017 AM No Build VISSIM Travel Time 6-7 AM	7-8 AM	7-9 AM	2017 AM Build Option 2 VISSIM Travel Time 6-7 AM	7-8 AM	7-9 AM	Change VISSIM Travel Time 6-7 AM	7-8 AM	7-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	8.6	8.7	8.6	8.7	8.7	8.6	0.0	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	8.6	8.6	8.6	8.6	8.6	8.6	0.0	0.0	0.0
		5	SR 241 SB south of SR 91	3	1001			7.1	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	4	1002	1003	1004	11.0	11.1	11.0	11.1	11.1	11.0	0.0	0.0	0.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.5	8.5	8.5	8.5	8.5	8.5	0.0	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.9	10.9	10.9	10.9	11.0	10.9	0.0	0.0	0.0
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	23.1	24.8	24.1	18.7	20.4	19.5	-4.4	-4.4	-4.6
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	23.0	24.7	24.0	18.6	20.3	19.5	-4.4	-4.4	-4.6
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	25.4	27.1	26.5	21.1	22.8	22.0	-4.3	-4.3	-4.4
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a	21.0	22.7	21.9	-4.4	-4.4	-4.6
		7	SR 71 NB north of SR 91	12	1010			12.4	13.3	12.0	9.0	10.1	7.7	-3.4	-3.2	-4.3
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	12.0	12.4	12.6	11.1	11.4	11.9	-0.9	-1.0	-0.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4	8.5	8.5	8.4	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	14.4	14.8	15.0	13.6	13.9	14.4	-0.8	-0.9	-0.6
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a	10.8	10.9	10.8	-3.6	-3.9	-4.1
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.2	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.0	11.0	11.0	11.0	11.0	10.9	0.0	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	20	1007	1003	1004	13.4	13.4	13.4	13.4	13.4	13.3	0.0	0.0	0.0
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a	10.9	10.9	10.9	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a	10.8	10.8	10.8	-0.2	-0.2	-0.1
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a	13.3	13.4	13.3	0.0	-0.1	0.0
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	43.0	54.1	55.9	32.0	39.5	40.5	-11.0	-14.6	-15.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	42.9	54.0	55.8	31.9	39.4	40.5	-11.0	-14.6	-15.3
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			28.7	37.2	38.3	20.5	26.7	27.0	-8.2	-10.5	-11.3
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	45.3	56.4	58.3	34.4	42.0	43.1	-10.9	-14.4	-15.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a	34.3	41.8	42.9	-11.0	-14.6	-15.4

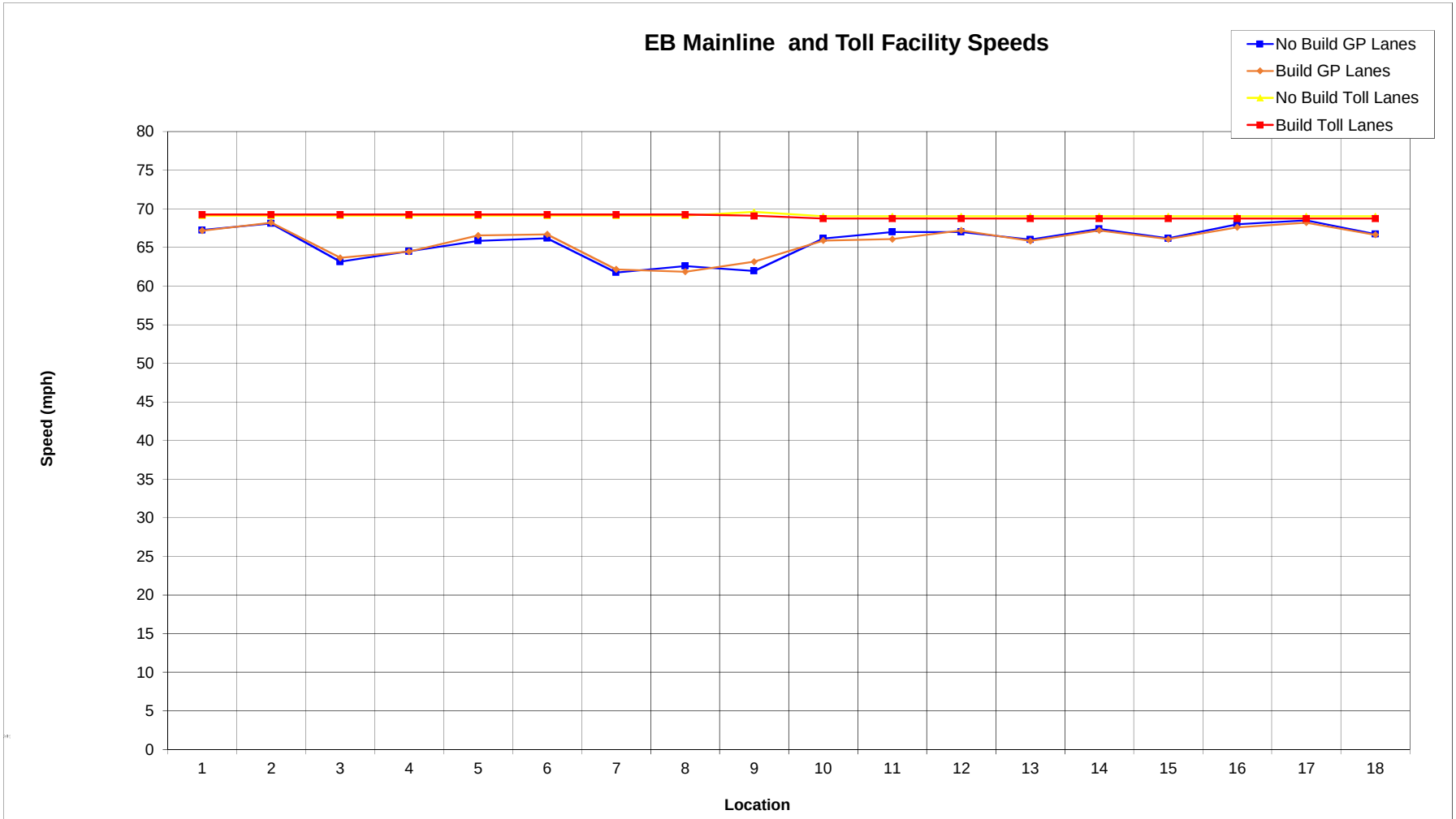


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area



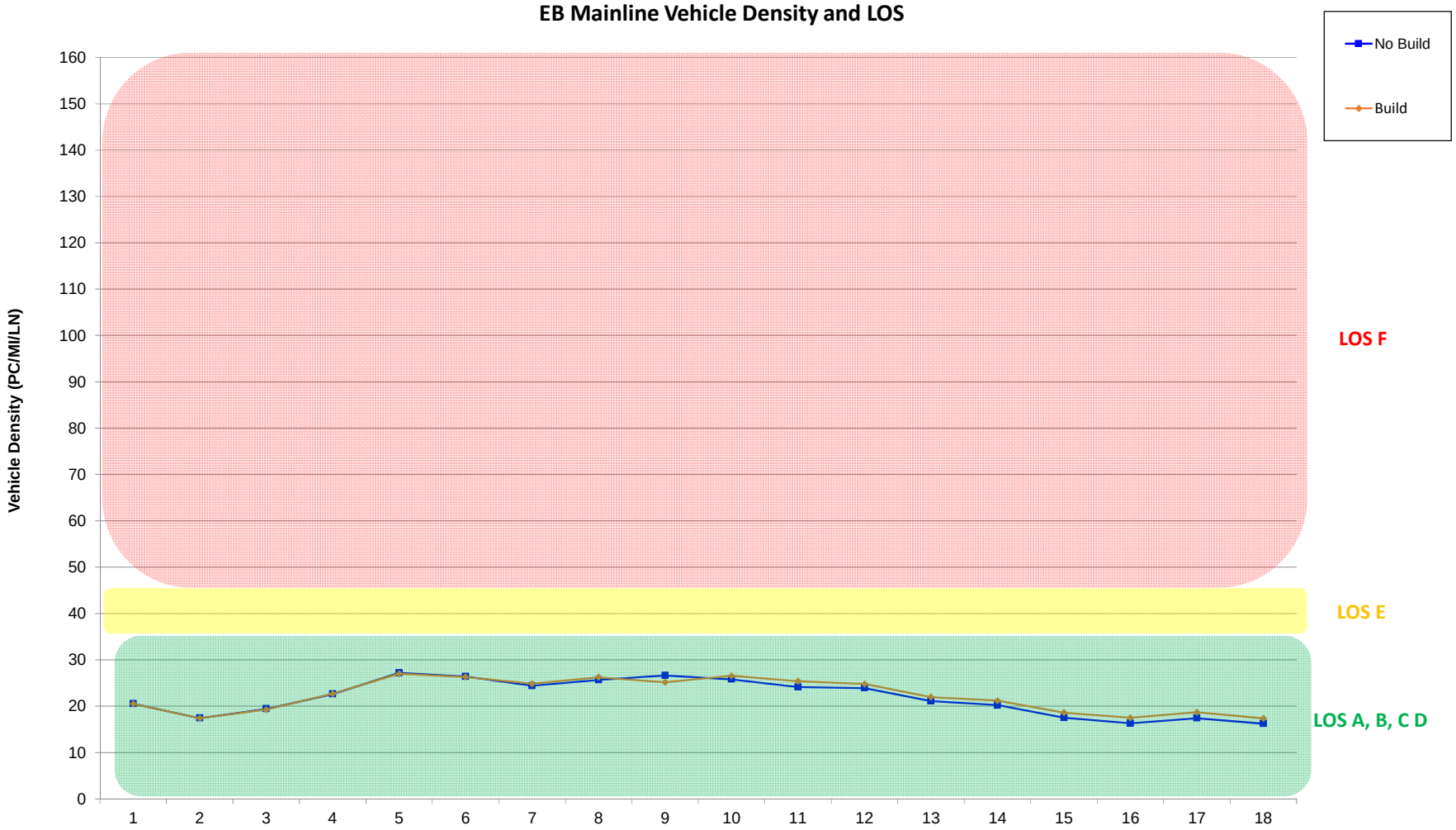
1	Off Ramp to Weir Canyon	7	On Ramp from NB Gypsum Canyon	13	On Ramp From Green River
2	On Ramp from SB Weir Canyon	8	On Ramp from SR 241 GP	14	Off Ramp to SR 71
3	On Ramp from NB Weir Canyon	9	On Ramp from SR 241 HOV	15	On Ramp from SR 71
4	Off Ramp to SR 241	10	On Ramp from HOT Lanes Exit (east of SR 241)	16	Off Ramp to Serfas/Autoclub
5	Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes Entrance (west of Green River Rd)	17	Off Ramp to EB Maple
6	On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River	18	On Ramp from Serfas/Autoclub

Charts 6-7 AM



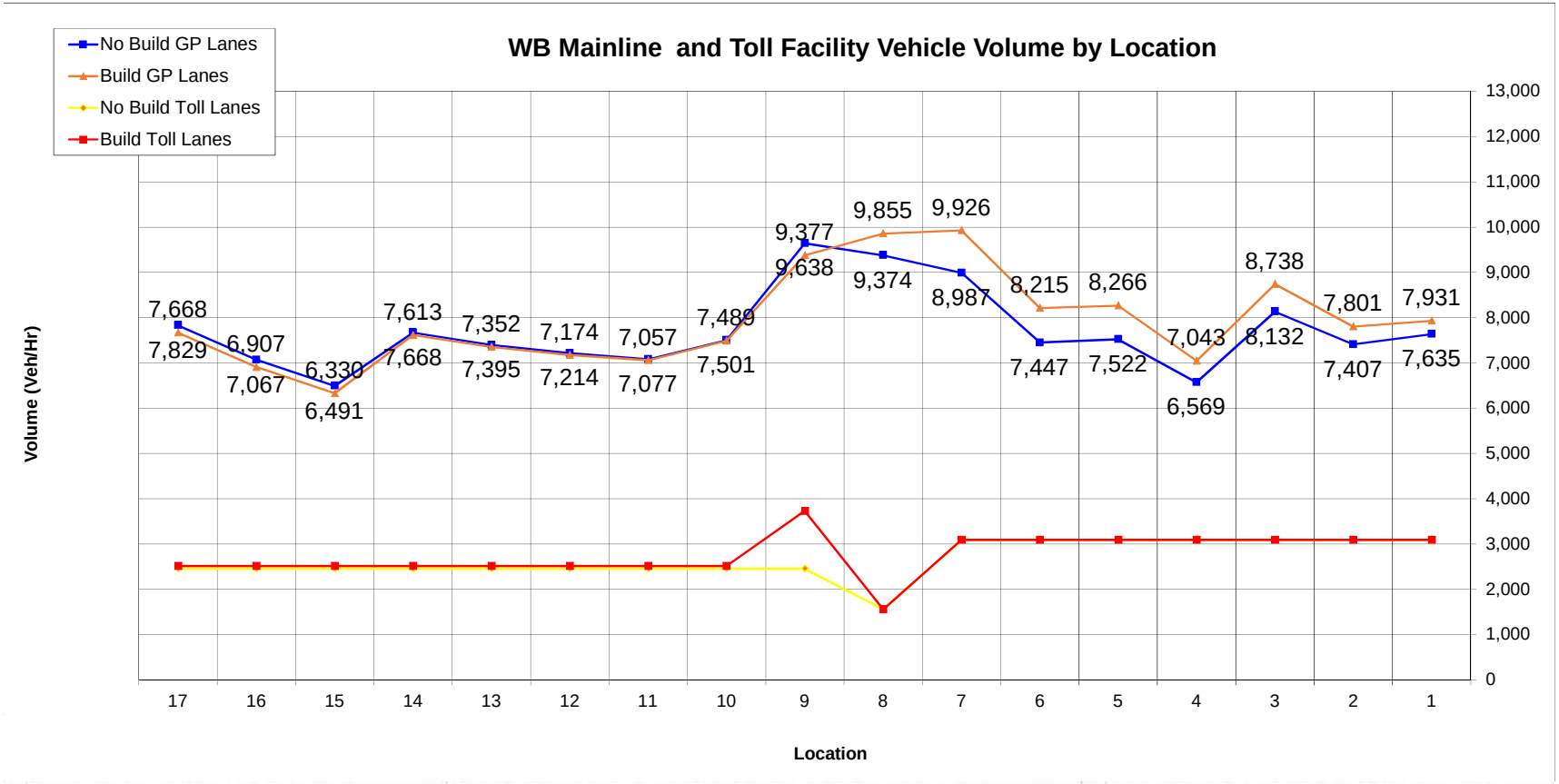
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 6-7 AM



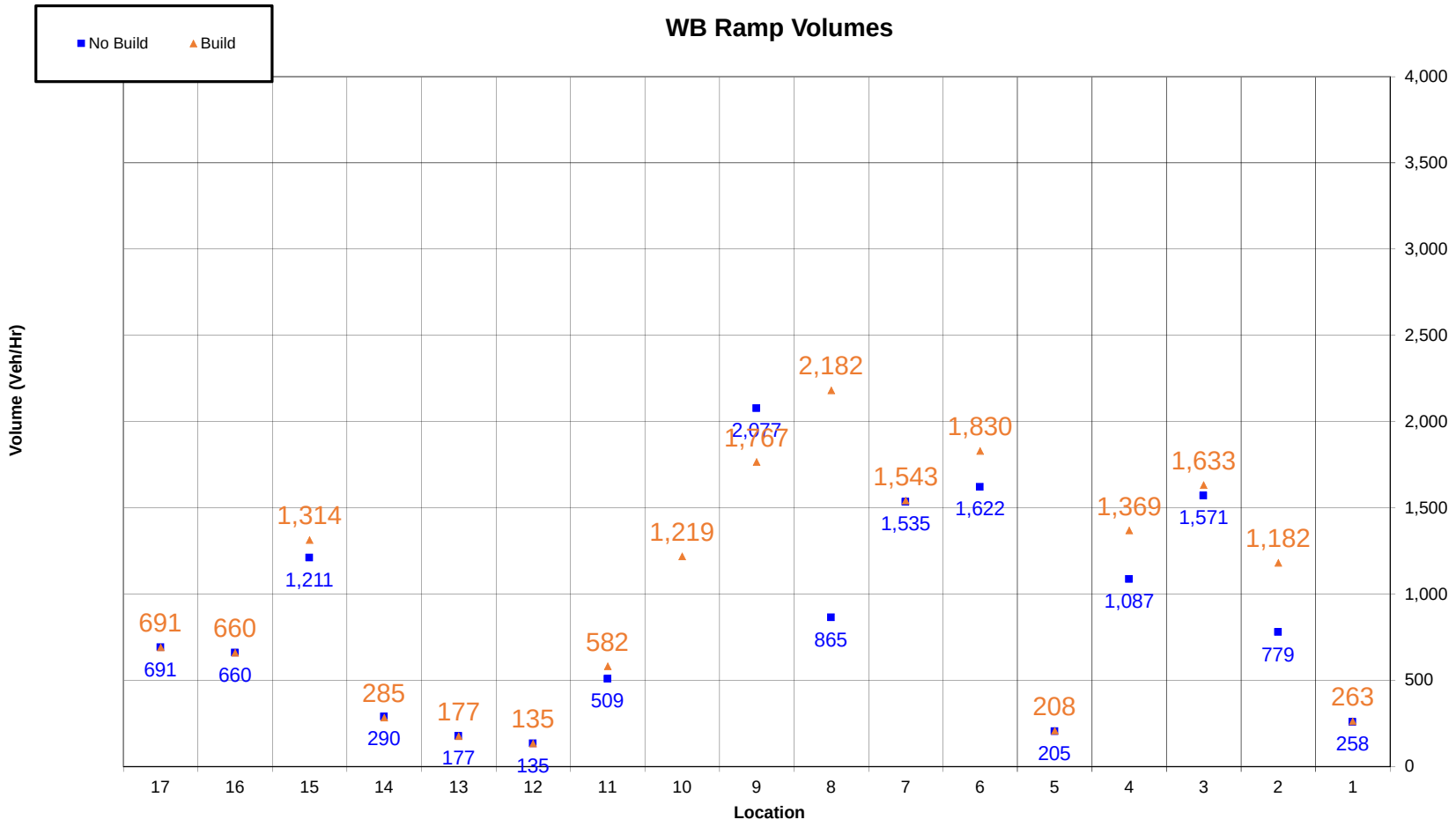
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 6-7 AM



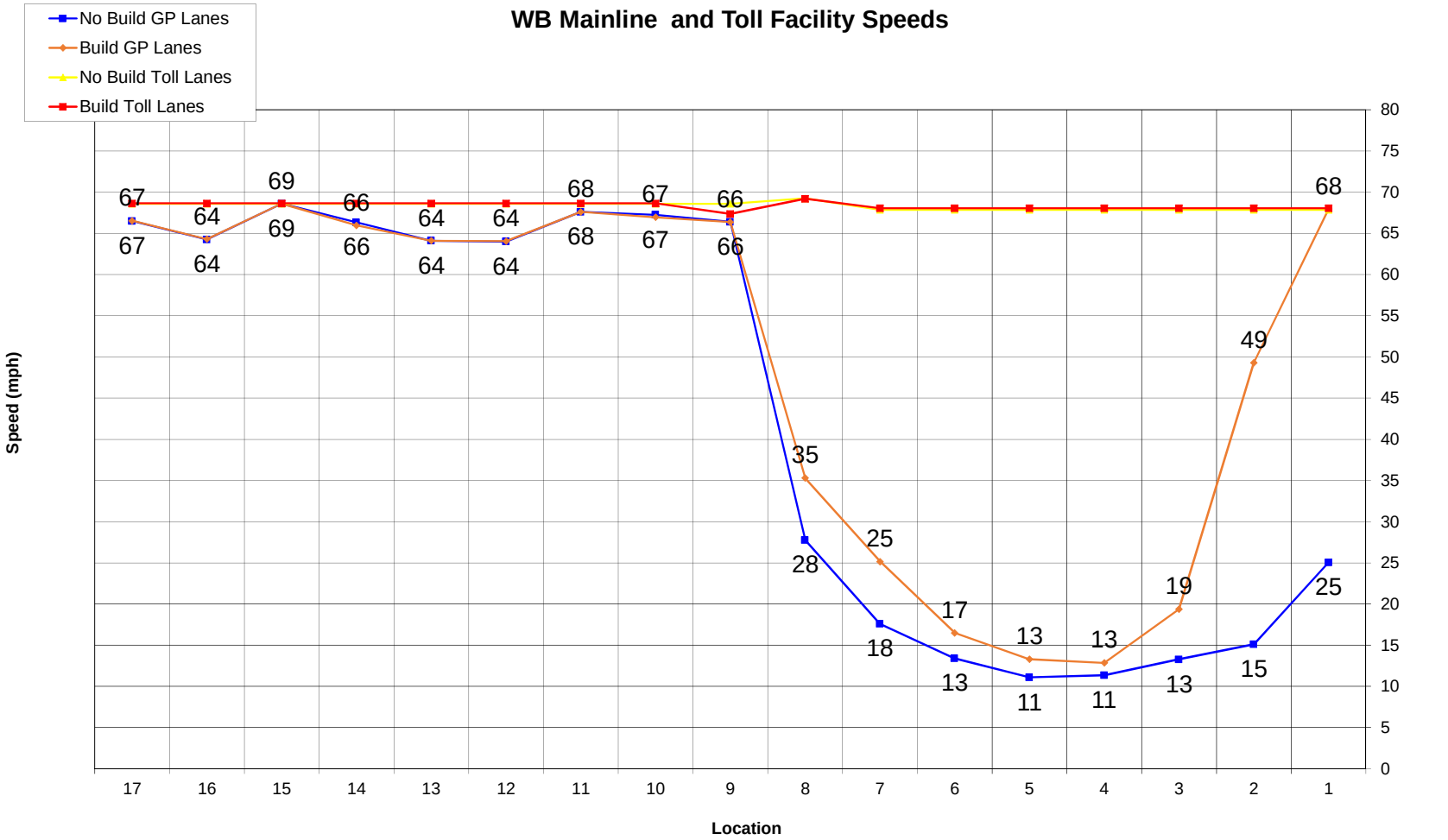
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 6-7 AM



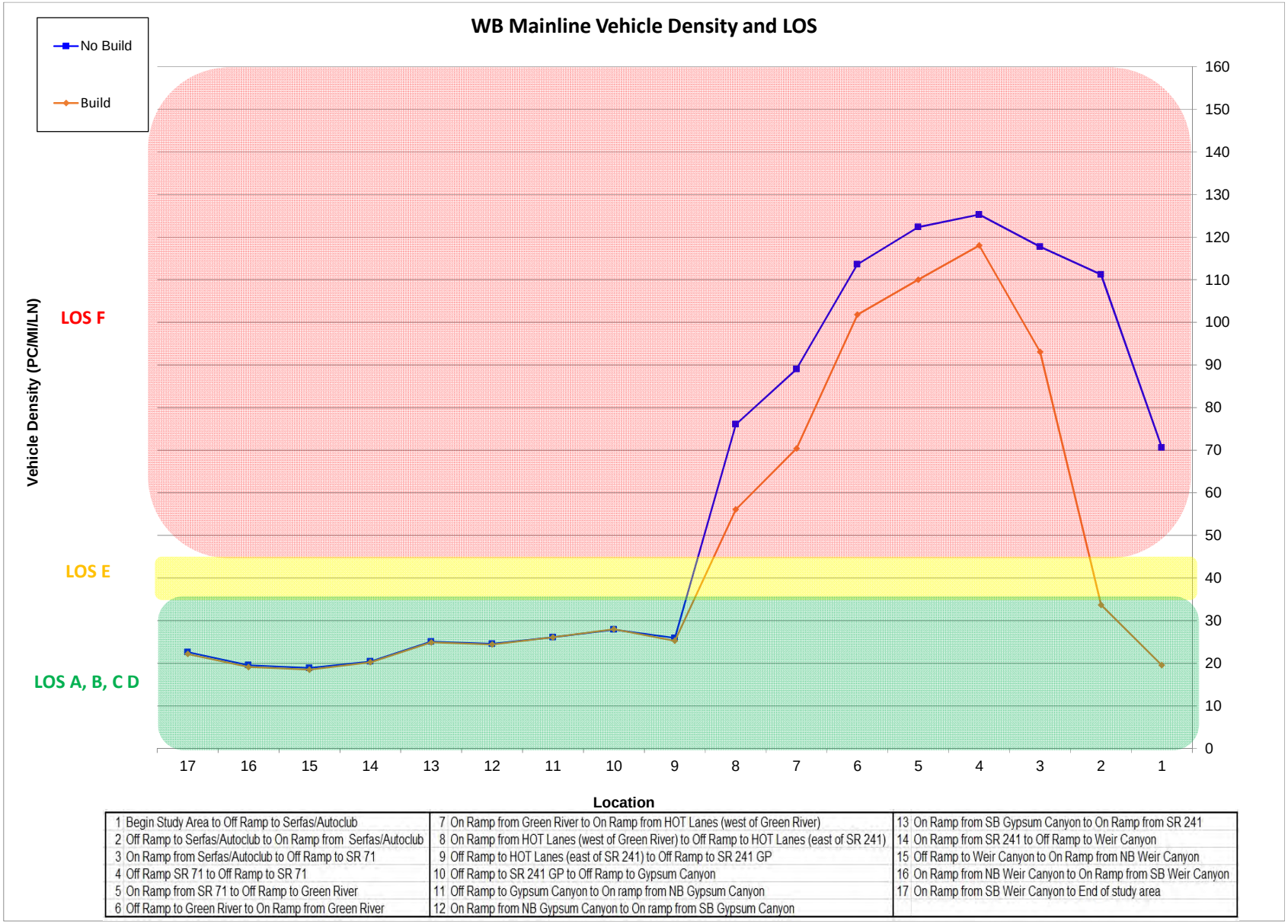
1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOT Lanes Exit (west of Green River)	13	On Ramp from SB Gypsum Canyon
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOT Lanes Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon
4	On Ramp from SR 71	10	Off Ramp to SR 241 HOV	16	On Ramp from NB Weir Canyon
5	Off Ramp to Green River	11	Off Ramp to Gypsum Canyon	17	On Ramp from SB Weir Canyon
6	On Ramp from Green River	12	On Ramp from NB Gypsum Canyon		

Charts 6-7 AM



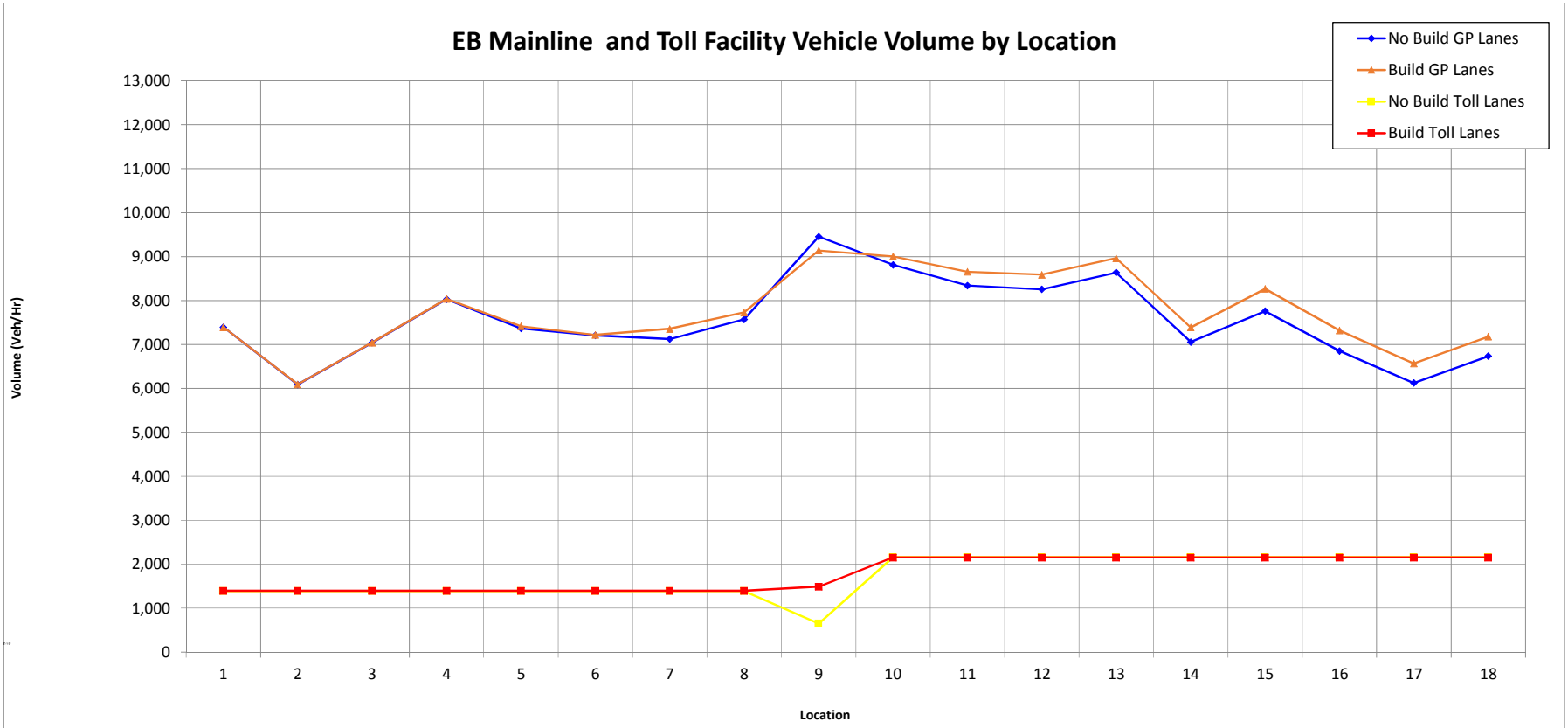
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 6-7 AM

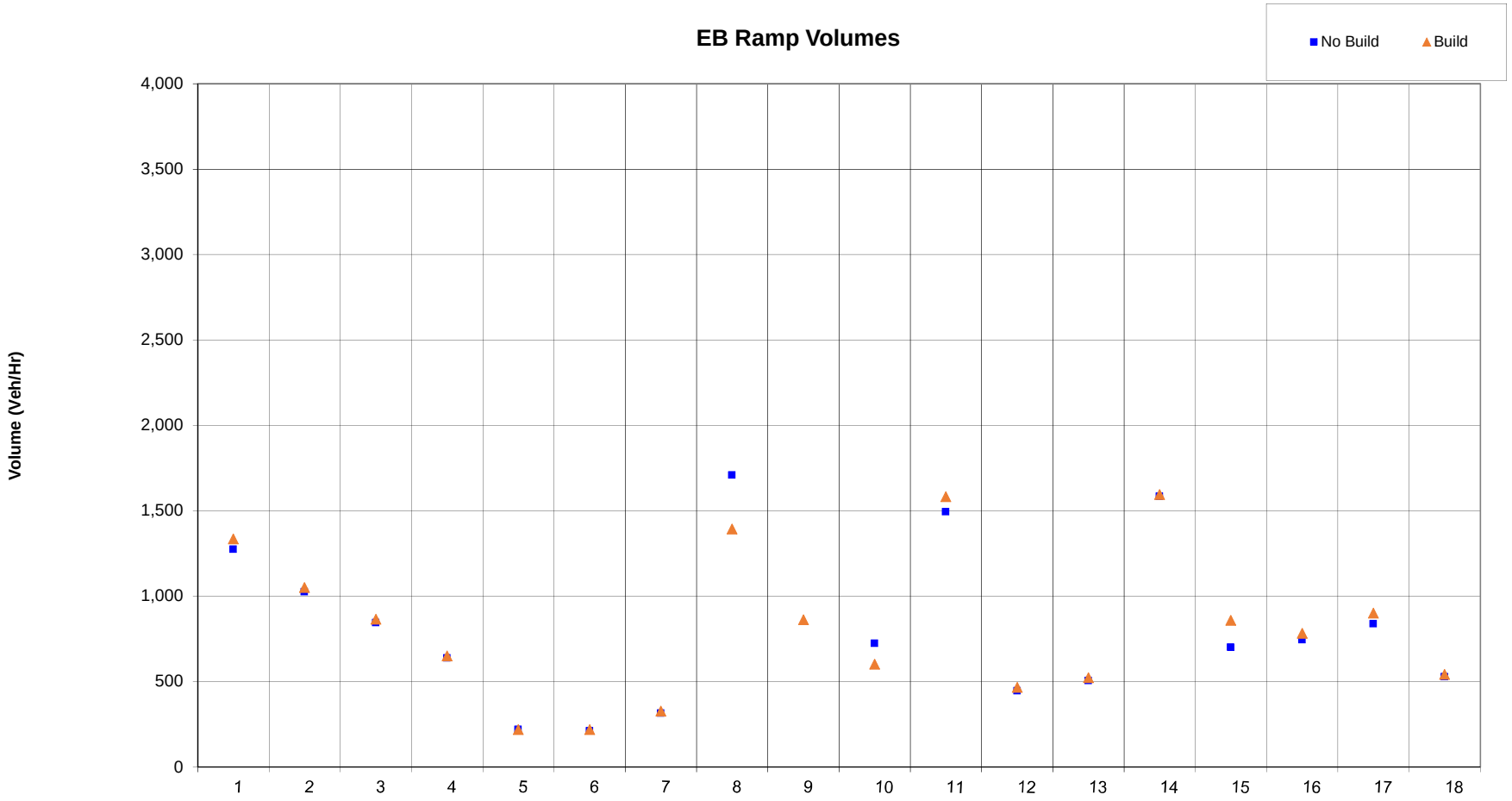


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 6-7 AM

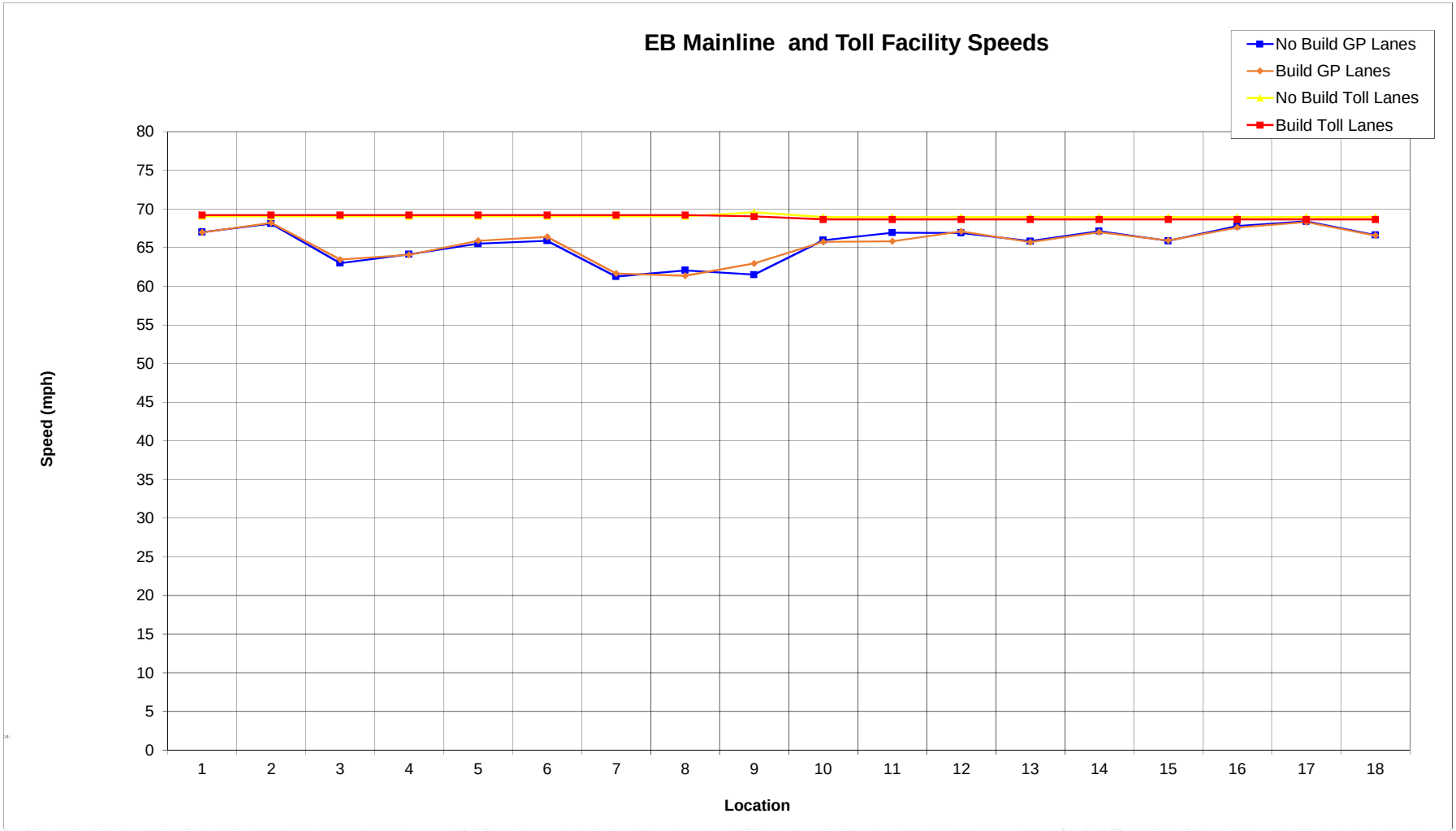


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

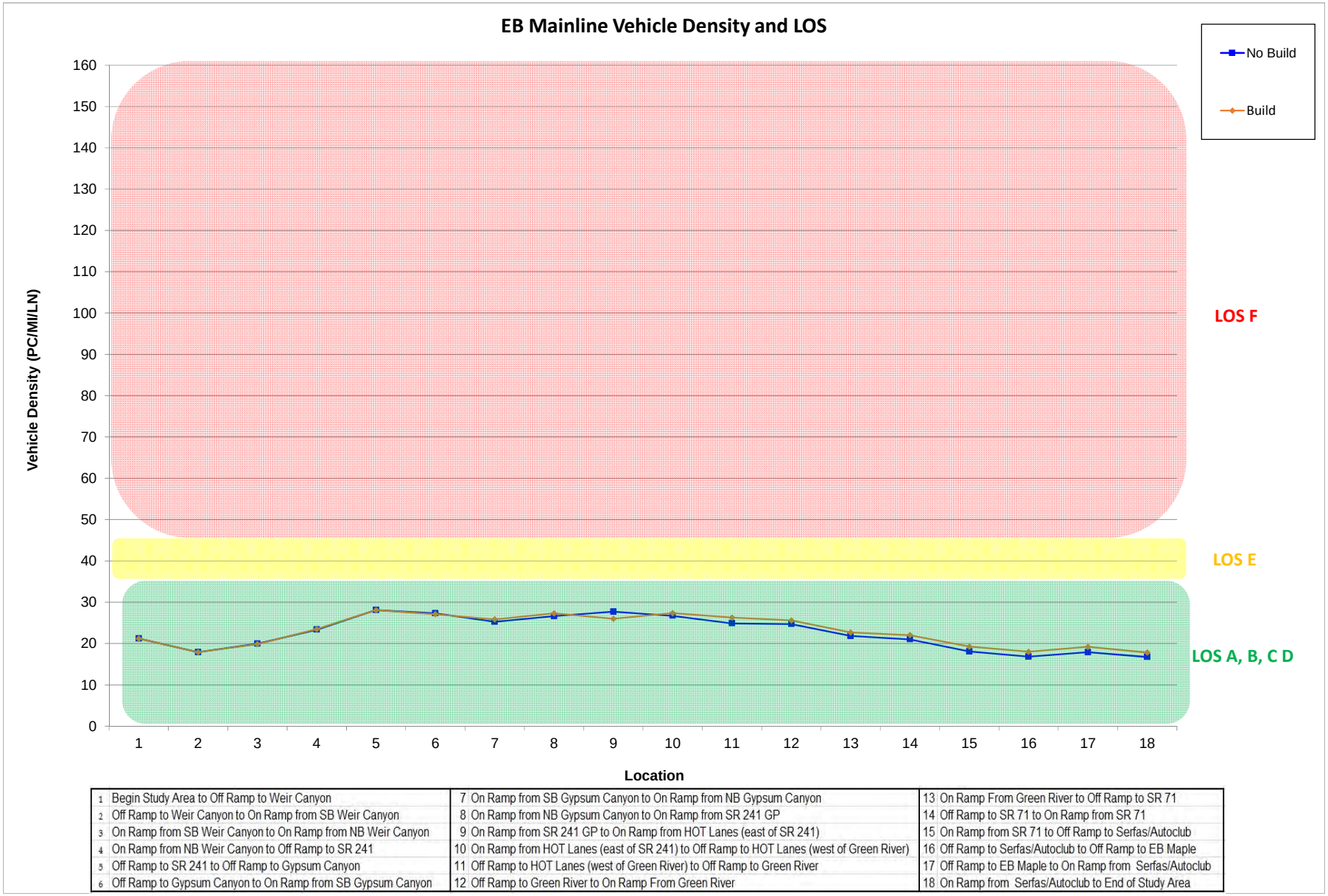


1	Off Ramp to Weir Canyon	7	On Ramp from NB Gypsum Canyon	13	On Ramp From Green River
2	On Ramp from SB Weir Canyon	8	On Ramp from SR 241 GP	14	Off Ramp to SR 71
3	On Ramp from NB Weir Canyon	9	On Ramp from SR 241 HOV	15	On Ramp from SR 71
4	Off Ramp to SR 241	10	On Ramp from HOT Lanes Exit (east of SR 241)	16	Off Ramp to Serfas/Autoclub
5	Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes Entrance (west of Green River Rd)	17	Off Ramp to EB Maple
6	On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River	18	On Ramp from Serfas/Autoclub

Charts 7-8 AM



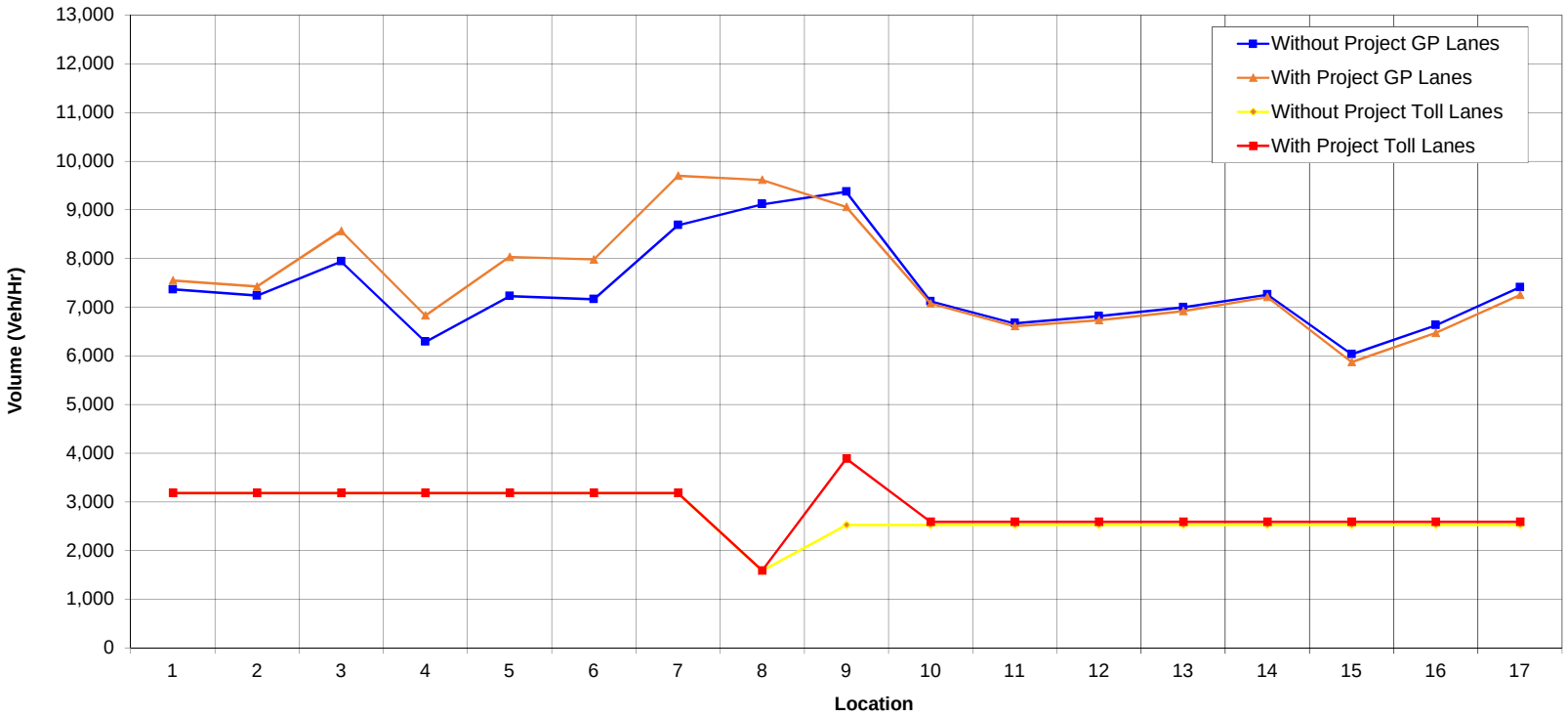
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area



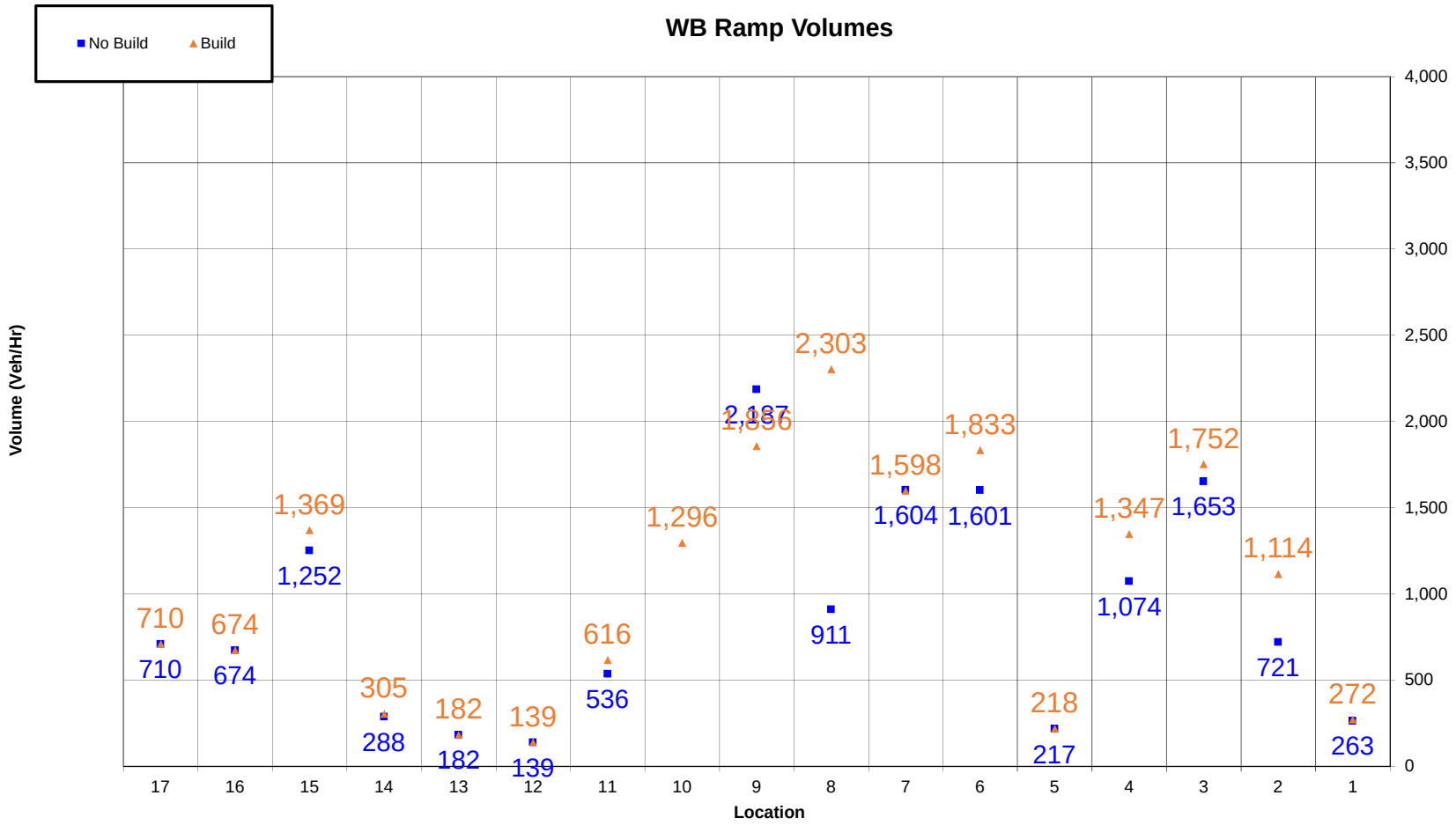
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 7-8 AM

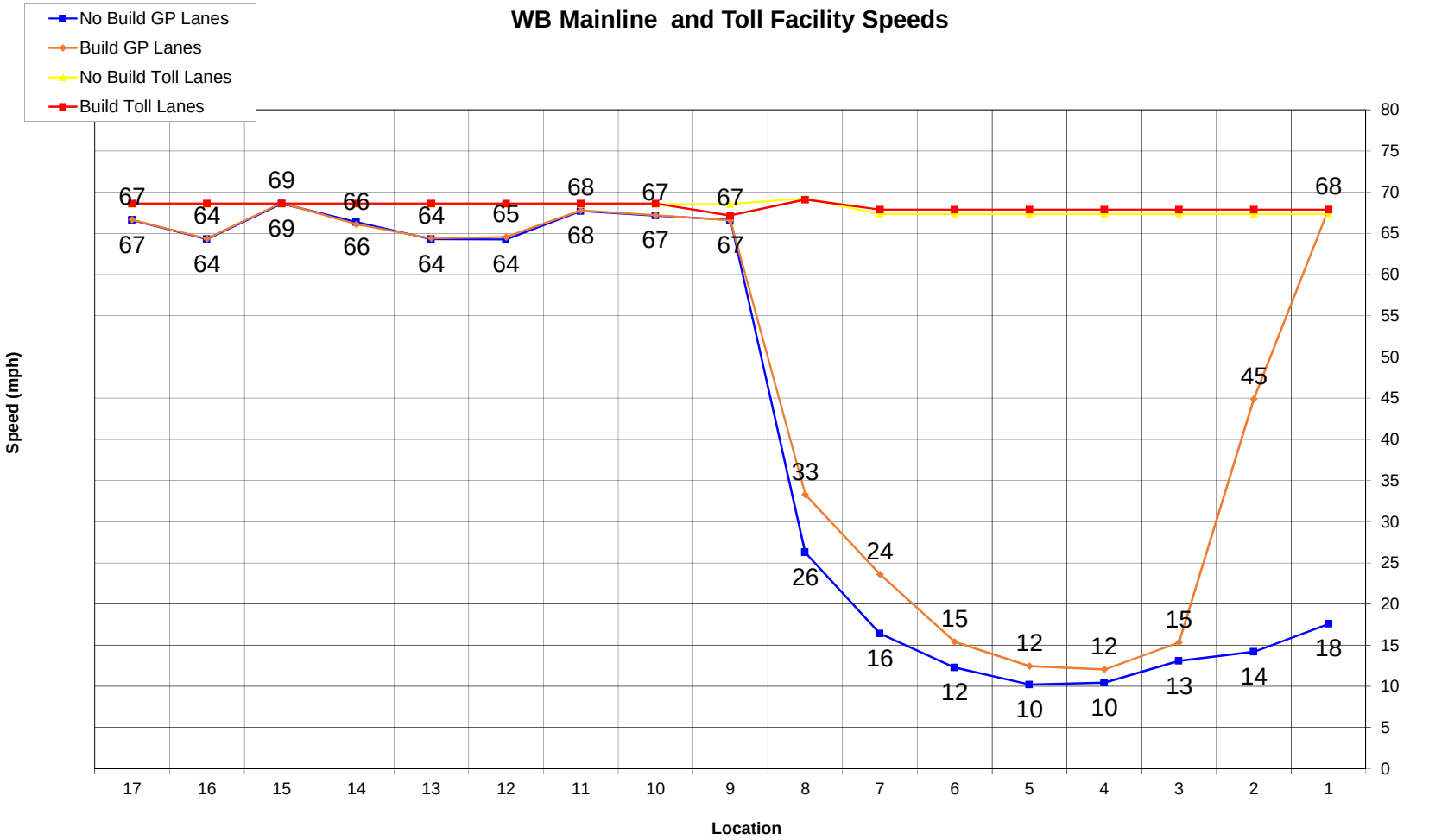
WB Mainline and Toll Facility Vehicle Volume by Location



1	Begin Study Area to Off Ramp to Serfas/Autoclub	7	On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13	On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8	On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241	14	On Ramp from SR 241 to Off Ramp to Weir Canyon
3	On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9	Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4	Off Ramp SR 71 to Off Ramp to SR 71	10	Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16	On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5	On Ramp from SR 71 to Off Ramp to Green River	11	Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17	On Ramp from SB Weir Canyon to End of study area
6	Off Ramp to Green River to On Ramp from Green River	12	On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon		

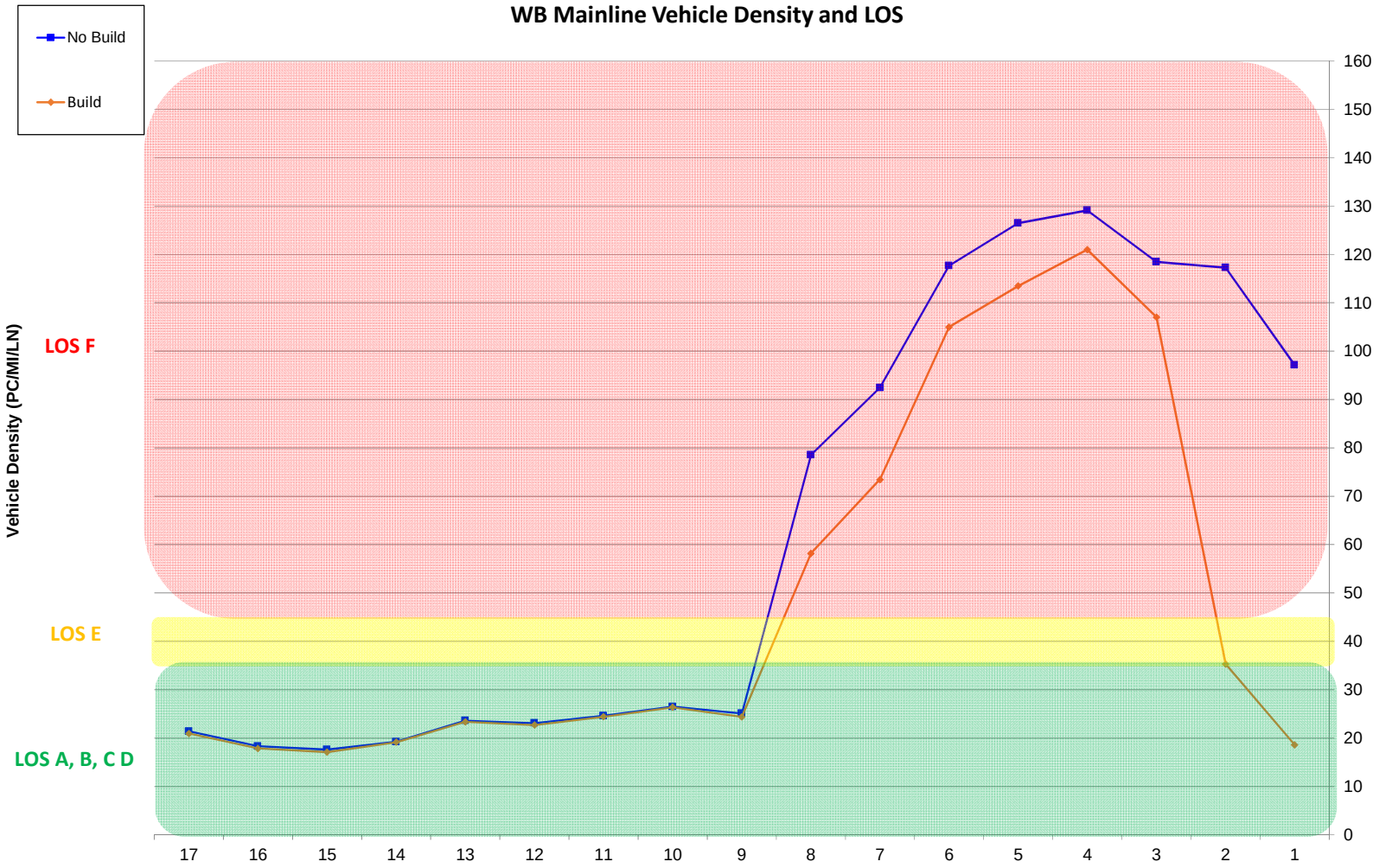


1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOT Lanes Exit (west of Green River)	13	On Ramp from SB Gypsum Canyon
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOT Lanes Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon
4	On Ramp from SR 71	10	Off Ramp to SR 241 HOV	16	On Ramp from NB Weir Canyon
5	Off Ramp to Green River	11	Off Ramp to Gypsum Canyon	17	On Ramp from SB Weir Canyon
6	On Ramp from Green River	12	On Ramp from NB Gypsum Canyon		



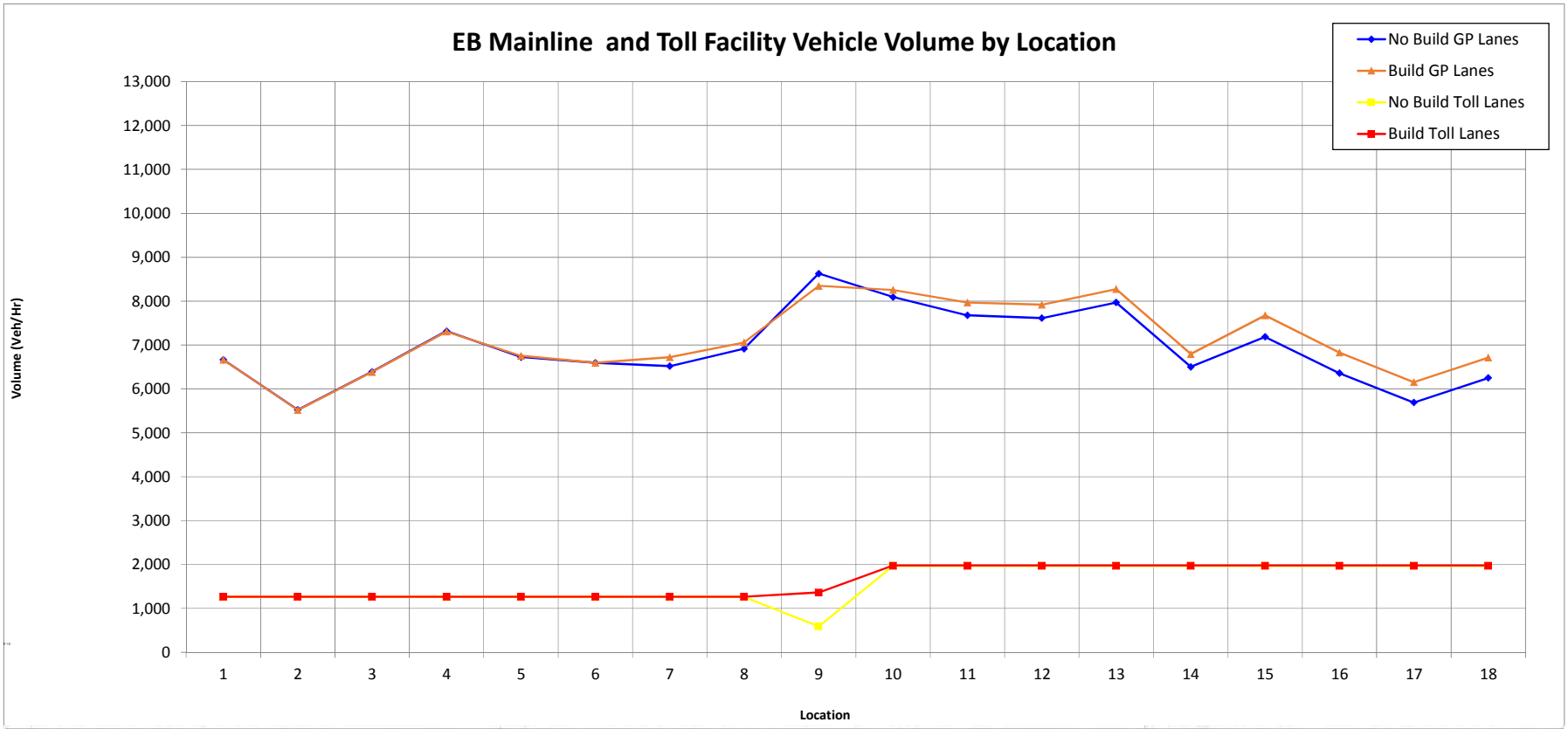
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 7-8 AM

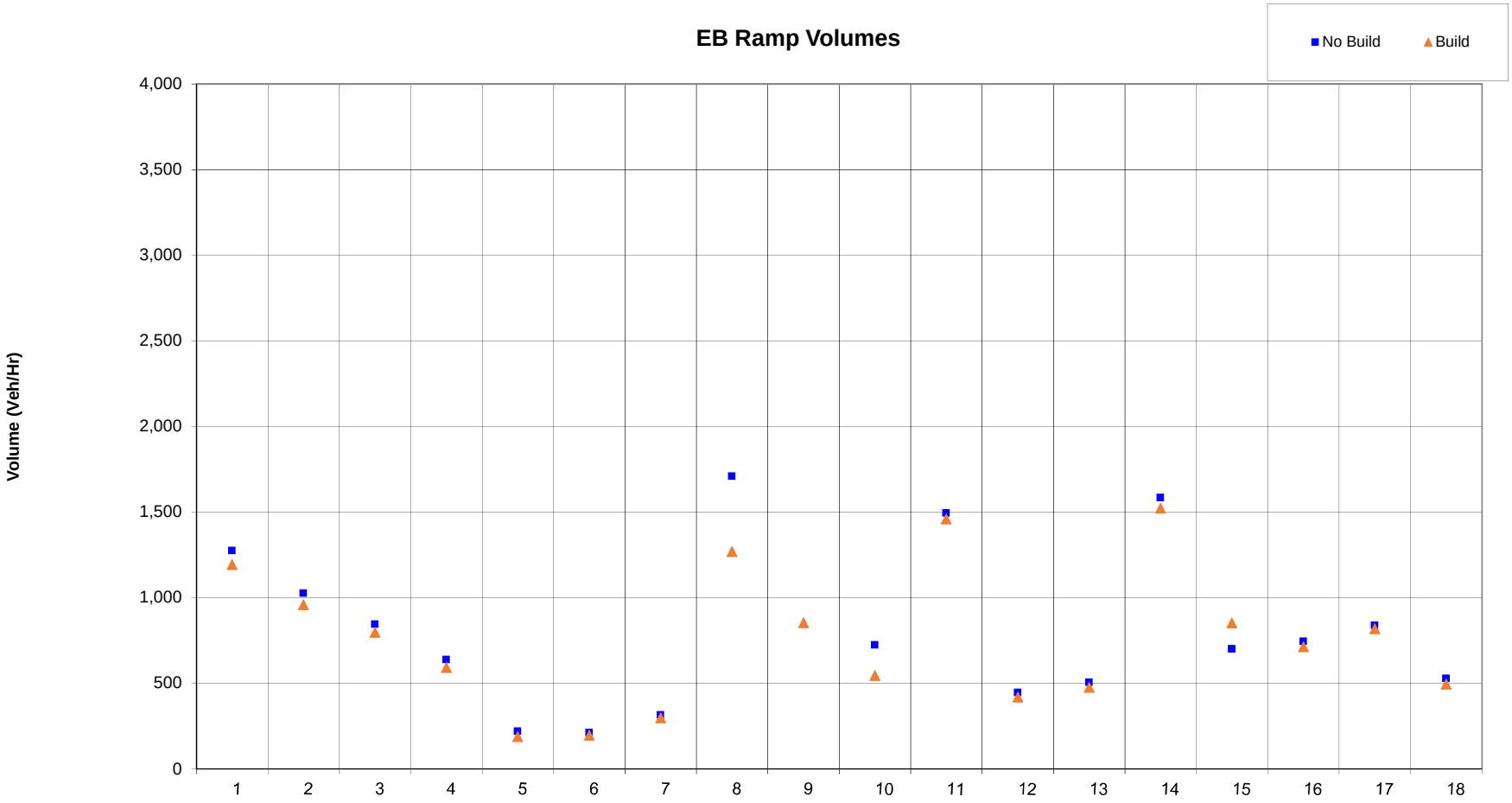


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 7-8 AM

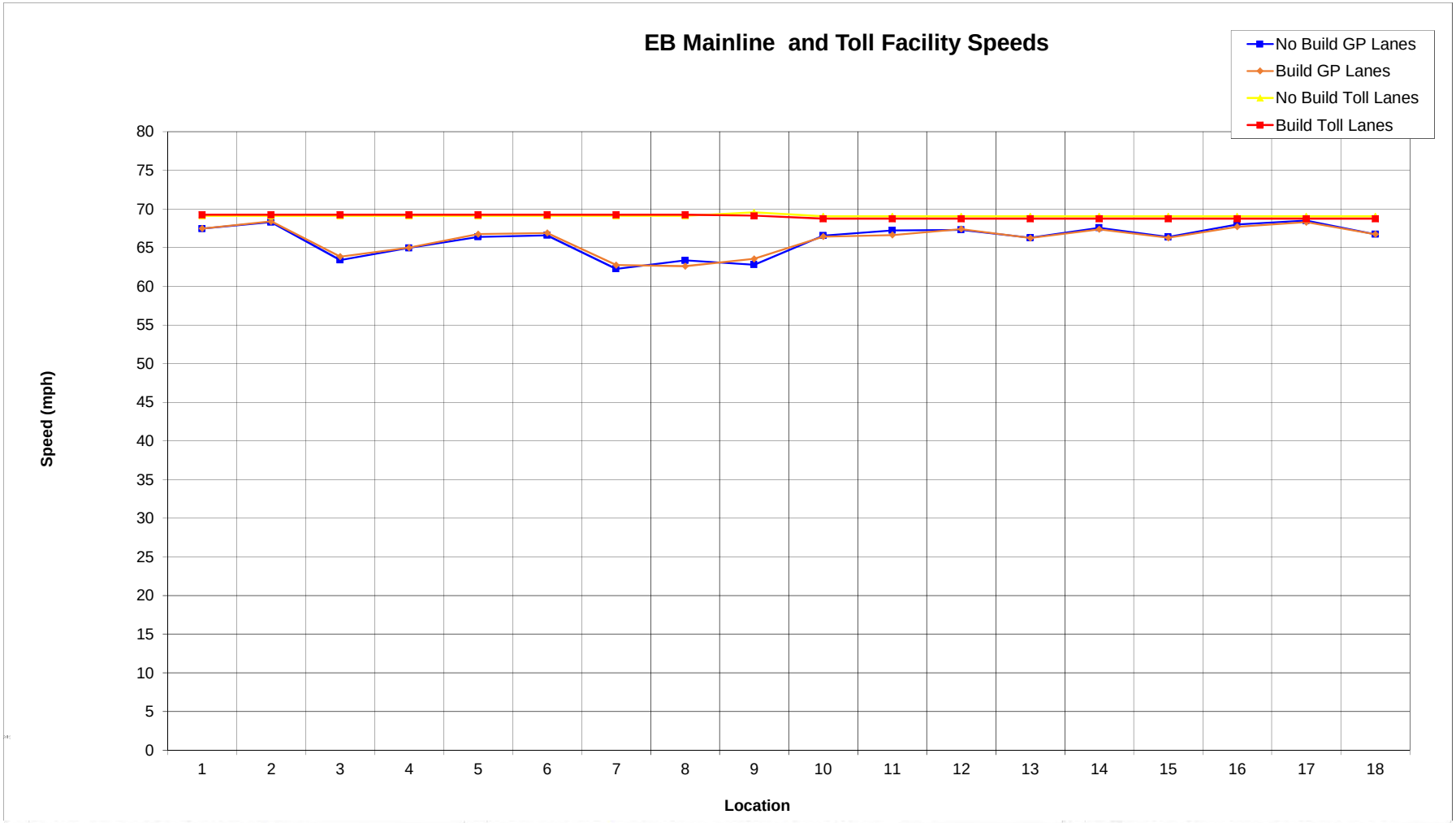


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

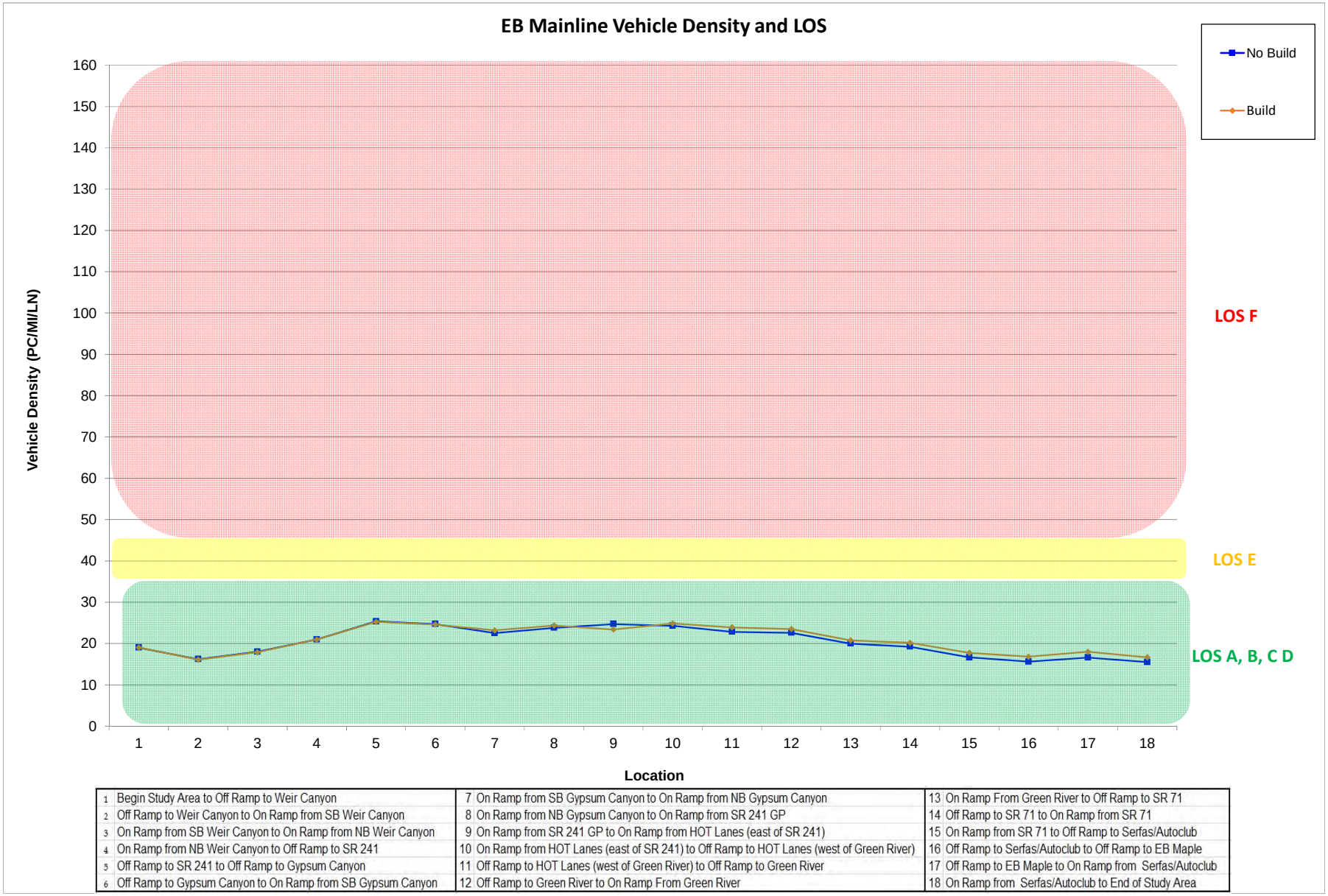


1	Off Ramp to Weir Canyon	7	On Ramp from NB Gypsum Canyon	13	On Ramp From Green River
2	On Ramp from SB Weir Canyon	8	On Ramp from SR 241 GP	14	Off Ramp to SR 71
3	On Ramp from NB Weir Canyon	9	On Ramp from SR 241 HOV	15	On Ramp from SR 71
4	Off Ramp to SR 241	10	On Ramp from HOT Lanes Exit (east of SR 241)	16	Off Ramp to Serfas/Autoclub
5	Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes Entrance (west of Green River Rd)	17	Off Ramp to EB Maple
6	On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River	18	On Ramp from Serfas/Autoclub

Charts 8-9 AM

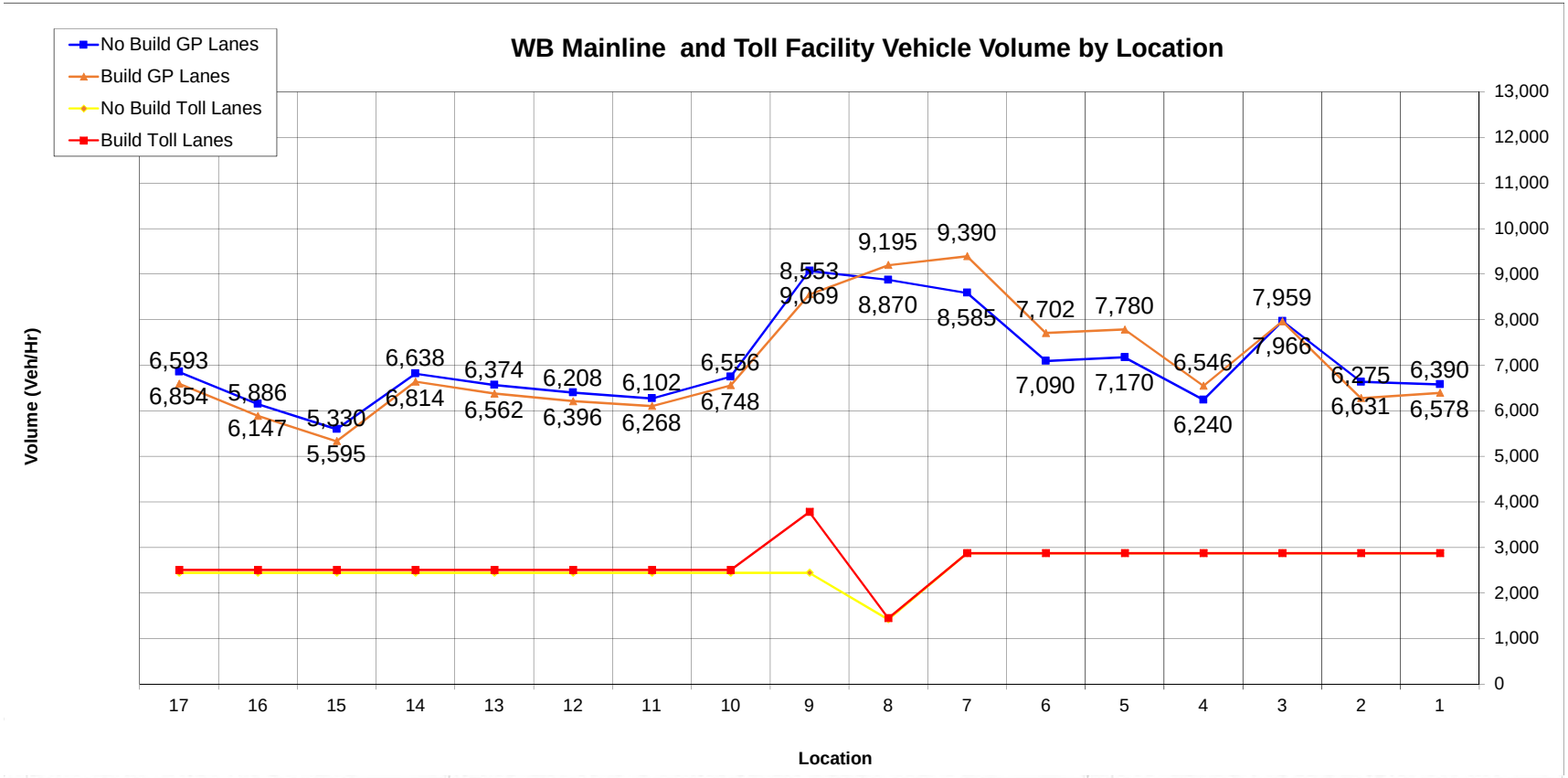


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area



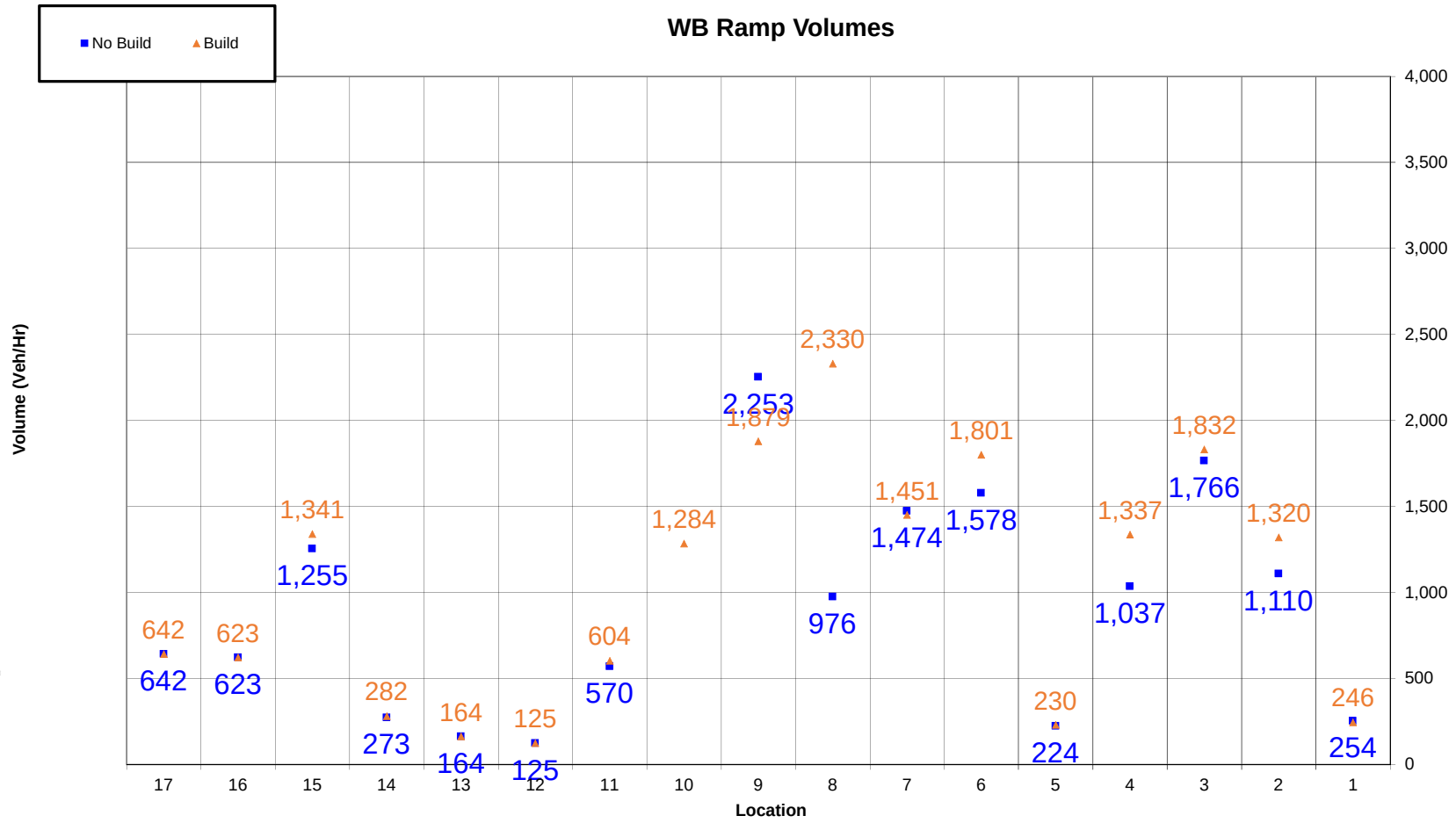
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 8-9 AM

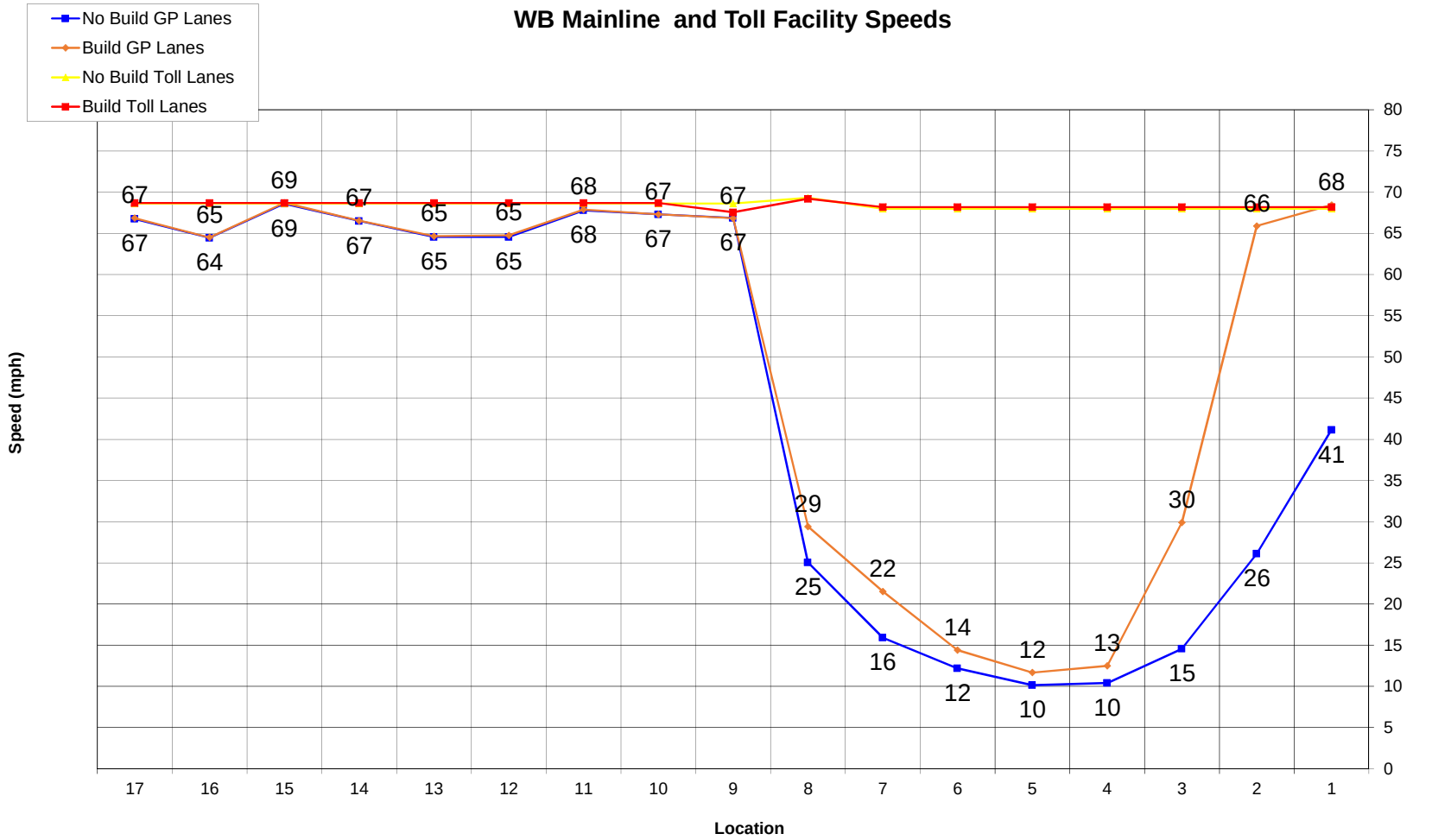


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 8-9 AM

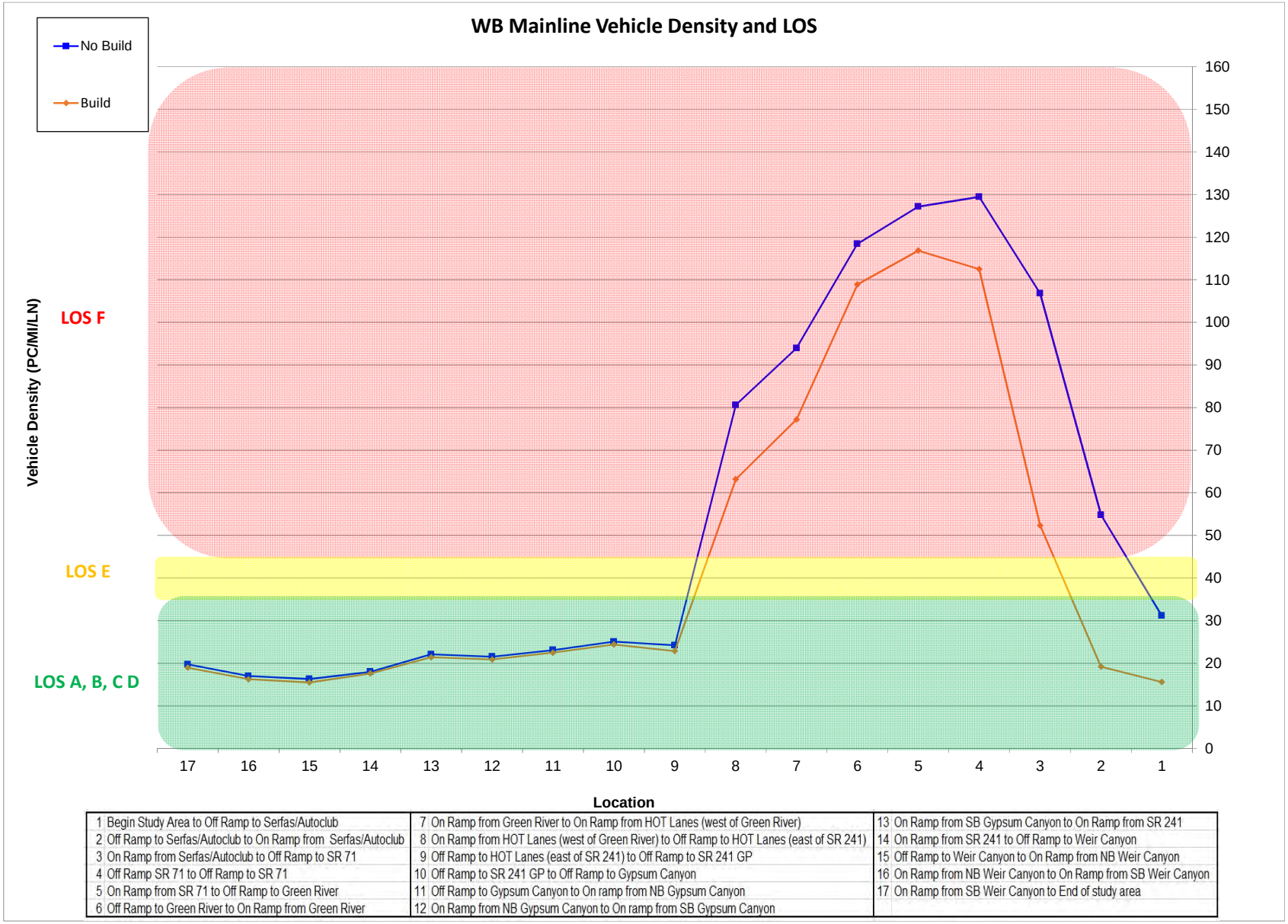


1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOT Lanes Exit (west of Green River)	13	On Ramp from SB Gypsum Canyon
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOT Lanes Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon
4	On Ramp from SR 71	10	Off Ramp to SR 241 HOV	16	On Ramp from NB Weir Canyon
5	Off Ramp to Green River	11	Off Ramp to Gypsum Canyon	17	On Ramp from SB Weir Canyon
6	On Ramp from Green River	12	On Ramp from NB Gypsum Canyon		



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 8-9 AM



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

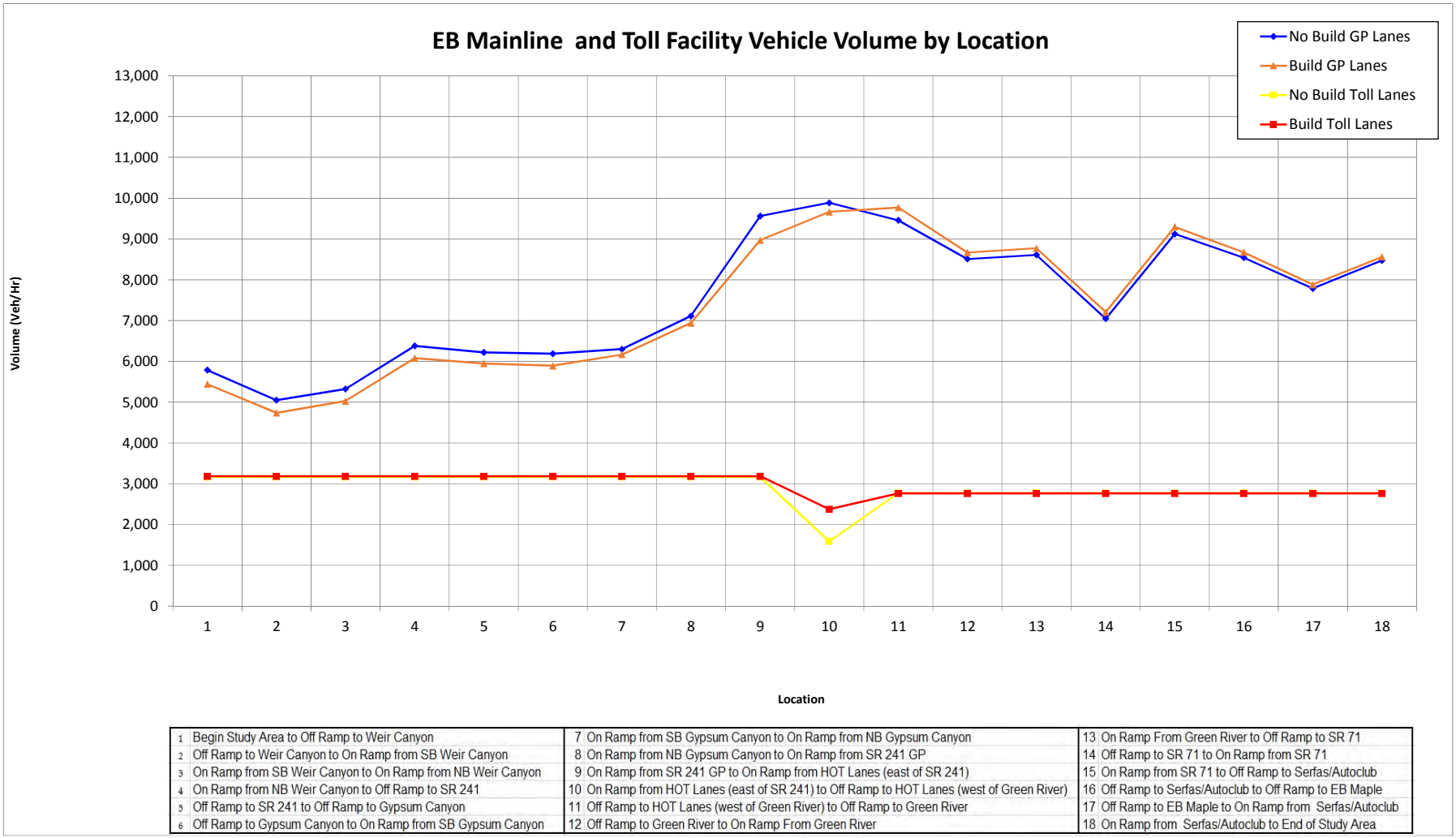
Charts 8-9 AM

SR-91
Vissim Model Summary - 2017 Build Option 2 - PM Peak Period
Network Summary Statistics

Parameter	2017 No Build	2017 Option 2	Difference
Total Vehicle Demand (4 Hr)	141,937	144,727	2,790
Total number of vehicles that did not reach their desitination	20,812	22,405	1,593
Total number of vehicles that have reached their destination	121,125	122,322	1,197
Total vehicle-miles traveled (VMT)	1,014,001	1,036,967	22,965
Total travel time, All Vehicle Types (VHT)	26,278	27,608	1,331
Average speed [mph], All Vehicle Types	38.6	37.6	-1.0
Average delay time per vehicle [mins], All Vehicle Types	5.27	5.68	0.41

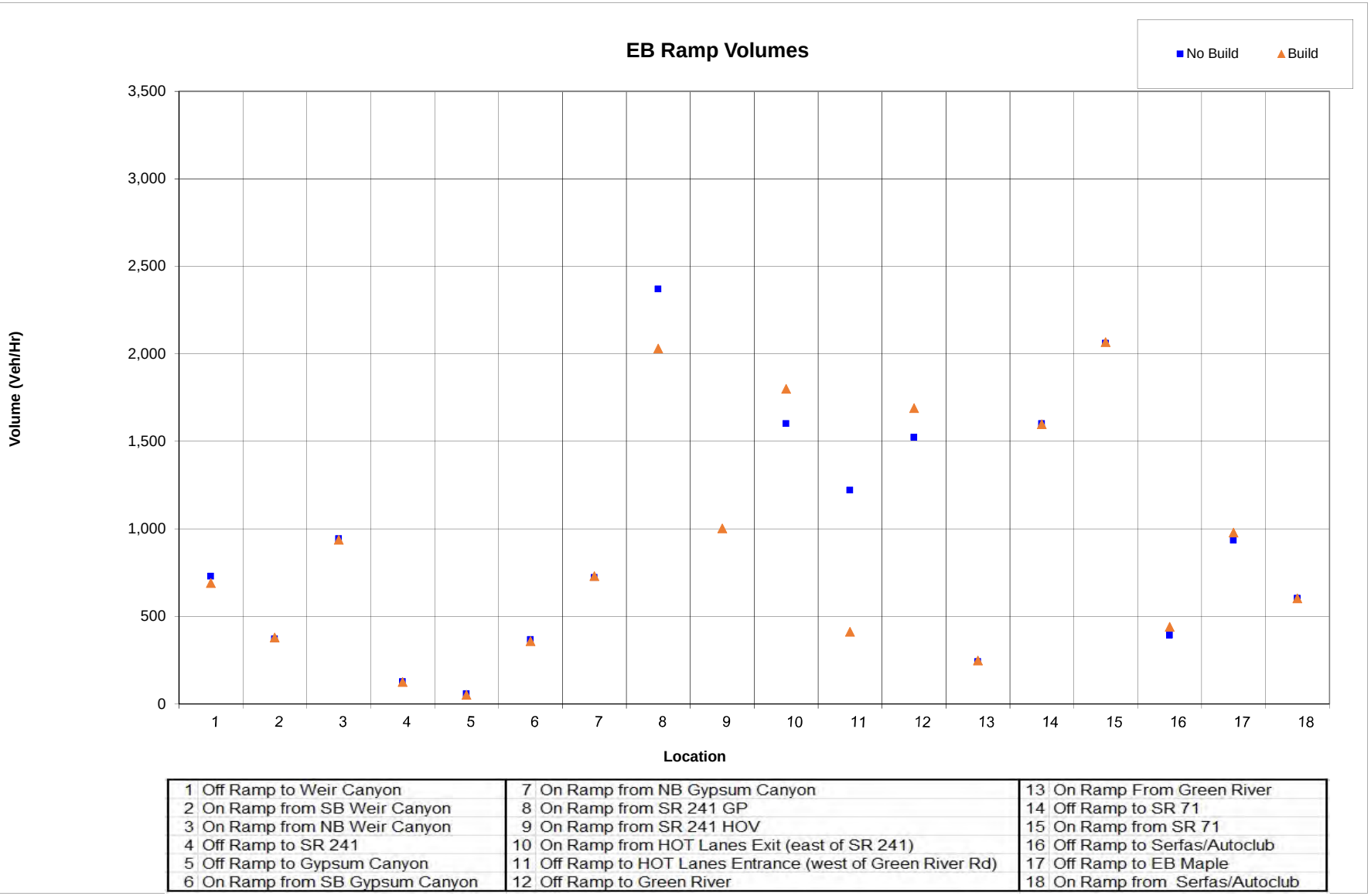
SR-91
Vissim Model Summary - 2017 Build Option 2 - PM Peak Period
Travel Time Results

#	Origin	#	Destination	Hide Travel Time Group Key	Seg 1	Seg 2	Seg 3	2017 PM No Build VISSIM Travel Time (Minutes) 3-4 PM	4-5 PM	5-6 PM	6-7 PM	2017 PM Build VISSIM Travel Time (Minutes) 3-4 PM	4-5 PM	5-6 PM	6-7 PM	Change VISSIM Travel Time (Minutes) 3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	28.3	29.6	29.4	27.6	30.3	31.9	32.0	29.4	2.0	2.4	2.6	1.8
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	28.3	29.5	29.4	27.6	30.3	31.9	31.9	29.4	2.0	2.4	2.6	1.8
		5	SR 241 SB south of SR 91	3	1001			18.4	19.1	19.0	17.7	19.3	20.8	20.6	18.7	1.0	1.7	1.5	1.0
		7	SR 71 NB north of SR 91	4	1002	1003	1004	30.6	31.9	31.8	30.0	32.7	34.3	34.3	31.7	2.0	2.4	2.6	1.8
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	10.4	10.5	10.5	10.5	11.2	11.3	11.3	11.2	0.8	0.8	0.8	0.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.4	8.4	8.4	8.4	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	7	2002	1003	1004	12.7	12.8	12.9	12.9	13.6	13.6	13.7	13.5	0.8	0.8	0.8	0.6
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	8.5	8.5	8.5	8.4	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	10.9	11.0	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a	n/a	10.9	10.8	10.8	10.8	-0.1	-0.1	-0.1	-0.1
		7	SR 71 NB north of SR 91	12	1010			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.7	-0.1	-0.2	-0.1	-0.1
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	13.4	13.5	13.6	13.6	15.0	15.2	15.1	14.9	1.6	1.7	1.5	1.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	13.4	13.4	13.5	13.5	15.0	15.2	15.1	14.8	1.6	1.8	1.5	1.3
		7	SR 71 NB north of SR 91	20	1007	1003	1004	15.7	15.8	15.9	15.9	17.3	17.5	17.5	17.2	1.6	1.7	1.5	1.3
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a	n/a	13.6	13.7	13.7	13.6	0.2	0.2	0.1	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.8	-2.5	-2.6	-2.7	-2.7
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a	n/a	15.9	16.0	16.0	15.9	0.2	0.2	0.1	0.0
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	10.2	10.2	10.1	9.9	10.2	10.2	10.1	9.9	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	10.2	10.2	10.0	9.9	10.2	10.2	10.0	9.8	0.0	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			6.4	6.7	6.2	5.8	6.5	6.6	6.2	5.8	0.1	-0.1	0.1	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	12.6	12.7	12.5	12.3	12.7	12.6	12.5	12.3	0.0	0.0	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a	n/a	12.6	12.6	12.4	12.2	-0.1	-0.1	-0.1	-0.1

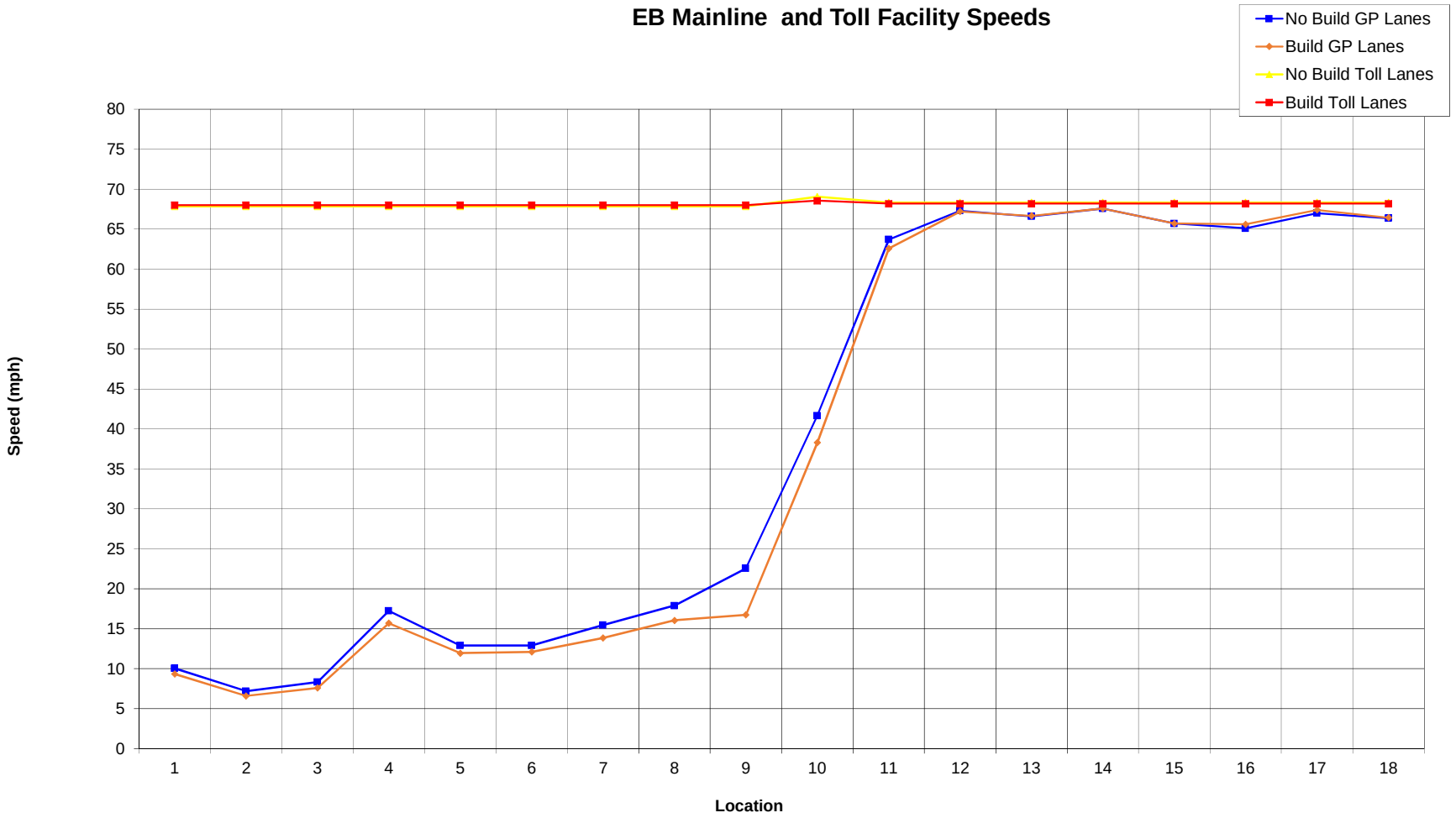


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 3-4 PM

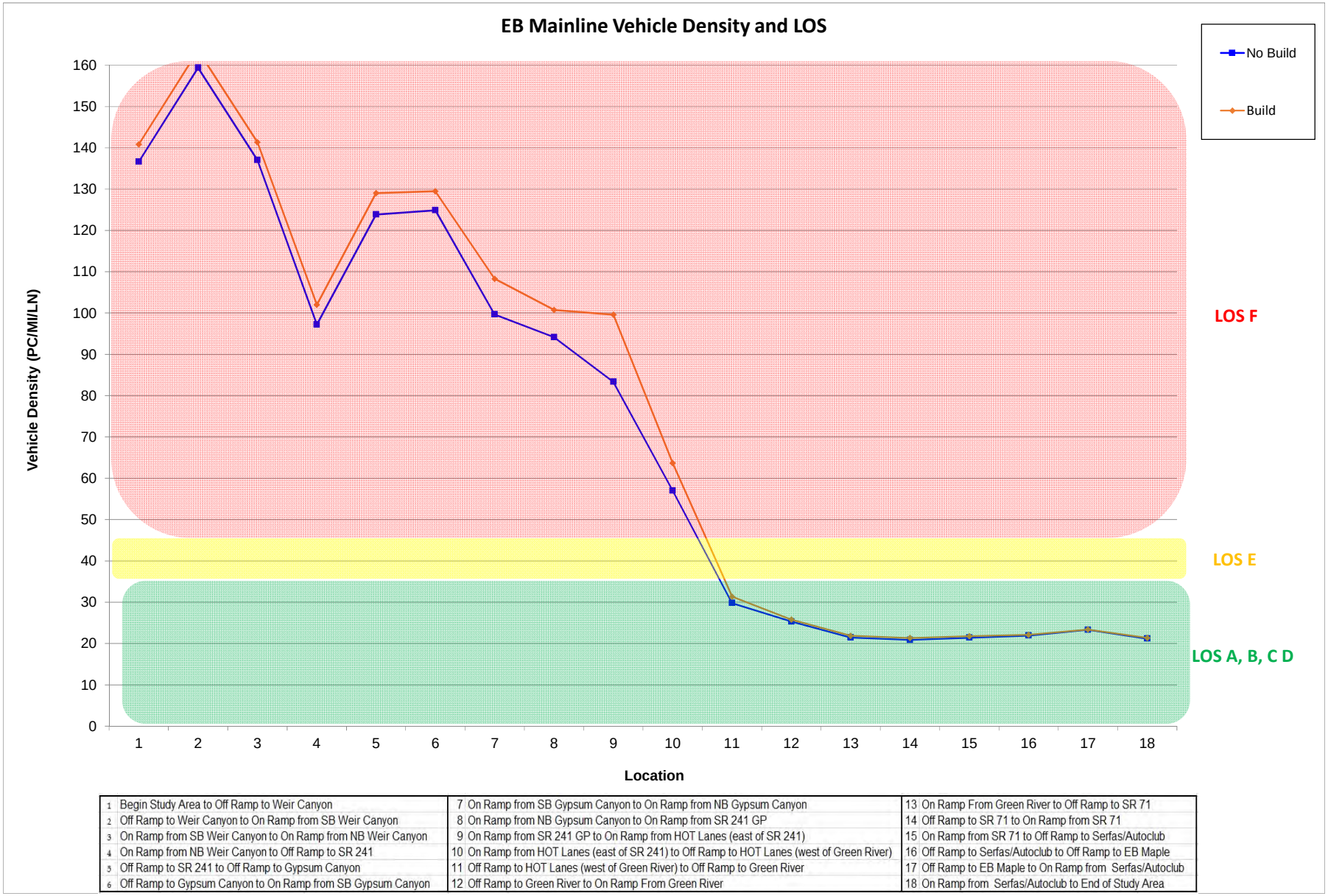


1	Off Ramp to Weir Canyon	7	On Ramp from NB Gypsum Canyon	13	On Ramp From Green River
2	On Ramp from SB Weir Canyon	8	On Ramp from SR 241 GP	14	Off Ramp to SR 71
3	On Ramp from NB Weir Canyon	9	On Ramp from SR 241 HOV	15	On Ramp from SR 71
4	Off Ramp to SR 241	10	On Ramp from HOT Lanes Exit (east of SR 241)	16	Off Ramp to Serfas/Autoclub
5	Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes Entrance (west of Green River Rd)	17	Off Ramp to EB Maple
6	On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River	18	On Ramp from Serfas/Autoclub



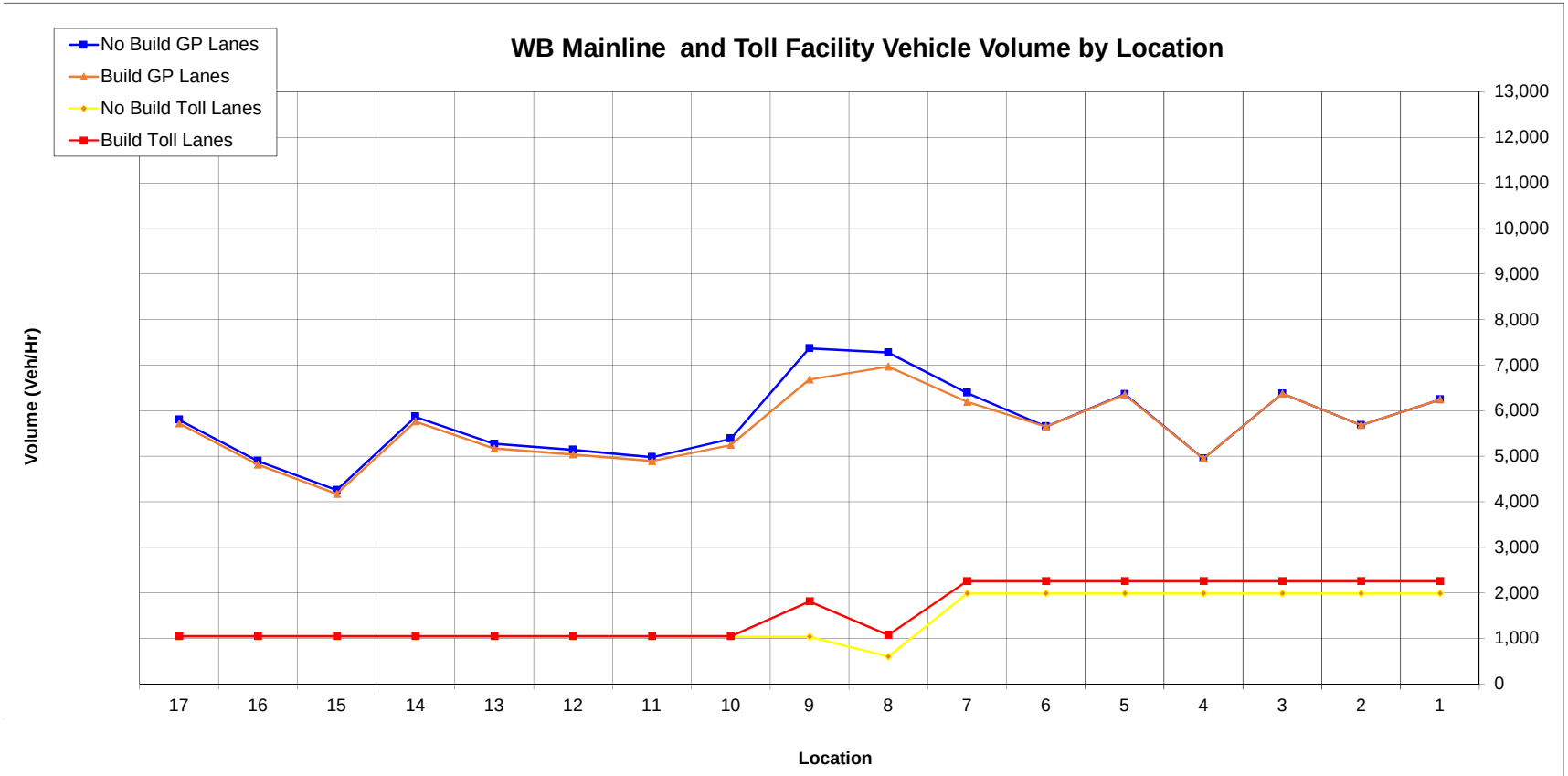
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 3-4 PM



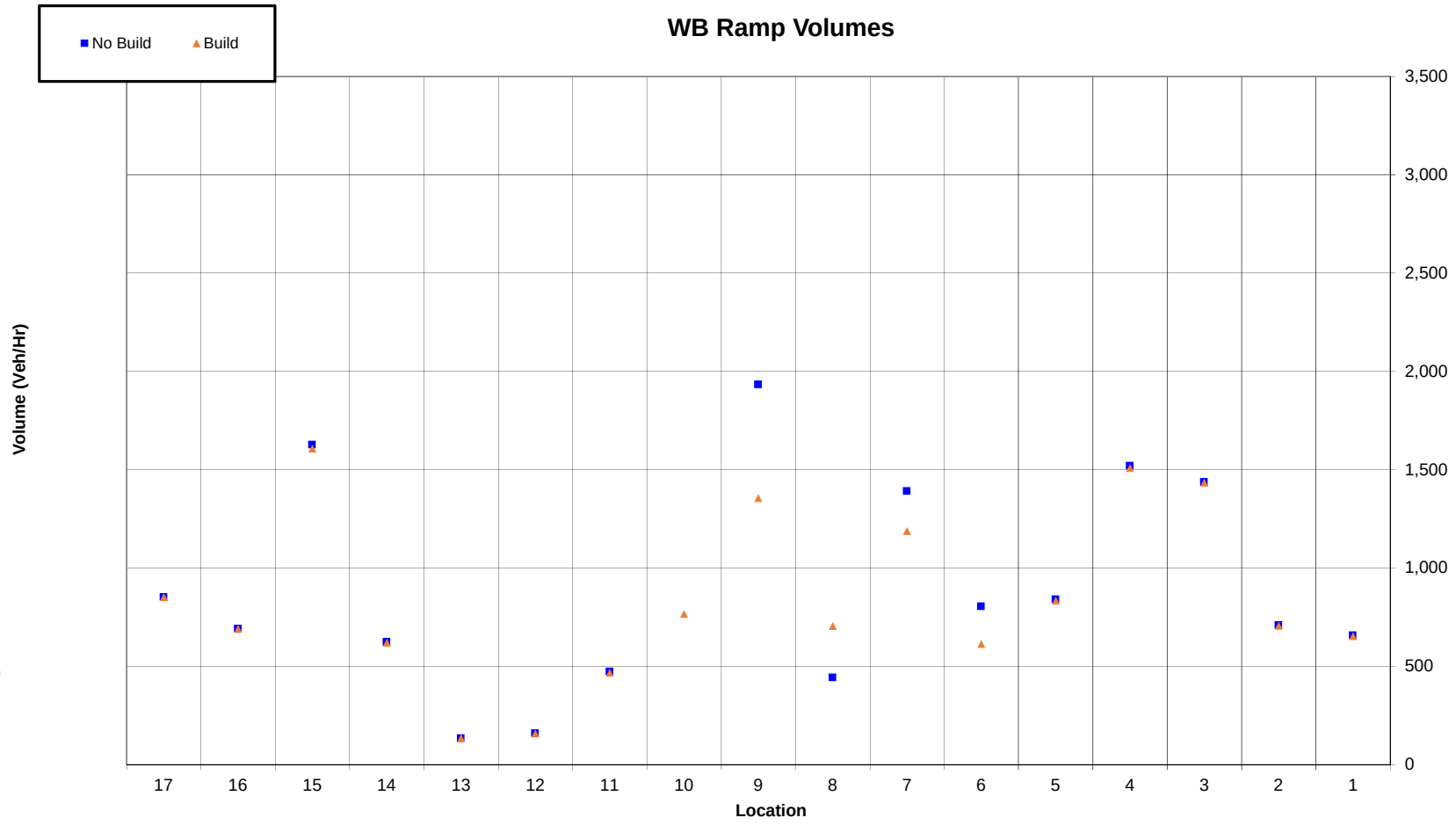
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 3-4 PM

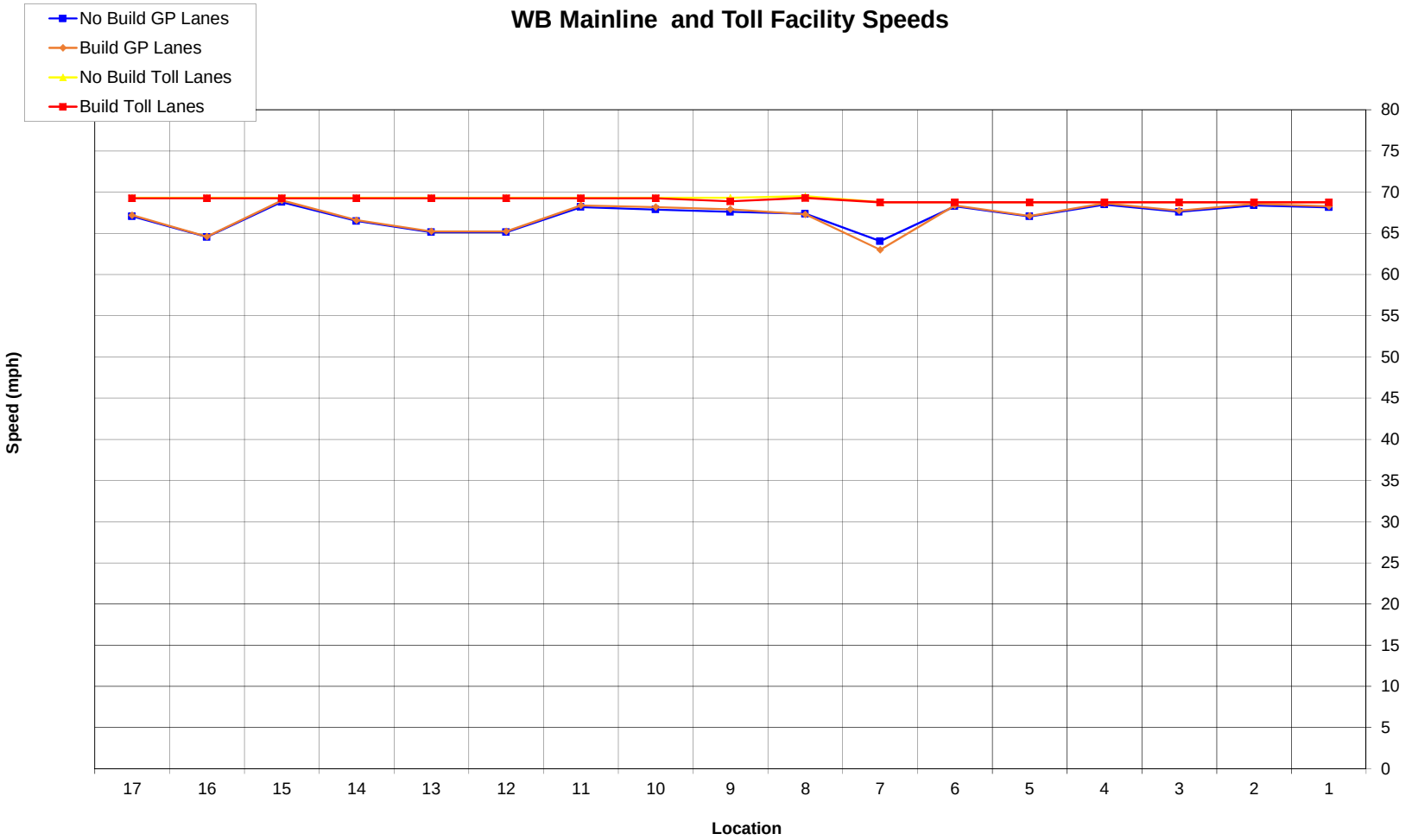


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 3-4 PM

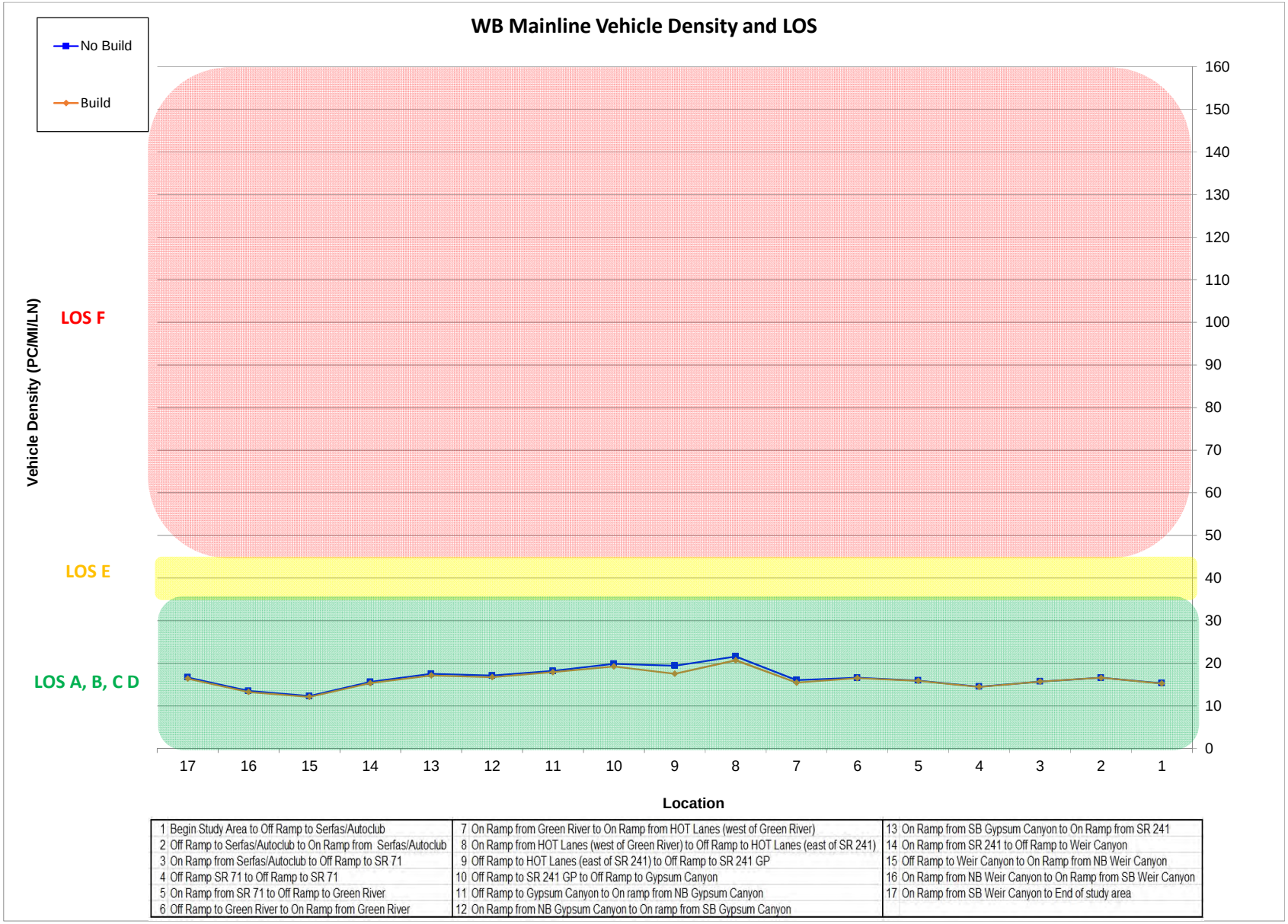


1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOT Lanes Exit (west of Green River)	13	On Ramp from SB Gypsum Canyon
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOT Lanes Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon
4	On Ramp from SR 71	10	Off Ramp to SR 241 HOV	16	On Ramp from NB Weir Canyon
5	Off Ramp to Green River	11	Off Ramp to Gypsum Canyon	17	On Ramp from SB Weir Canyon
6	On Ramp from Green River	12	On Ramp from NB Gypsum Canyon		



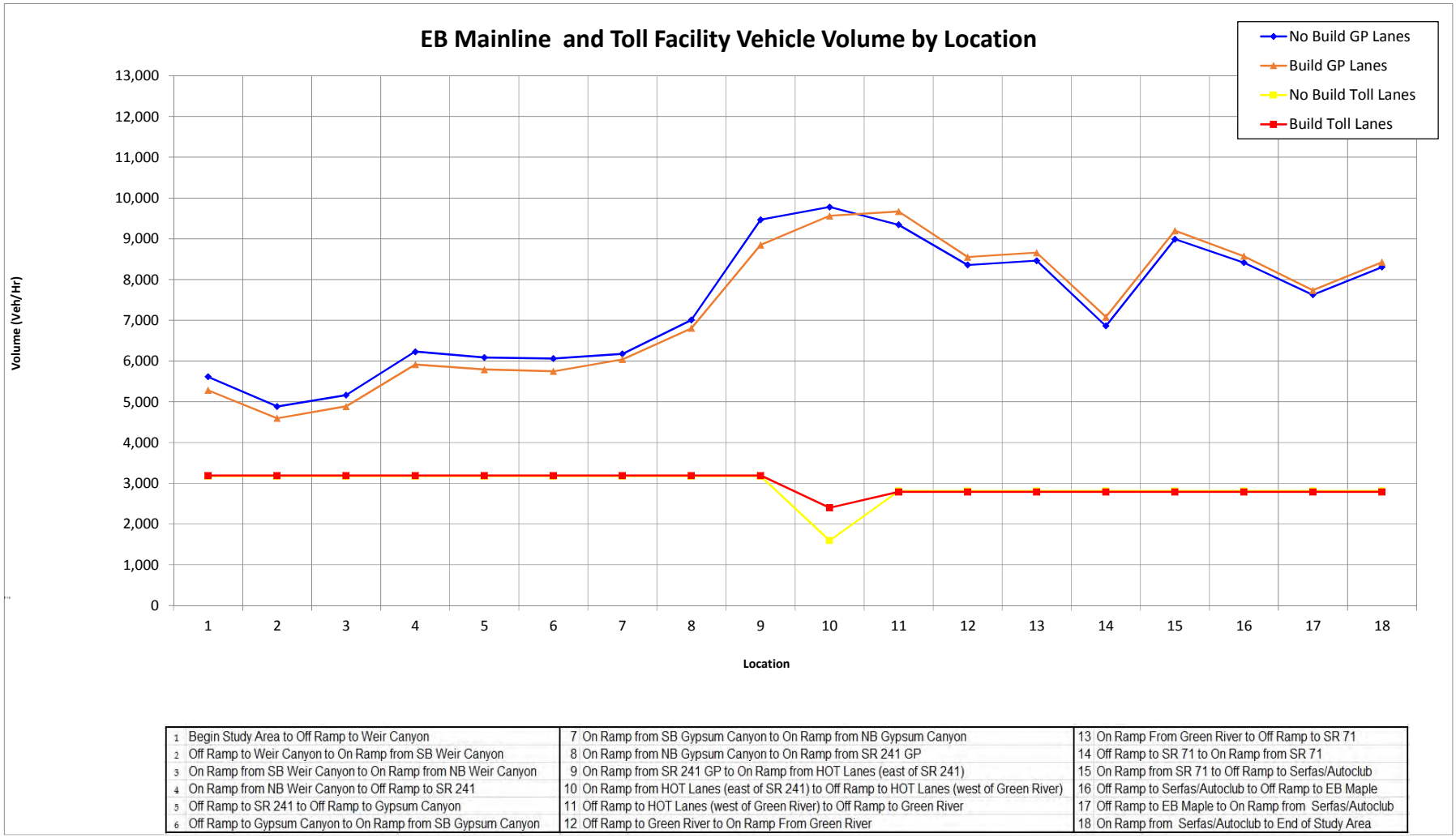
1	Begin Study Area to Off Ramp to Serfas/Autoclub	7	On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13	On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8	On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14	On Ramp from SR 241 to Off Ramp to Weir Canyon
3	On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9	Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4	Off Ramp SR 71 to Off Ramp to SR 71	10	Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16	On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5	On Ramp from SR 71 to Off Ramp to Green River	11	Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17	On Ramp from SB Weir Canyon to End of study area
6	Off Ramp to Green River to On Ramp from Green River	12	On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon		

Charts 3-4 PM



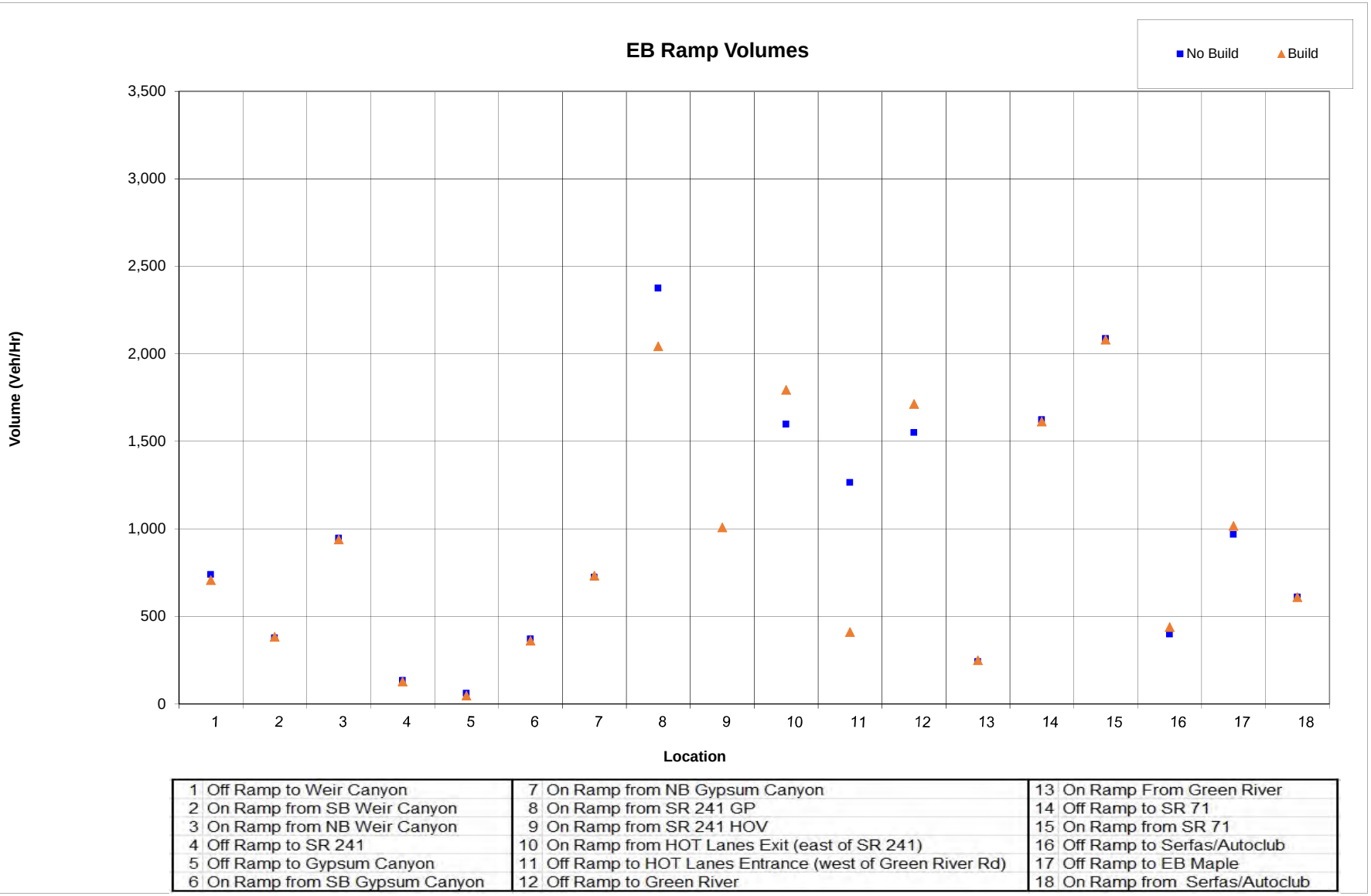
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 3-4 PM

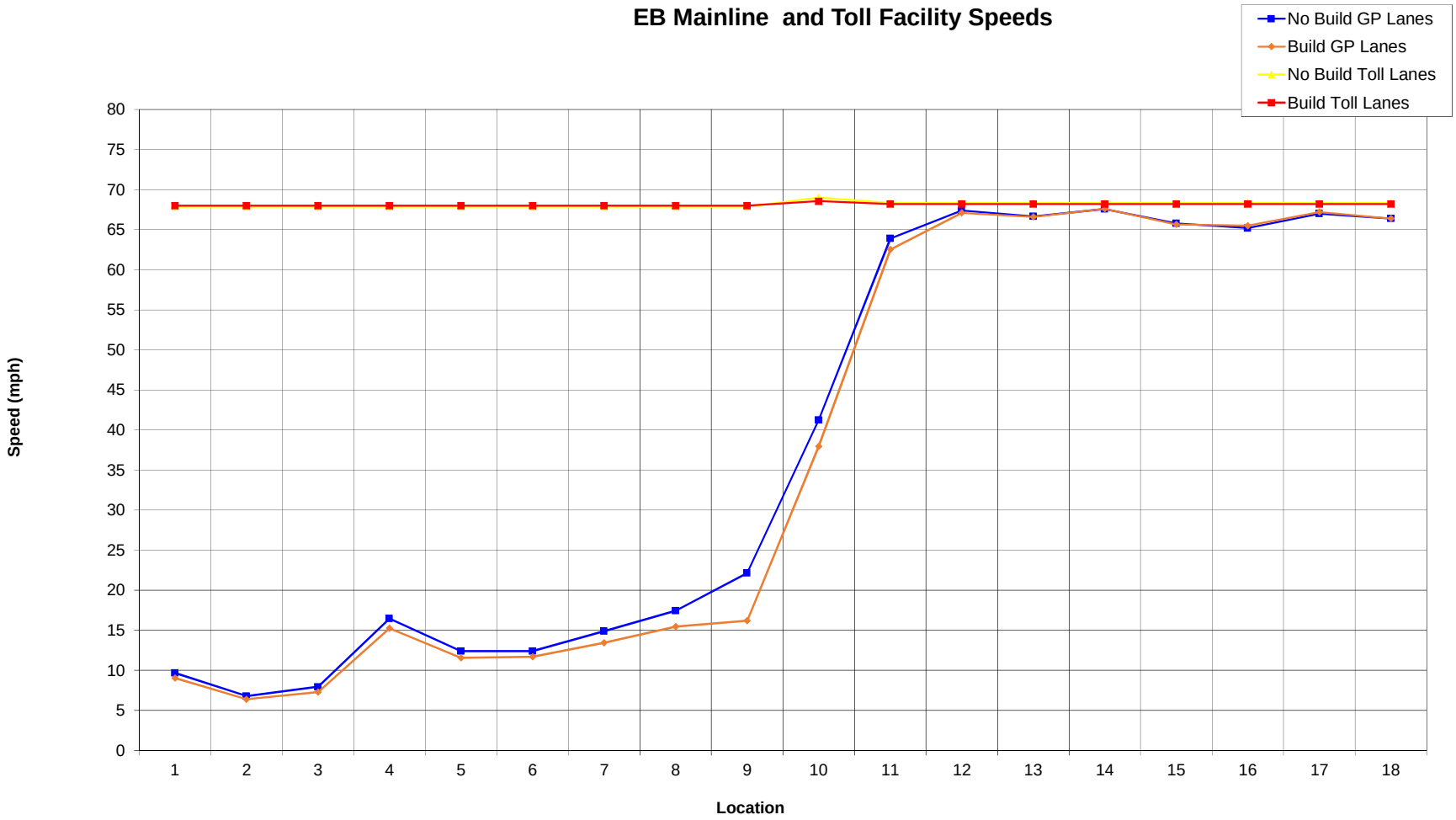


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 4-5 PM

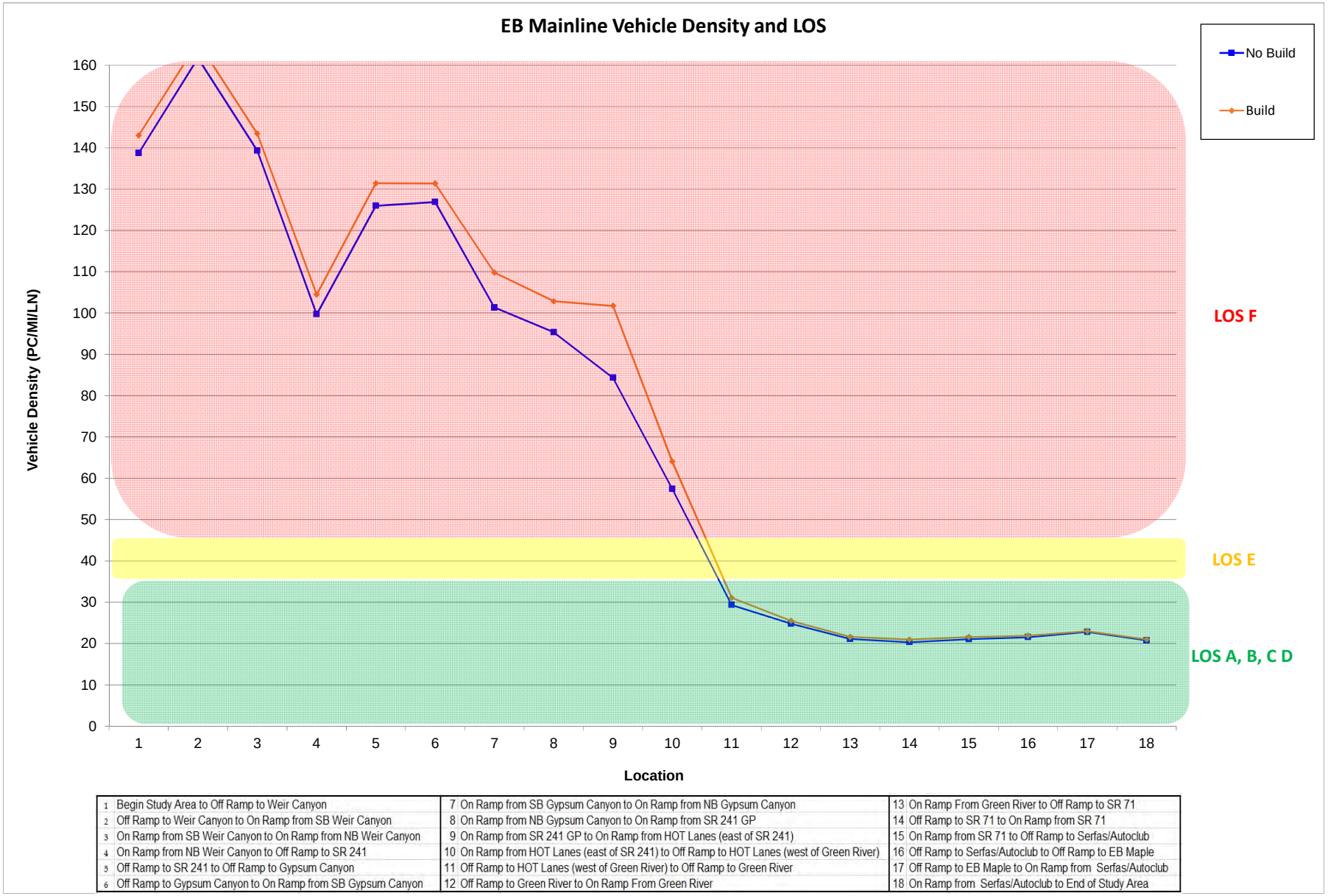


1	Off Ramp to Weir Canyon	7	On Ramp from NB Gypsum Canyon	13	On Ramp From Green River
2	On Ramp from SB Weir Canyon	8	On Ramp from SR 241 GP	14	Off Ramp to SR 71
3	On Ramp from NB Weir Canyon	9	On Ramp from SR 241 HOV	15	On Ramp from SR 71
4	Off Ramp to SR 241	10	On Ramp from HOT Lanes Exit (east of SR 241)	16	Off Ramp to Serfas/Autoclub
5	Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes Entrance (west of Green River Rd)	17	Off Ramp to EB Maple
6	On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River	18	On Ramp from Serfas/Autoclub



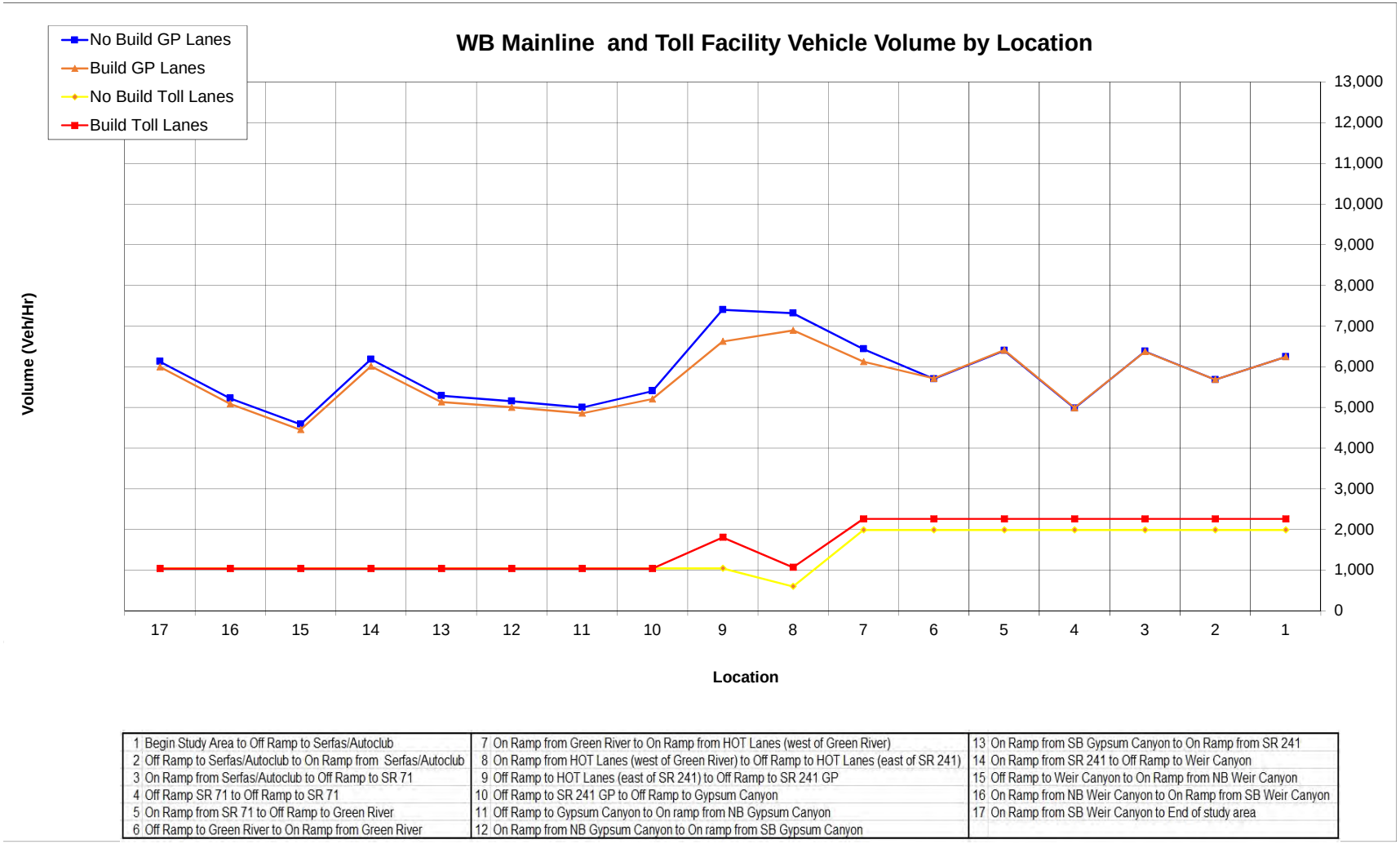
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 4-5 PM



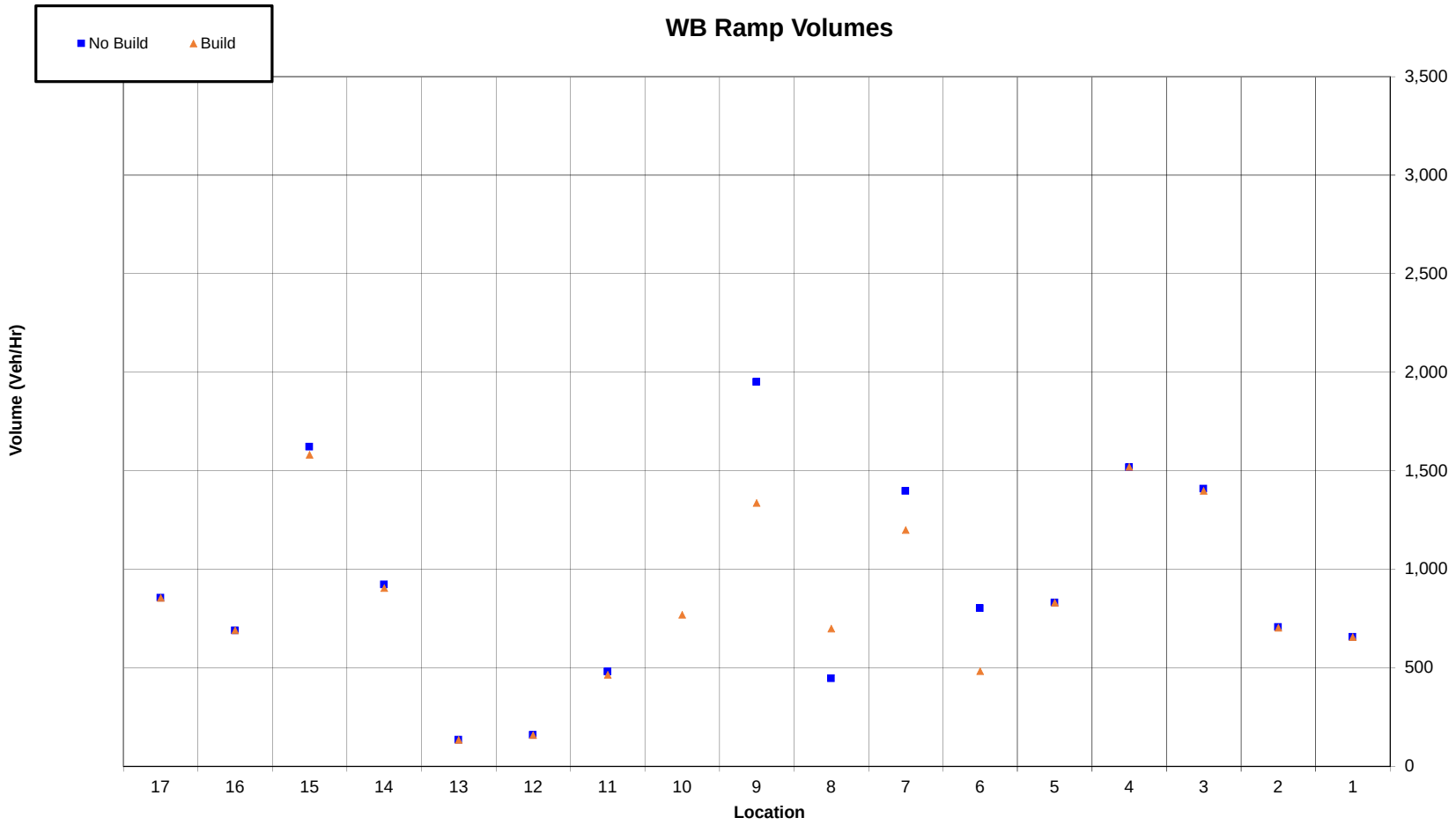
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 4-5 PM

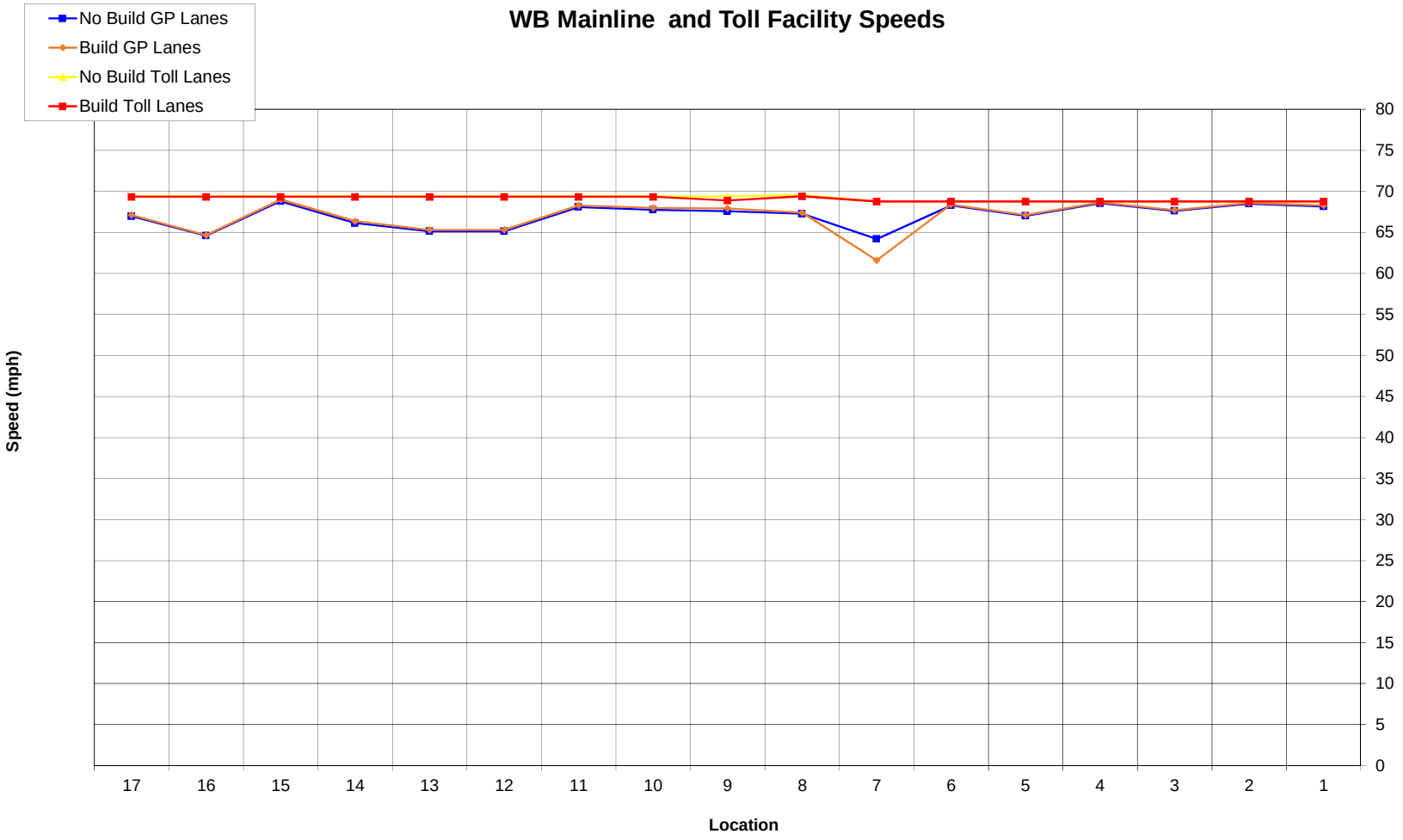


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

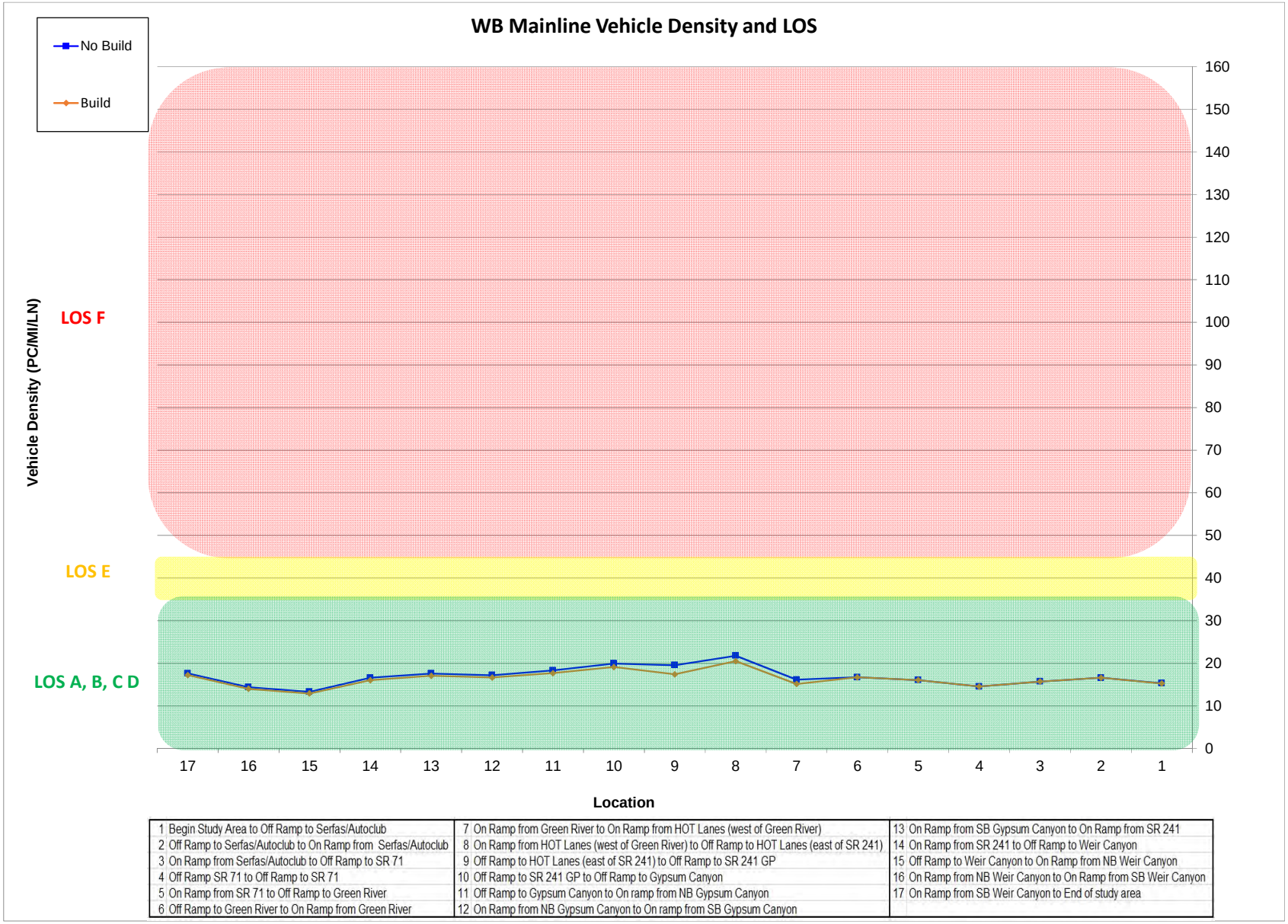
Charts 4-5 PM



1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOT Lanes Exit (west of Green River)	13	On Ramp from SB Gypsum Canyon
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOT Lanes Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon
4	On Ramp from SR 71	10	Off Ramp to SR 241 HOV	16	On Ramp from NB Weir Canyon
5	Off Ramp to Green River	11	Off Ramp to Gypsum Canyon	17	On Ramp from SB Weir Canyon
6	On Ramp from Green River	12	On Ramp from NB Gypsum Canyon		

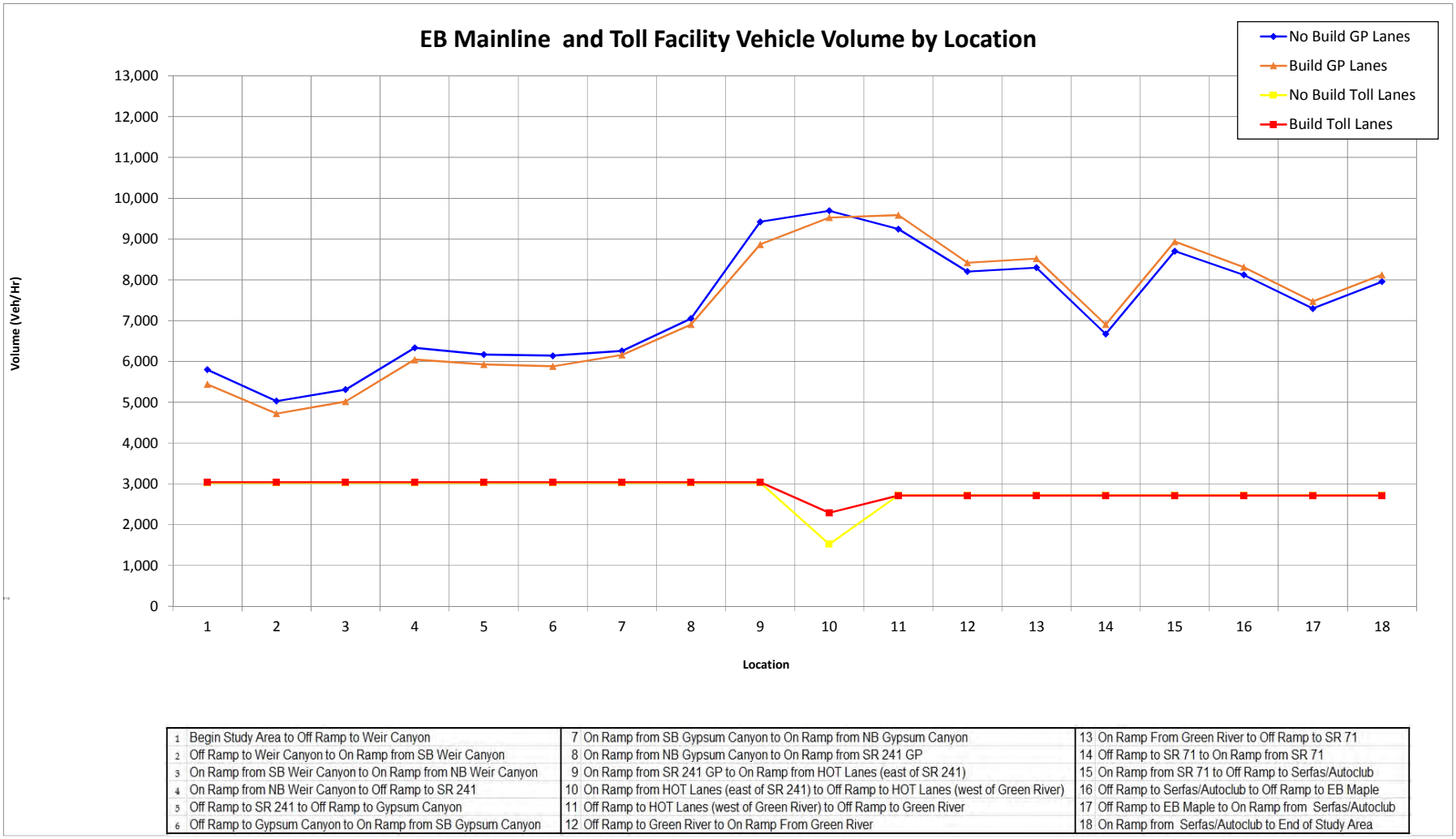


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



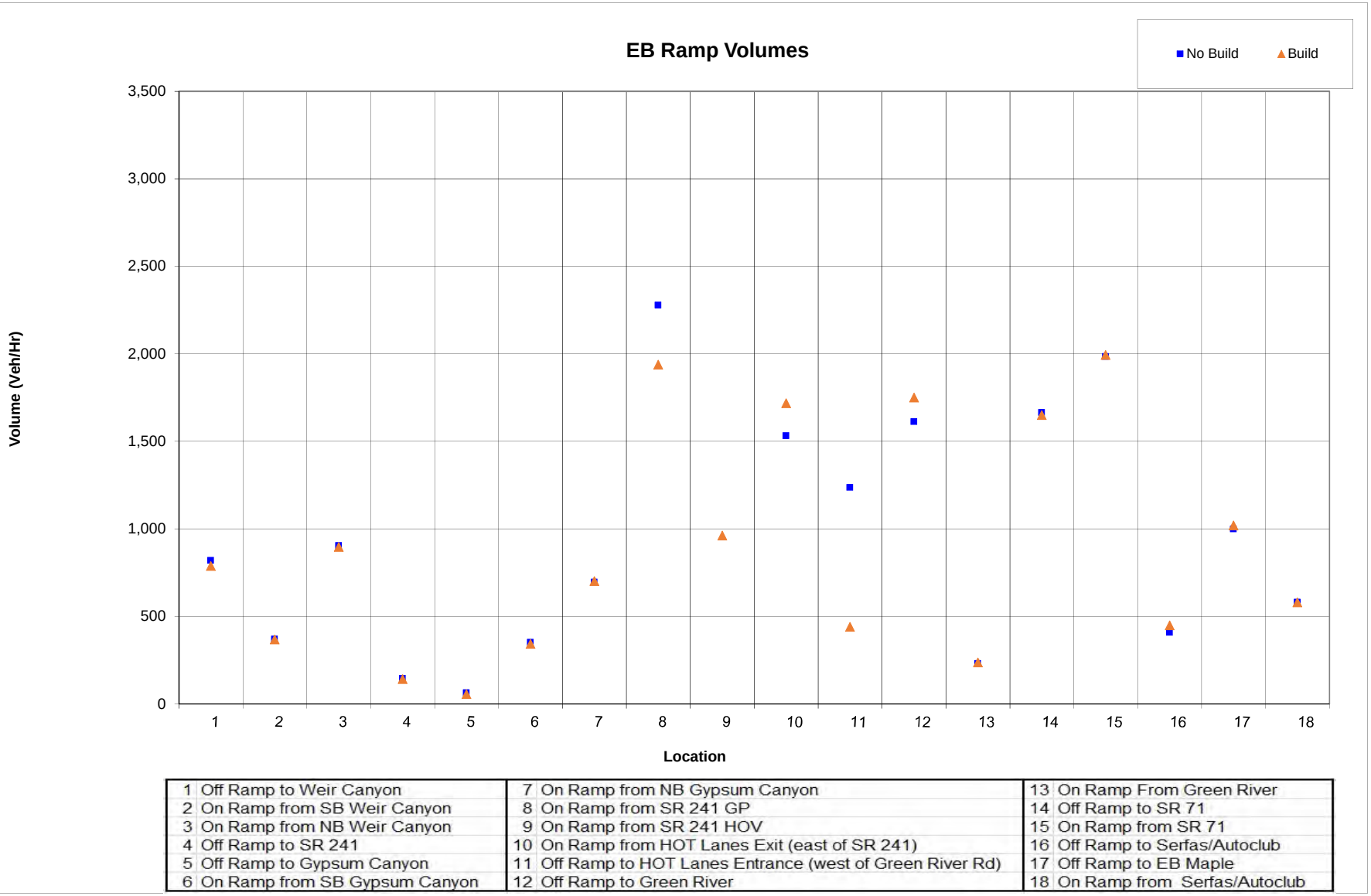
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 4-5 PM

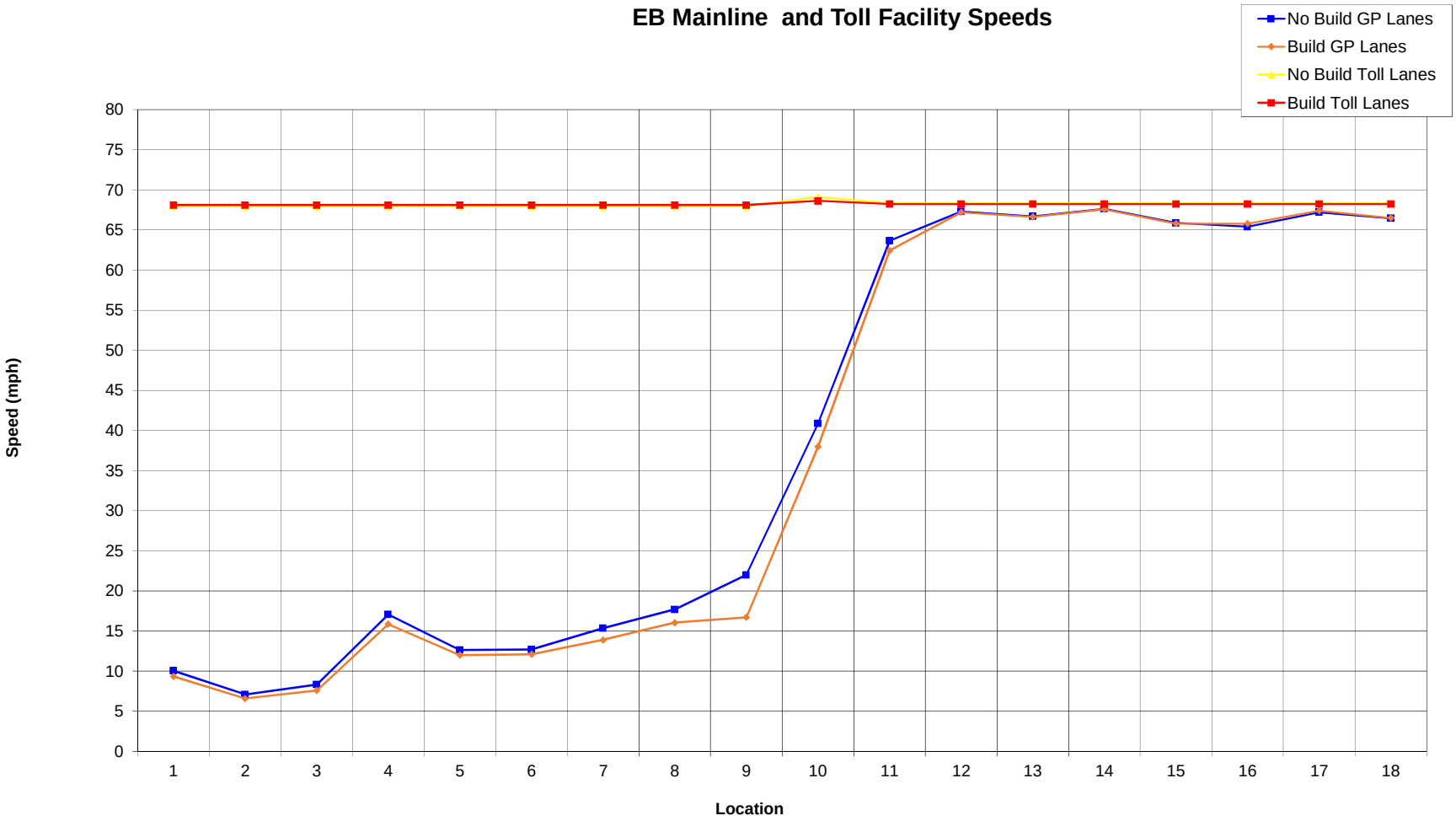


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 5-6 PM

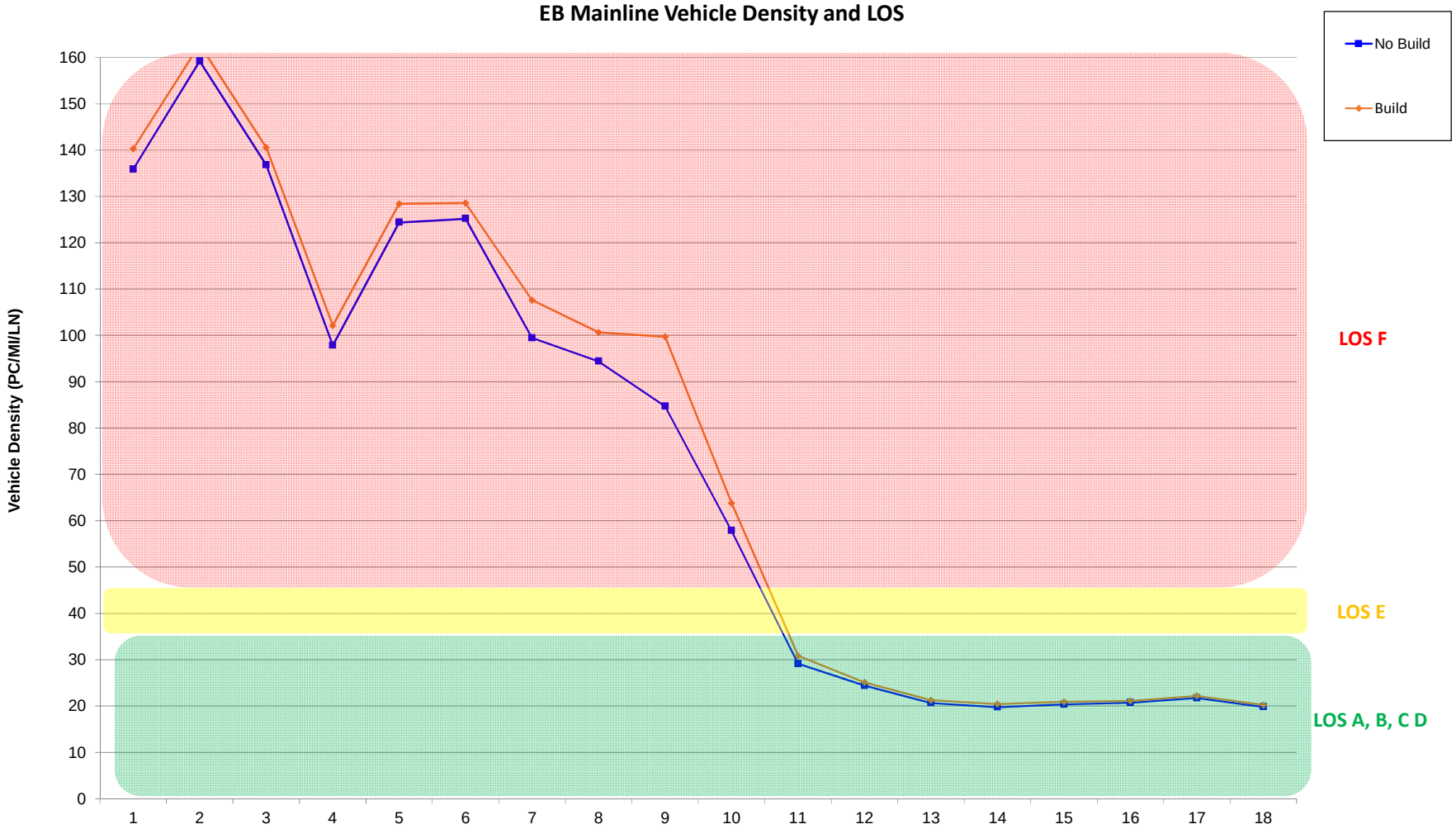


1	Off Ramp to Weir Canyon	7	On Ramp from NB Gypsum Canyon	13	On Ramp From Green River
2	On Ramp from SB Weir Canyon	8	On Ramp from SR 241 GP	14	Off Ramp to SR 71
3	On Ramp from NB Weir Canyon	9	On Ramp from SR 241 HOV	15	On Ramp from SR 71
4	Off Ramp to SR 241	10	On Ramp from HOT Lanes Exit (east of SR 241)	16	Off Ramp to Serfas/Autoclub
5	Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes Entrance (west of Green River Rd)	17	Off Ramp to EB Maple
6	On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River	18	On Ramp from Serfas/Autoclub



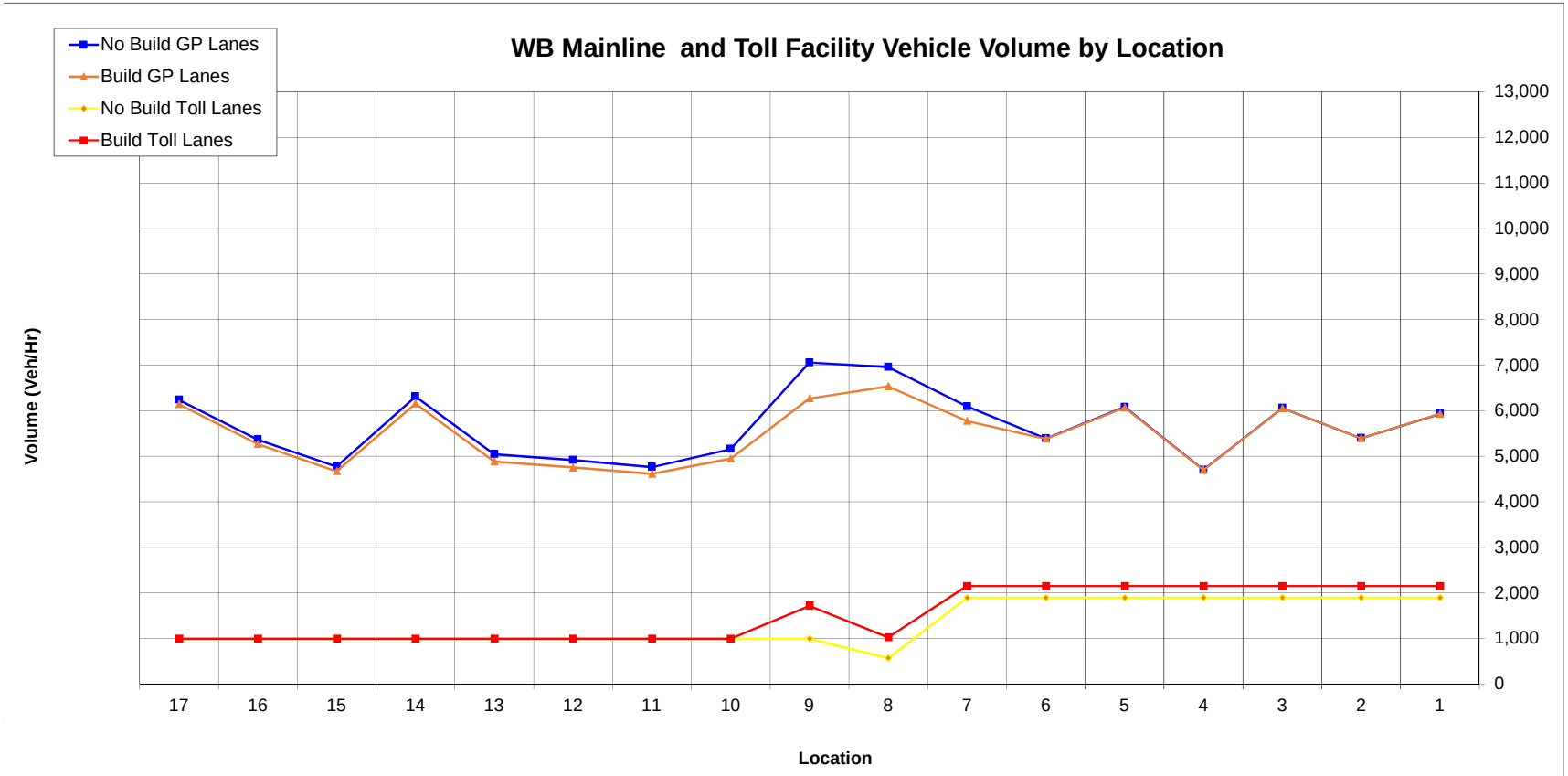
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 5-6 PM



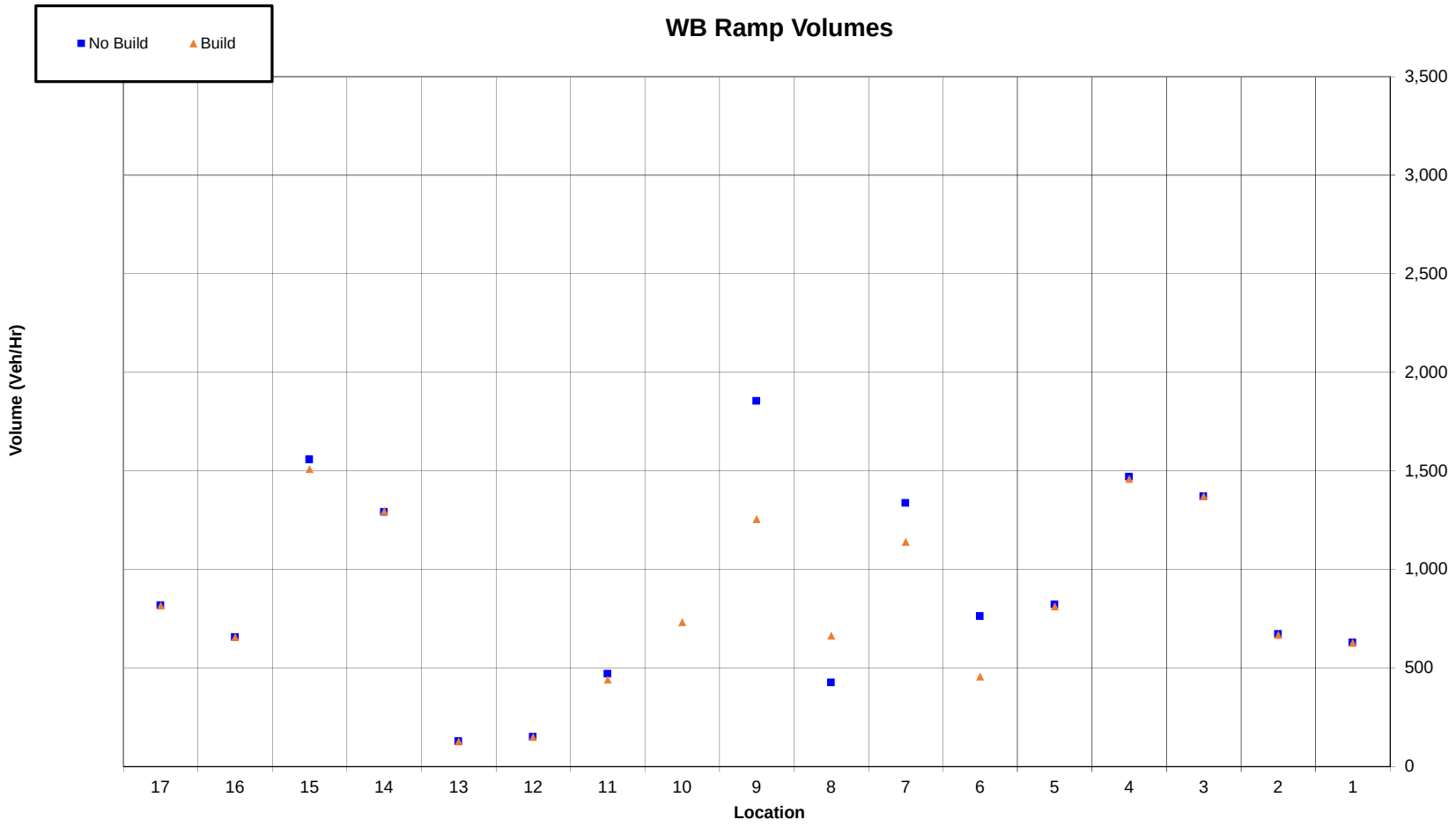
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 5-6 PM

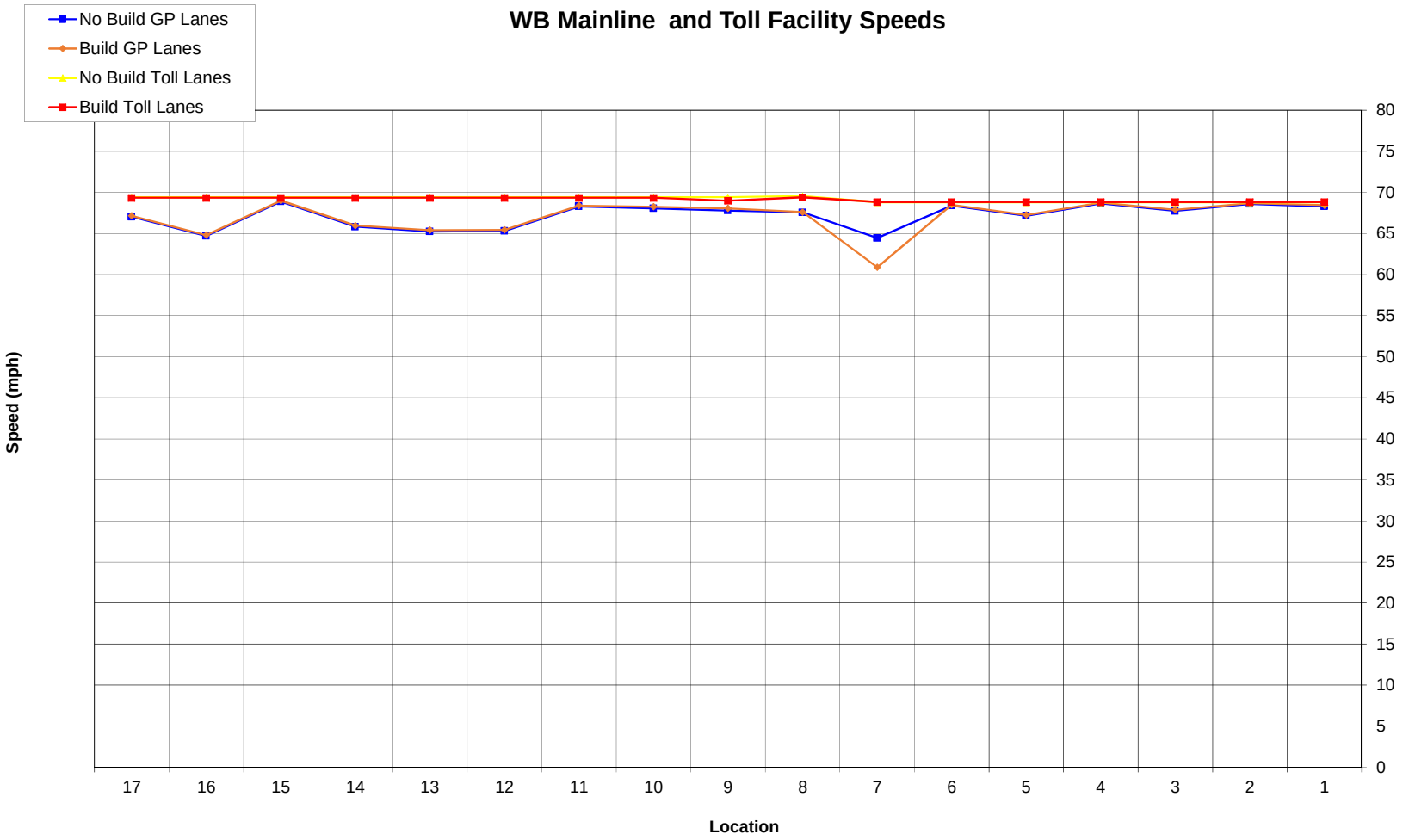


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

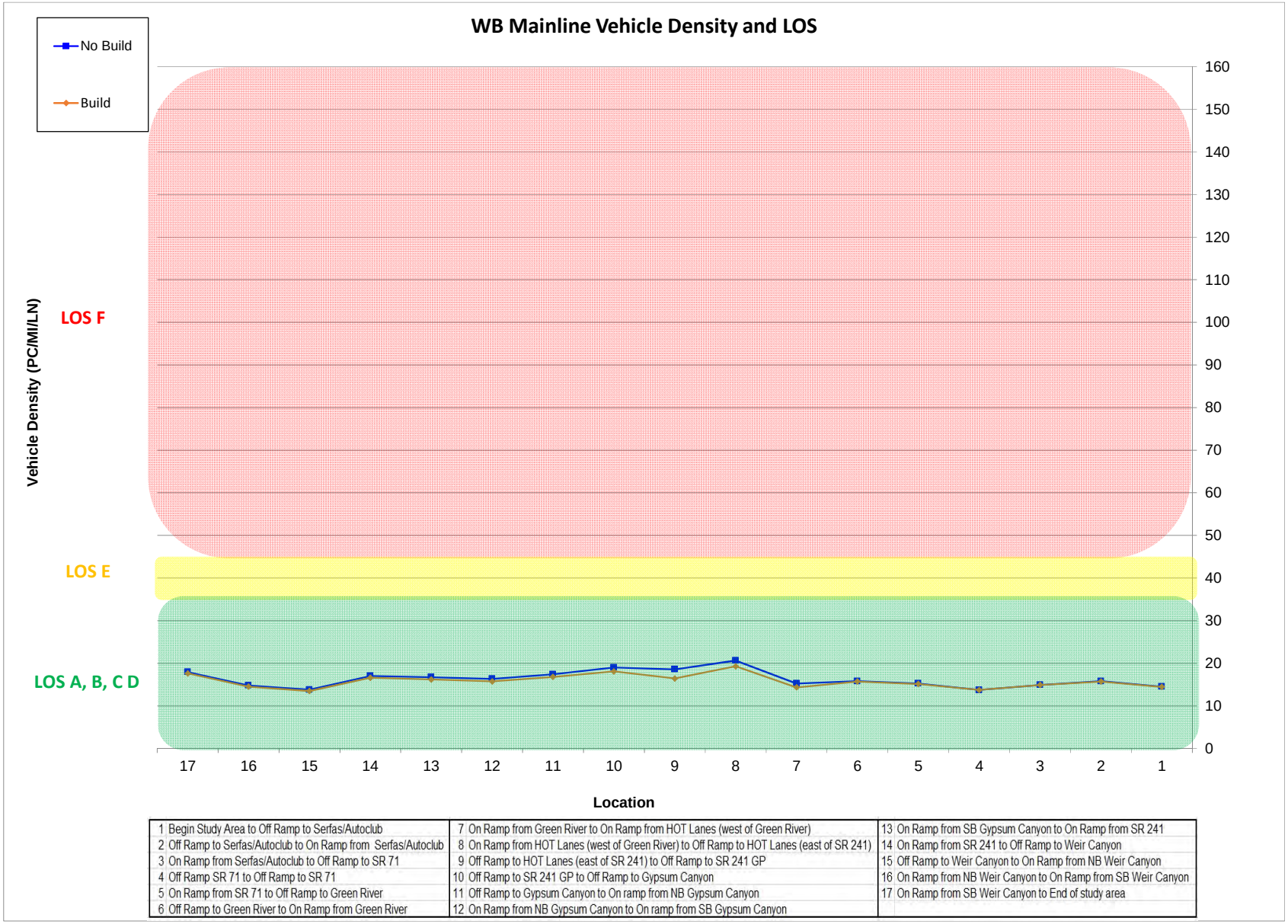
Charts 5-6 PM



1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOT Lanes Exit (west of Green River)	13	On Ramp from SB Gypsum Canyon
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOT Lanes Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon
4	On Ramp from SR 71	10	Off Ramp to SR 241 HOV	16	On Ramp from NB Weir Canyon
5	Off Ramp to Green River	11	Off Ramp to Gypsum Canyon	17	On Ramp from SB Weir Canyon
6	On Ramp from Green River	12	On Ramp from NB Gypsum Canyon		

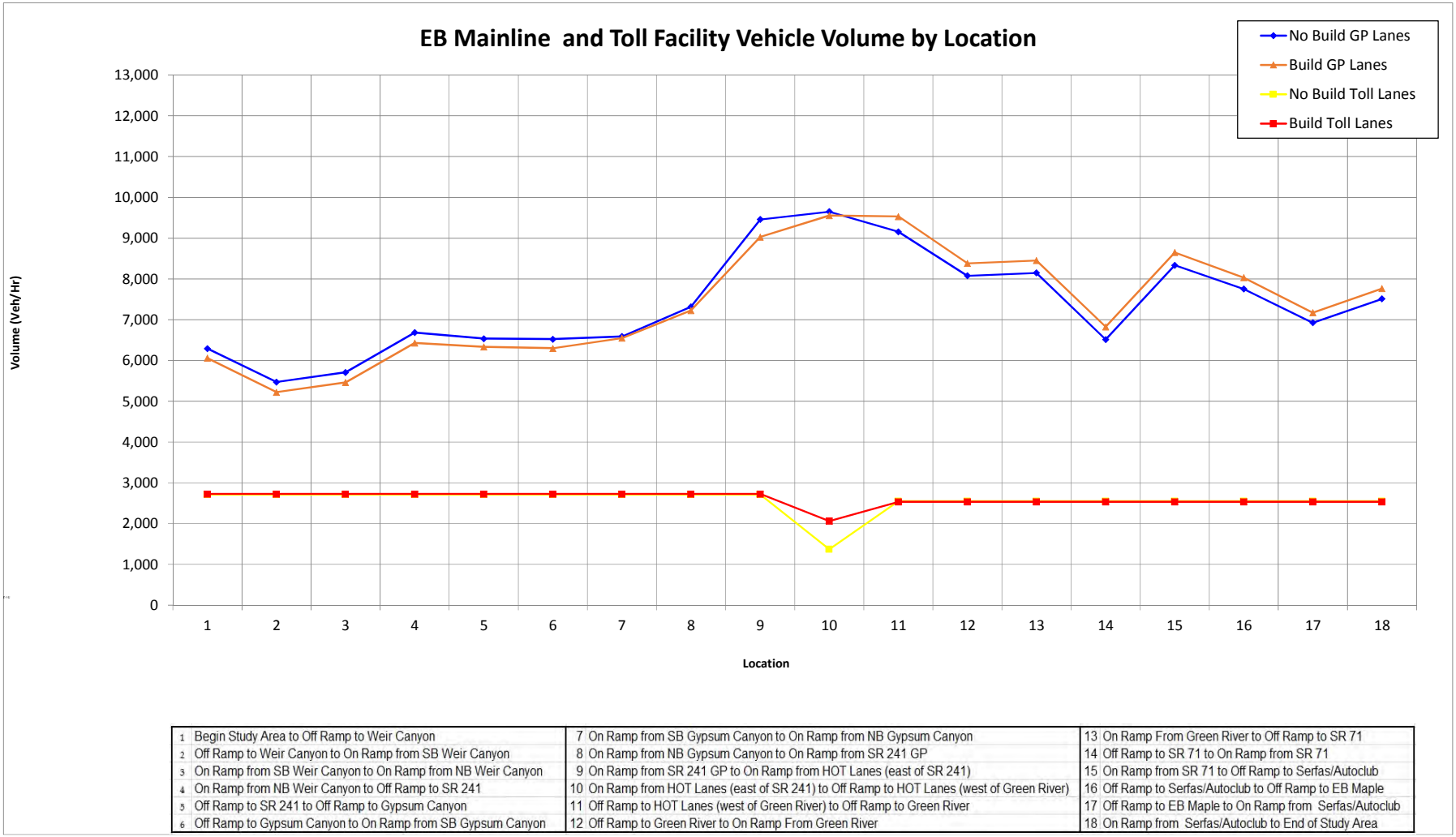


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



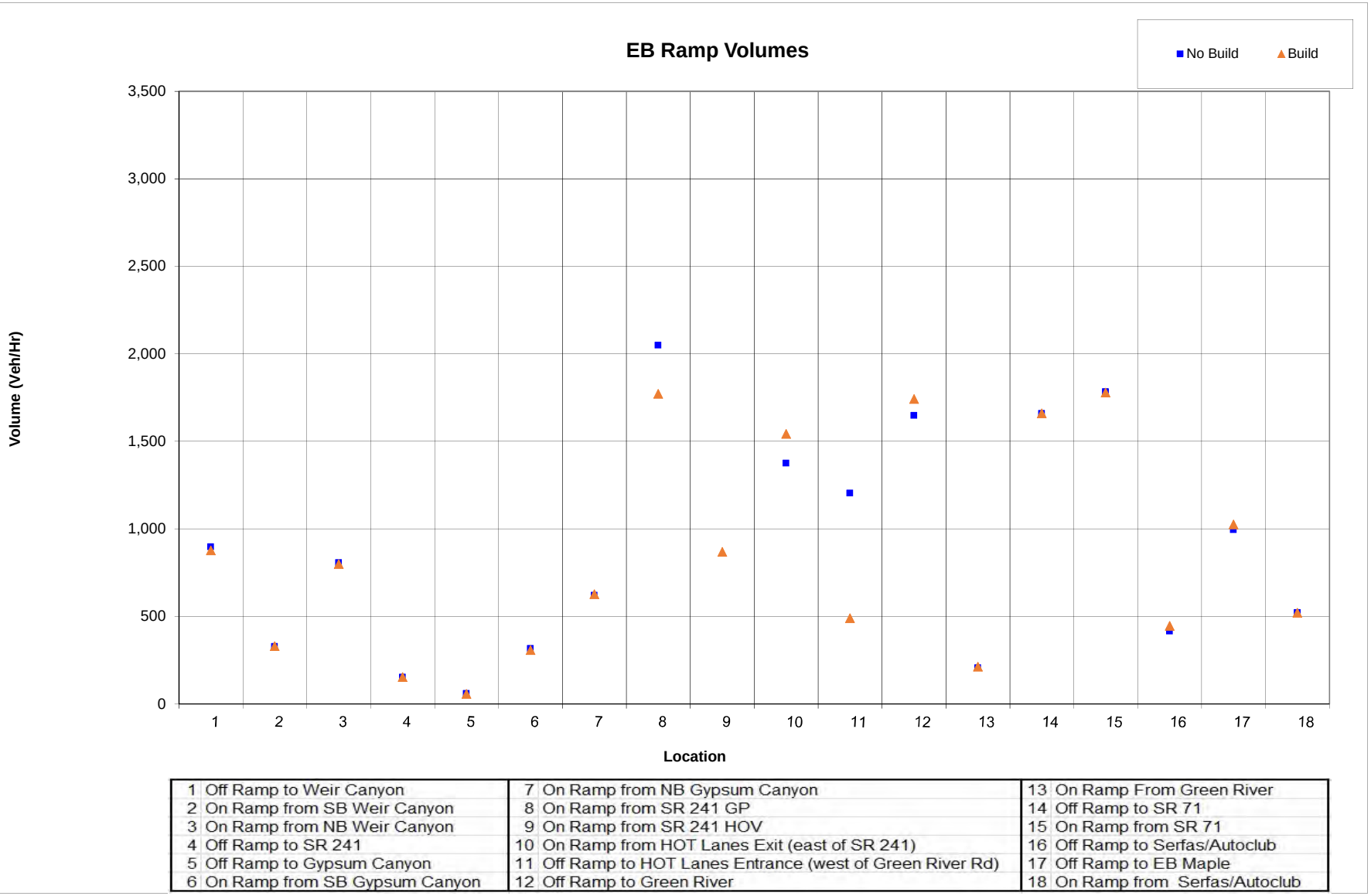
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 5-6 PM



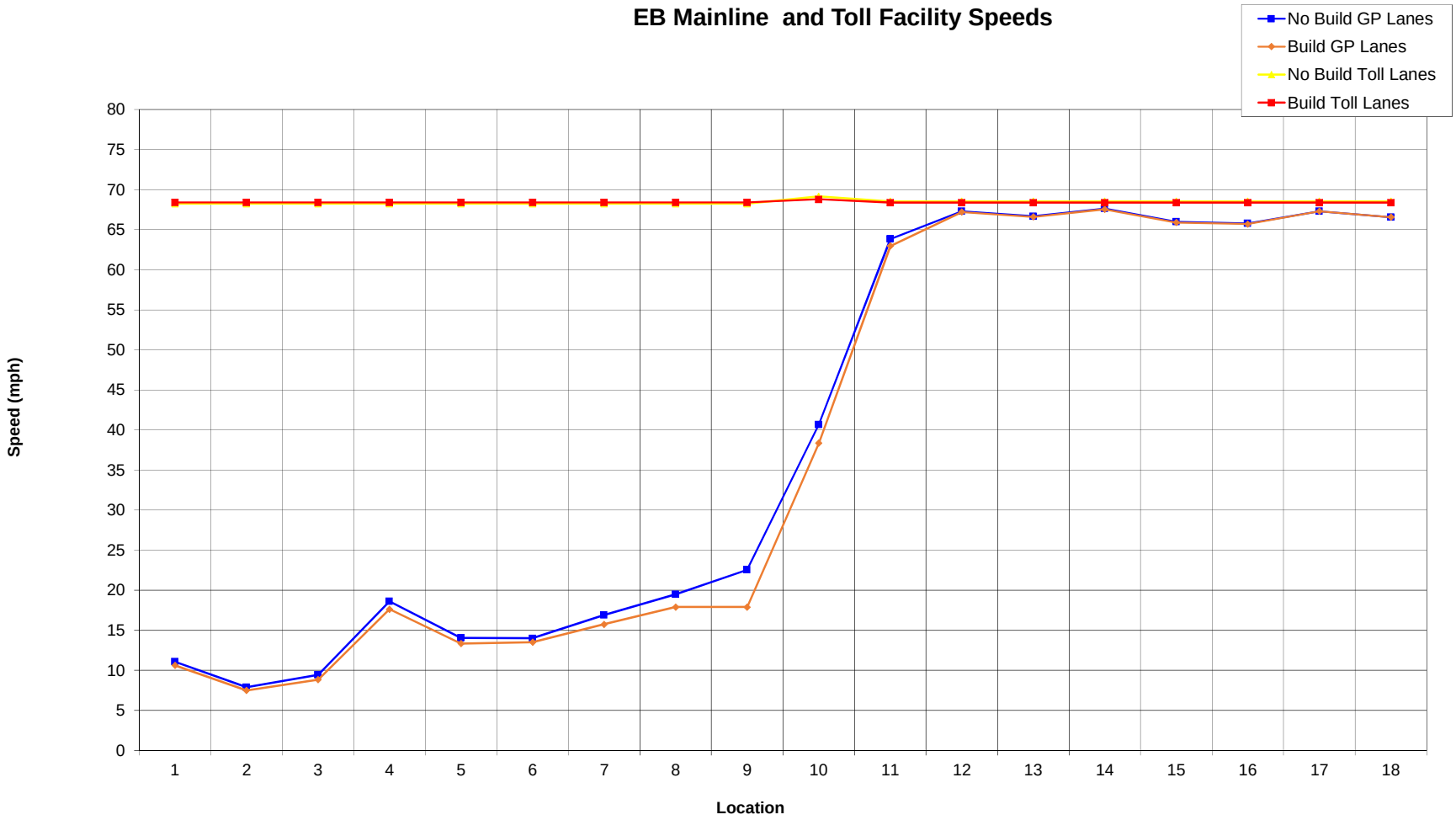
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 6-7 PM



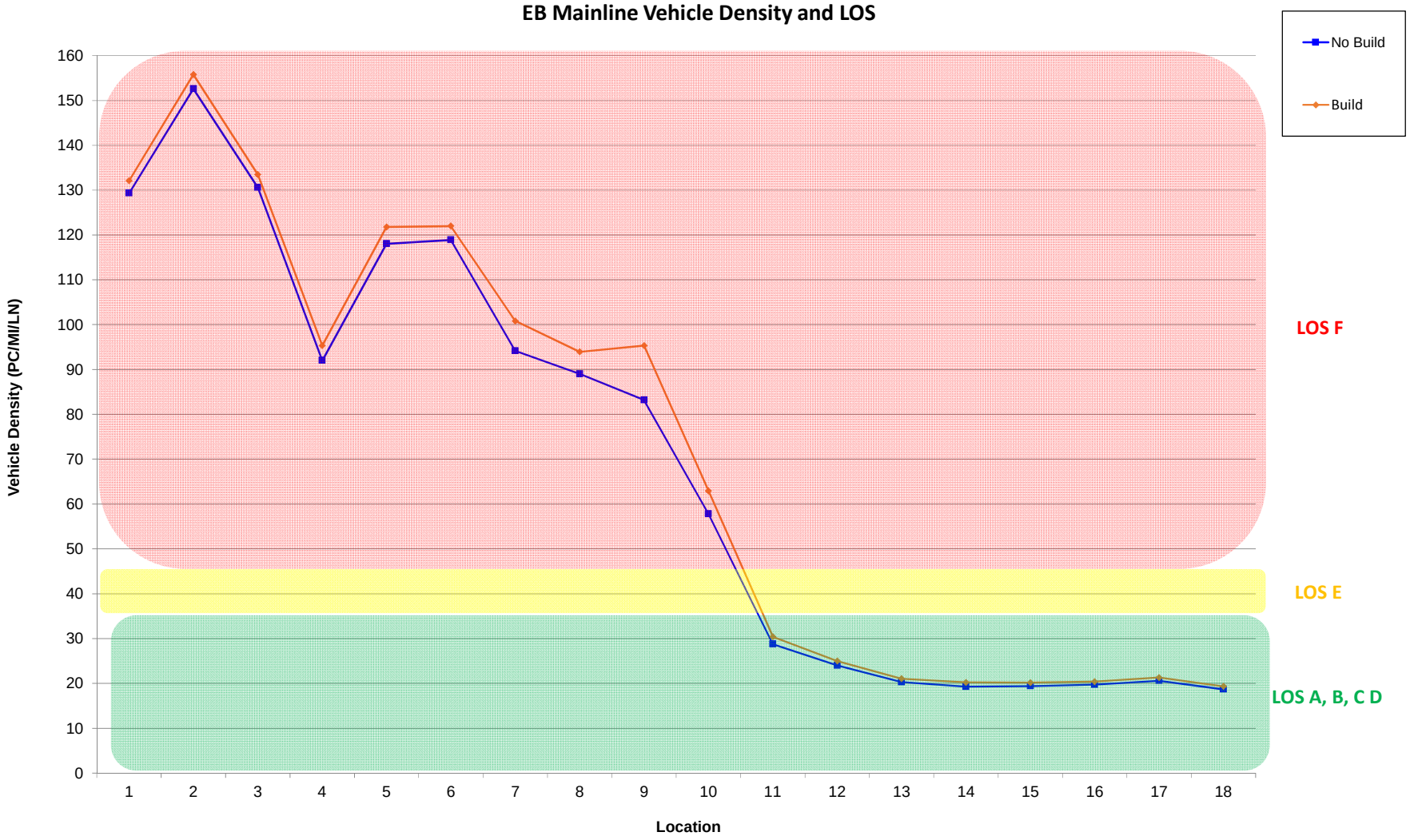
1	Off Ramp to Weir Canyon	7	On Ramp from NB Gypsum Canyon	13	On Ramp From Green River
2	On Ramp from SB Weir Canyon	8	On Ramp from SR 241 GP	14	Off Ramp to SR 71
3	On Ramp from NB Weir Canyon	9	On Ramp from SR 241 HOV	15	On Ramp from SR 71
4	Off Ramp to SR 241	10	On Ramp from HOT Lanes Exit (east of SR 241)	16	Off Ramp to Serfas/Autoclub
5	Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes Entrance (west of Green River Rd)	17	Off Ramp to EB Maple
6	On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River	18	On Ramp from Serfas/Autoclub

Charts 6-7 PM



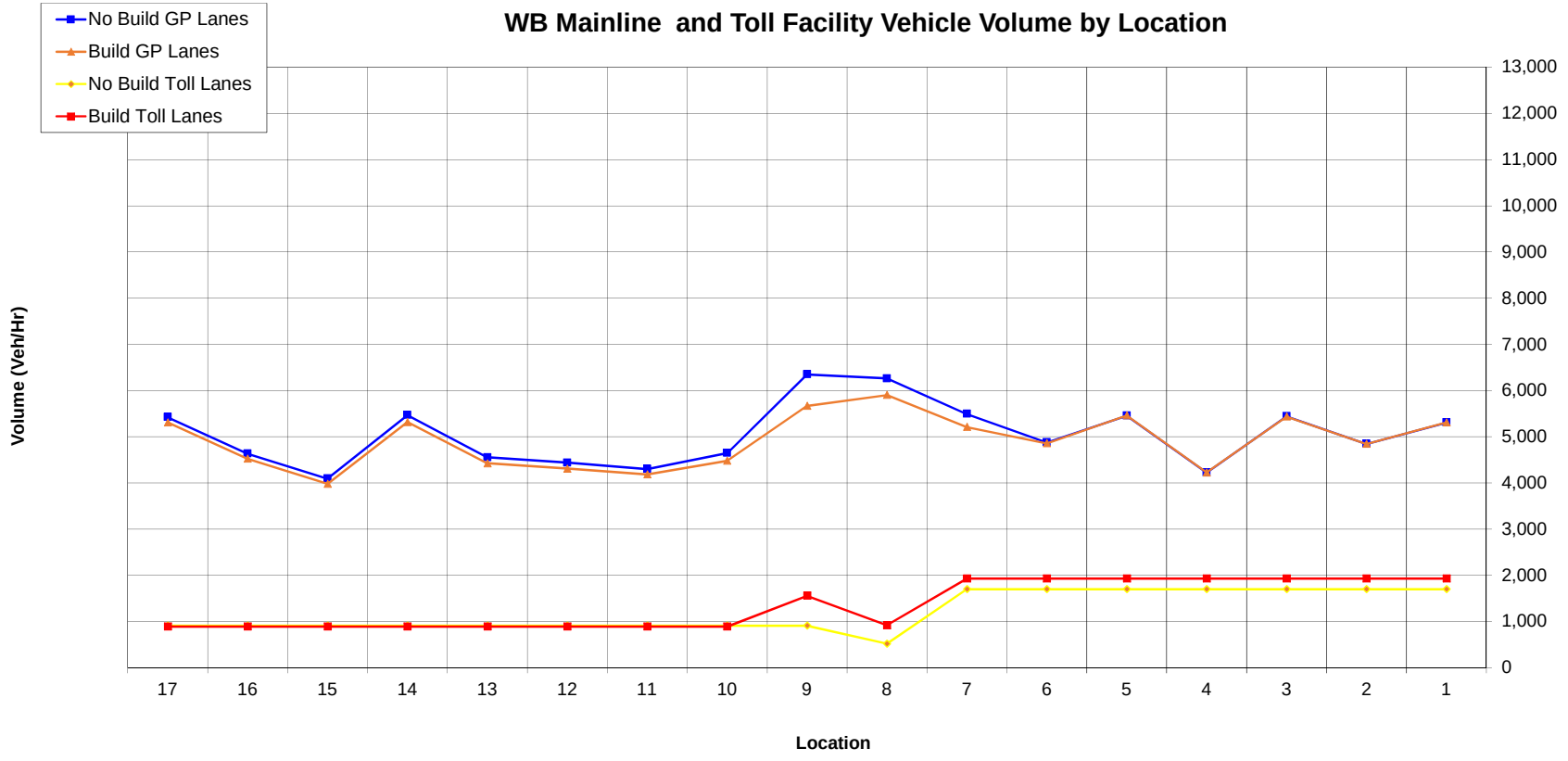
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 6-7 PM



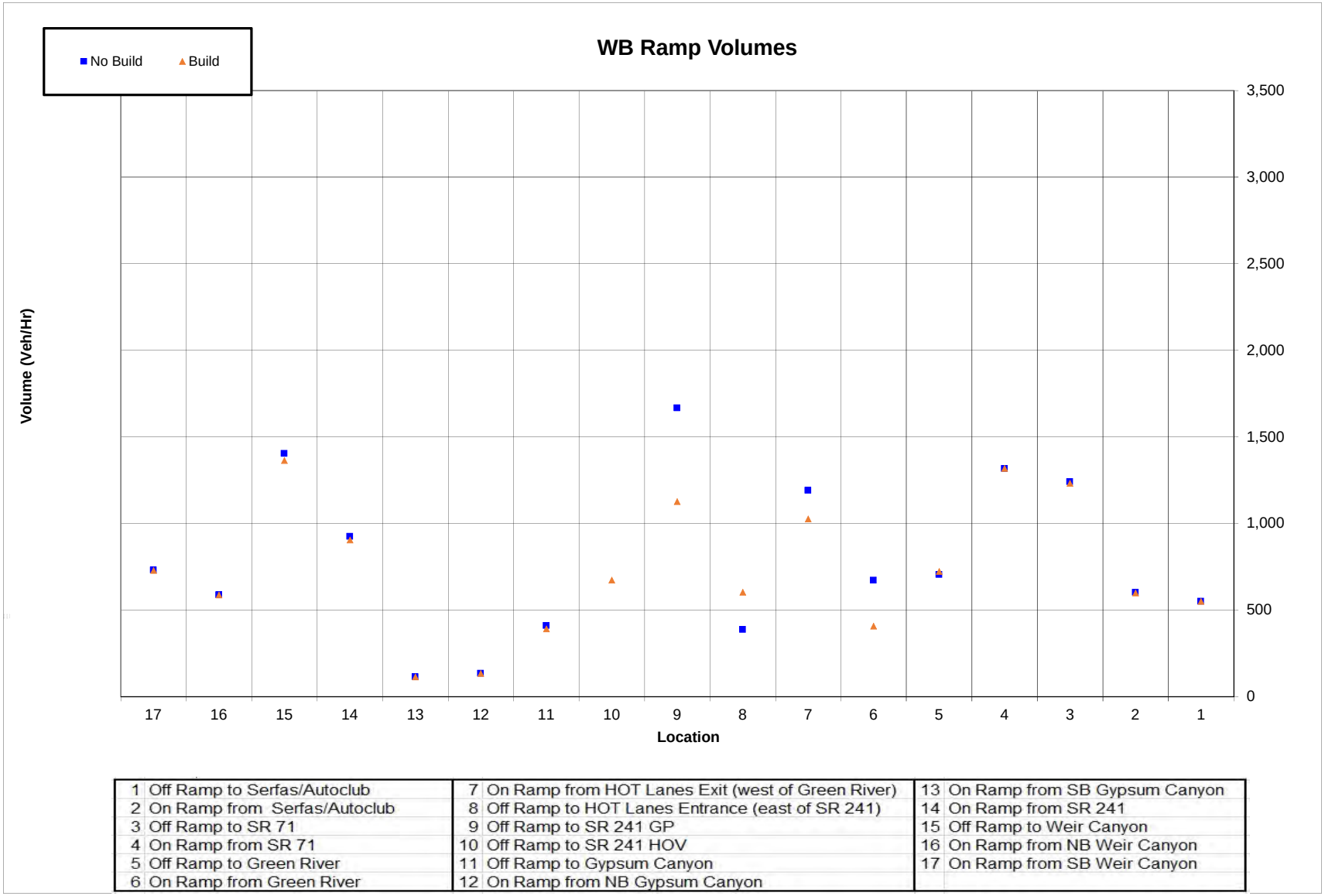
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	On Ramp From Green River to Off Ramp to SR 71
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	Off Ramp to SR 71 to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to On Ramp From Green River	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 6-7 PM

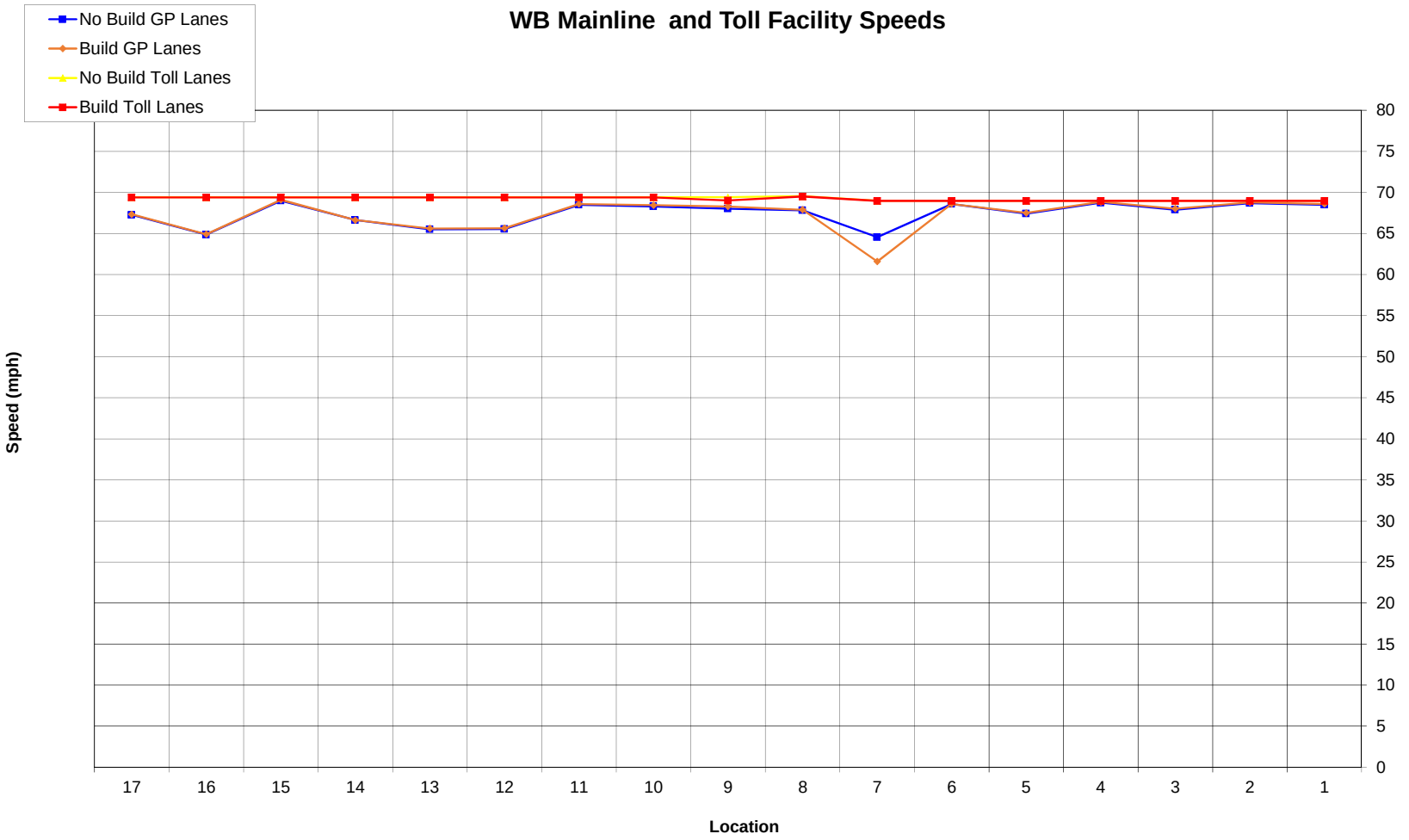


1	Begin Study Area to Off Ramp to Serfas/Autoclub	7	On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13	On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2	Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8	On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14	On Ramp from SR 241 to Off Ramp to Weir Canyon
3	On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9	Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4	Off Ramp SR 71 to Off Ramp to SR 71	10	Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16	On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5	On Ramp from SR 71 to Off Ramp to Green River	11	Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17	On Ramp from SB Weir Canyon to End of study area
6	Off Ramp to Green River to On Ramp from Green River	12	On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon		

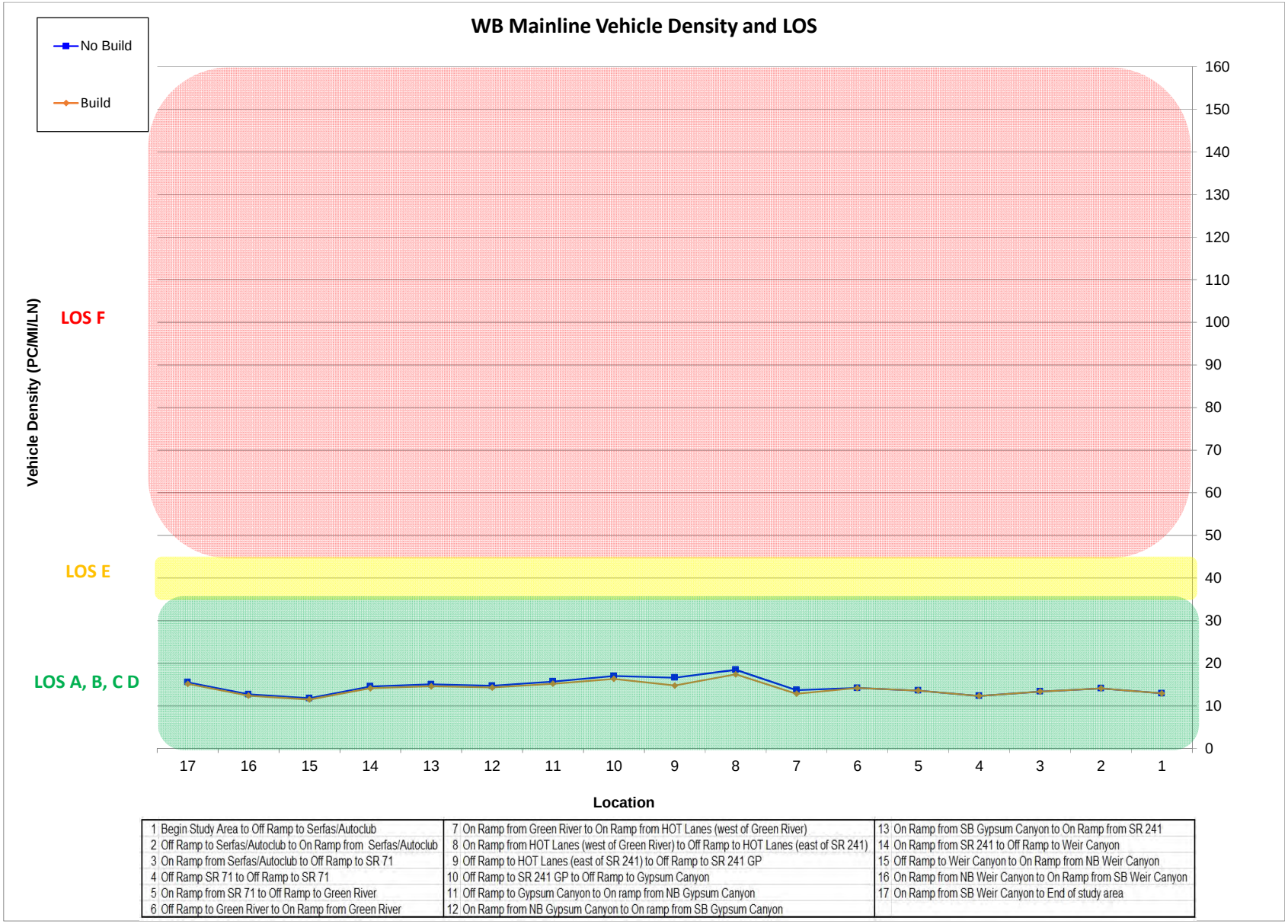
Charts 6-7 PM



1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOT Lanes Exit (west of Green River)	13	On Ramp from SB Gypsum Canyon
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOT Lanes Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon
4	On Ramp from SR 71	10	Off Ramp to SR 241 HOV	16	On Ramp from NB Weir Canyon
5	Off Ramp to Green River	11	Off Ramp to Gypsum Canyon	17	On Ramp from SB Weir Canyon
6	On Ramp from Green River	12	On Ramp from NB Gypsum Canyon		



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 6-7 PM

Appendix F

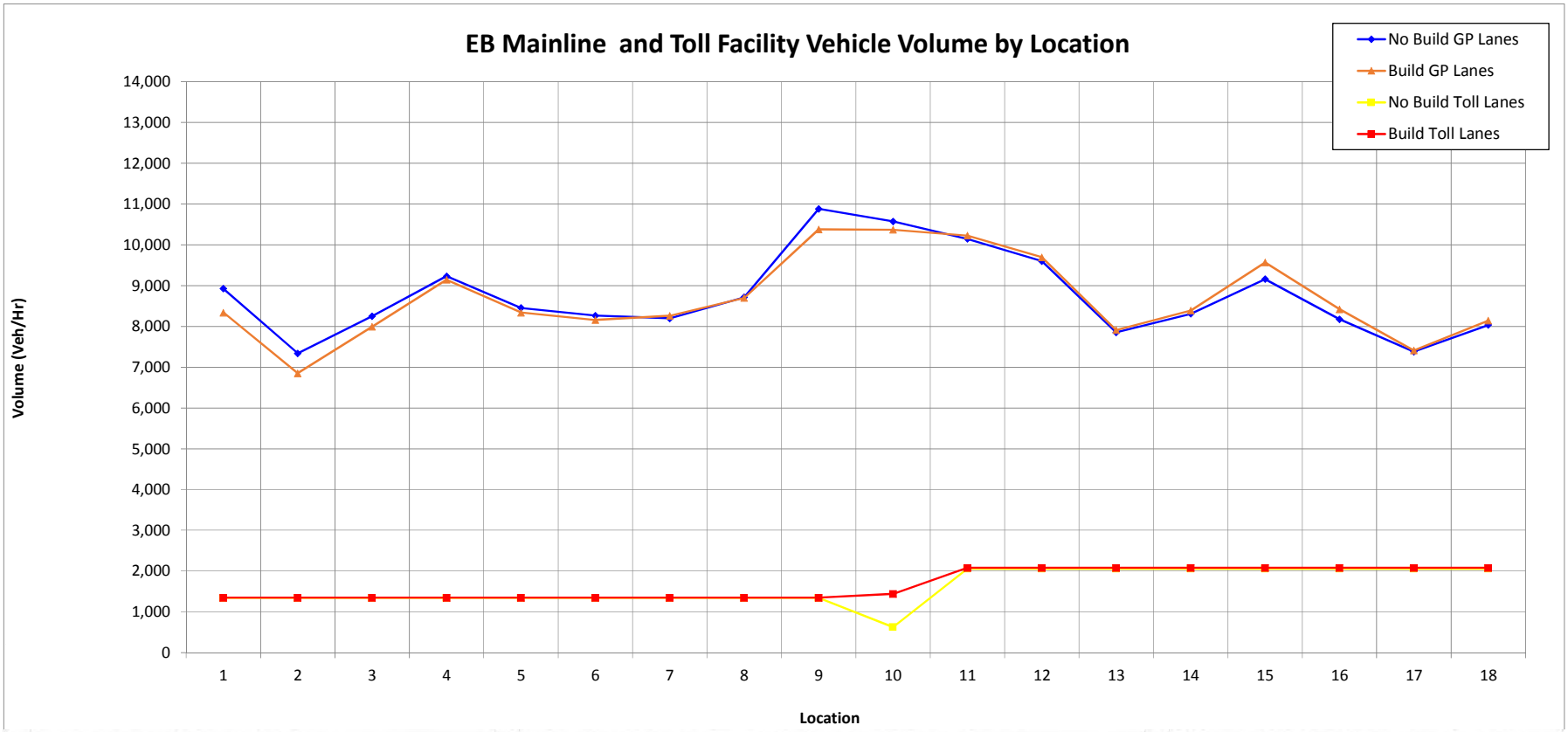
VISSIM Summary of Results
2040 Build Conditions

SR-91
Vissim Model Summary - 2040 Build Option 2 - AM
Network Summary Statistics

Parameter	2040 AM No Build	2040 AM Build Option 2	Difference
Total Vehicle Demand (4 Hr)	119,605	120,167	562
Total number of vehicles that did not reach their desitination	10,264	9,895	-369
Totla number of vehicles that have reached their destination	109,342	110,273	931
Total vehicle-miles traveled (VMT)	939,671	953,732	14,061
Total travel time, All Vehicle Types (VHT)	27,641	25,219	-2,422
Average speed [mph], All Vehicle Types	34.0	37.8	3.8
Average delay time per vehicle [mins], All Vehicle Types	7.00	5.57	-1.43

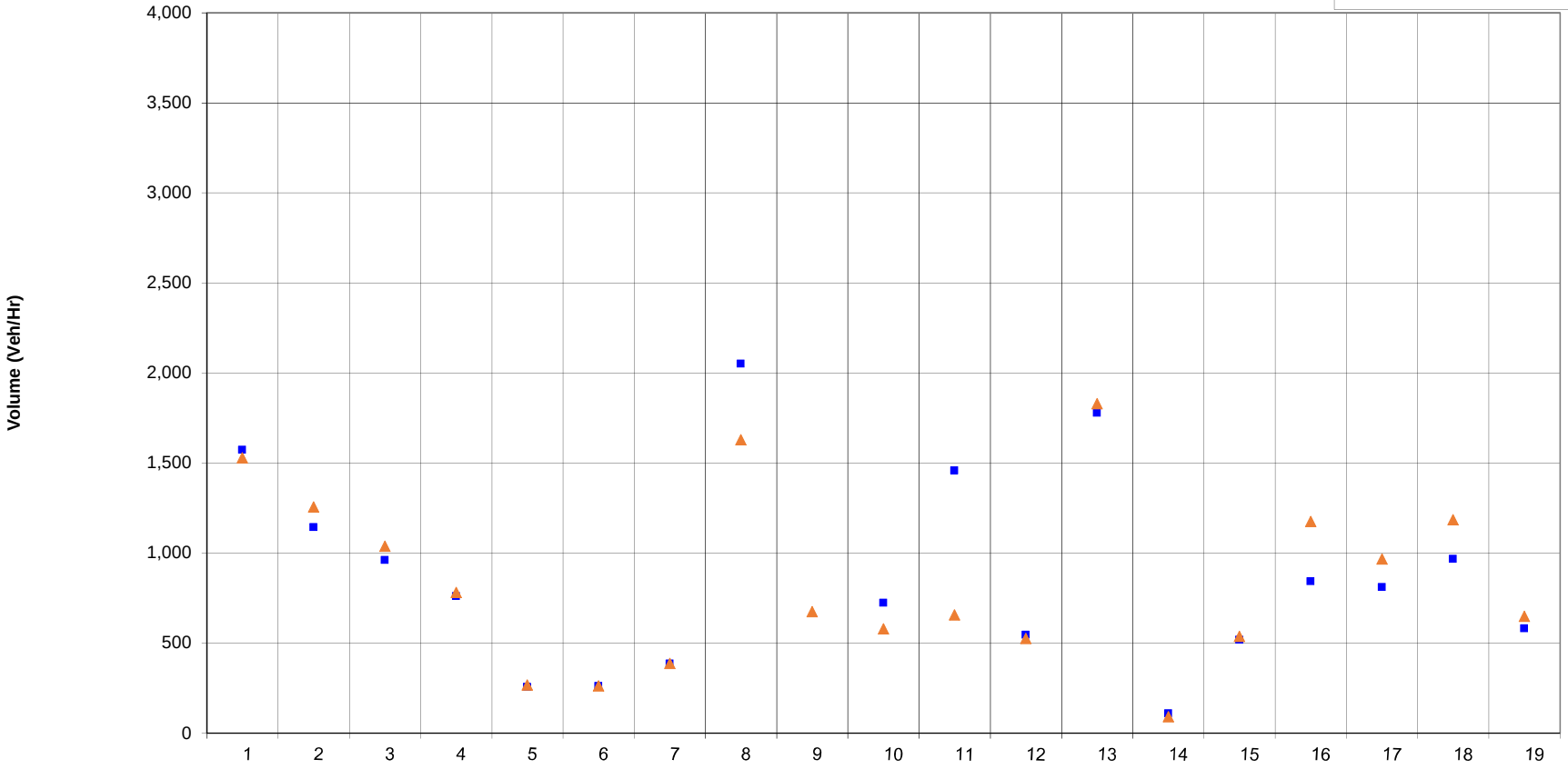
SR-91
Vissim Model Summary - 2040 Build Option 2 - AM
Travel Time Results

#	Origin	#	Destination	Hide Travel Time				2040 AM No Build VISSIM Travel Time			2040 AM Build VISSIM Travel Time			Change VISSIM Travel Time		
				p Ke	Seg 1	Seg 2	Seg 3	6-7 AM	7-8 AM	7-9 AM	6-7 AM	7-8 AM	7-9 AM	6-7 AM	7-8 AM	7-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	9.7	12.6	13.7	8.9	9.5	9.4	-0.8	-3.1	-4.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	9.5	12.4	13.5	8.8	9.4	9.3	-0.7	-3.0	-4.2
		5	SR 241 SB south of SR 91	3	1001			7.9	10.7	12.0	7.3	7.7	7.9	-0.6	-3.0	-4.2
		7	SR 71 NB north of SR 91	4	1002	1003	1004	11.0	13.9	15.0	10.2	10.8	10.7	-0.8	-3.1	-4.2
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.7	8.7	8.6	8.6	8.6	8.5	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.3	8.3	8.3	8.4	8.4	8.4	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.0	10.0	9.9	9.9	9.9	9.9	-0.1	-0.1	-0.1
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	22.8	21.2	16.3	18.1	19.4	20.0	-4.7	-1.8	3.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	20.8	19.3	15.4	16.4	19.2	19.9	-4.4	-0.1	4.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	23.2	21.8	17.8	18.9	21.7	22.4	-4.4	-0.1	4.6
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a	18.8	21.6	22.3	-4.5	-0.2	4.5
		7	SR 71 NB north of SR 91	12	1010			8.5	8.0	5.7	6.2	8.2	7.8	-2.4	0.2	2.1
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	15.0	14.5	13.2	14.1	12.9	13.5	-1.0	-1.5	0.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	15.5	15.0	14.7	14.8	15.2	15.9	-0.6	0.2	1.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a	10.8	10.8	10.8	-4.6	-4.2	-3.9
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.3	7.3	7.3	7.3	7.3	7.2	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.1	11.1	11.1	11.0	11.0	11.0	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	20	1007	1003	1004	12.4	12.4	12.4	12.3	12.3	12.3	-0.1	-0.1	-0.1
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a	11.0	11.0	11.0	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a	10.8	10.8	10.8	-0.1	-0.1	-0.1
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a	12.3	12.3	12.3	-0.1	-0.1	-0.1
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	39.6	56.0	59.3	29.5	44.1	54.6	-10.1	-11.9	-4.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	37.6	54.2	58.4	27.8	44.0	54.5	-9.8	-10.2	-3.9
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			23.5	38.6	44.5	15.2	28.8	35.5	-8.3	-9.8	-9.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	40.1	56.6	60.9	30.2	46.4	57.0	-9.8	-10.2	-3.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a	30.2	46.3	56.9	-9.9	-10.3	-4.0



1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area

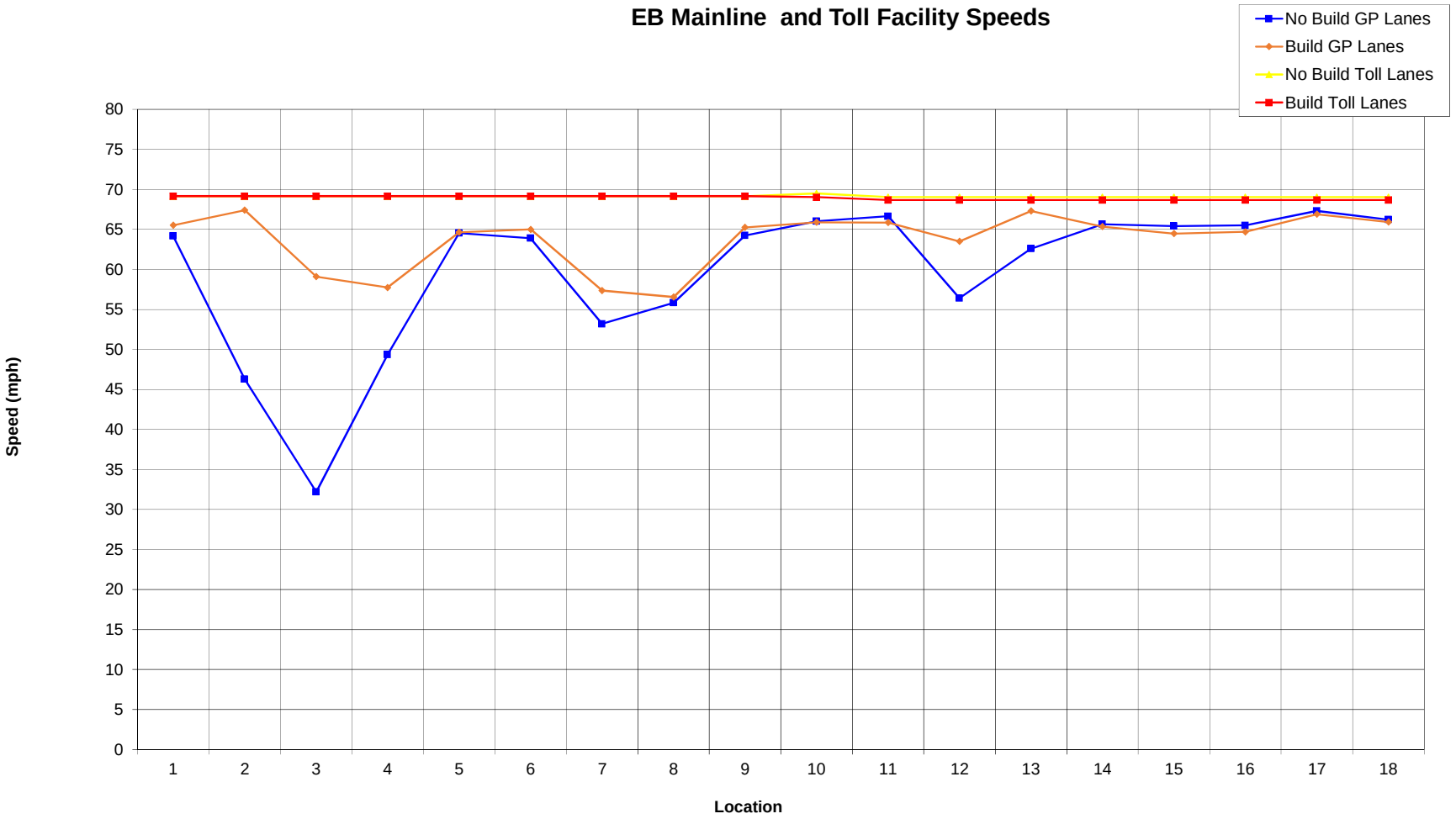
EB Ramp Volumes



1 Off Ramp to Weir Canyon	8 On Ramp from SR 241 GP	15 On Ramp from Green River (to SR 91 EB)
2 On Ramp from SB Weir Canyon	9 On Ramp from SR 241 HOV	16 On Ramp from SR 71
3 On Ramp from NB Weir Canyon	10 On Ramp from HOT Lanes Exit (east of SR 241)	17 Off Ramp to Serfas/Autoclub
4 Off Ramp to SR 241	11 Off Ramp to HOT Lanes Entrance (west of Green River Rd)	18 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	12 Off Ramp to Green River	19 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	13 Off Ramp to SR 71 CD	
7 On Ramp from NB Gypsum Canyon	14 On Ramp from Green River (to SR 71 NB)	

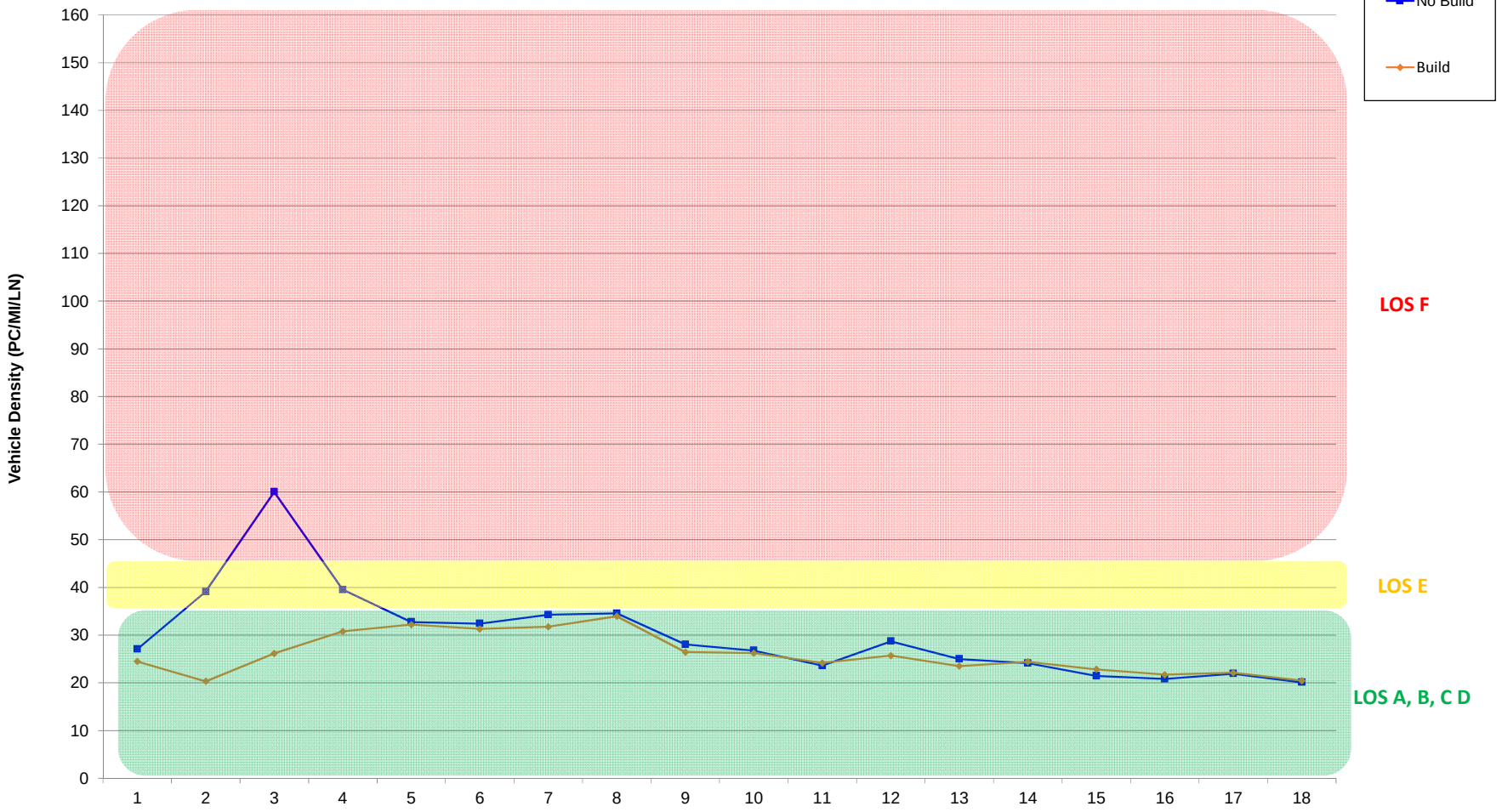
Charts 6-7 AM

EB Mainline and Toll Facility Speeds



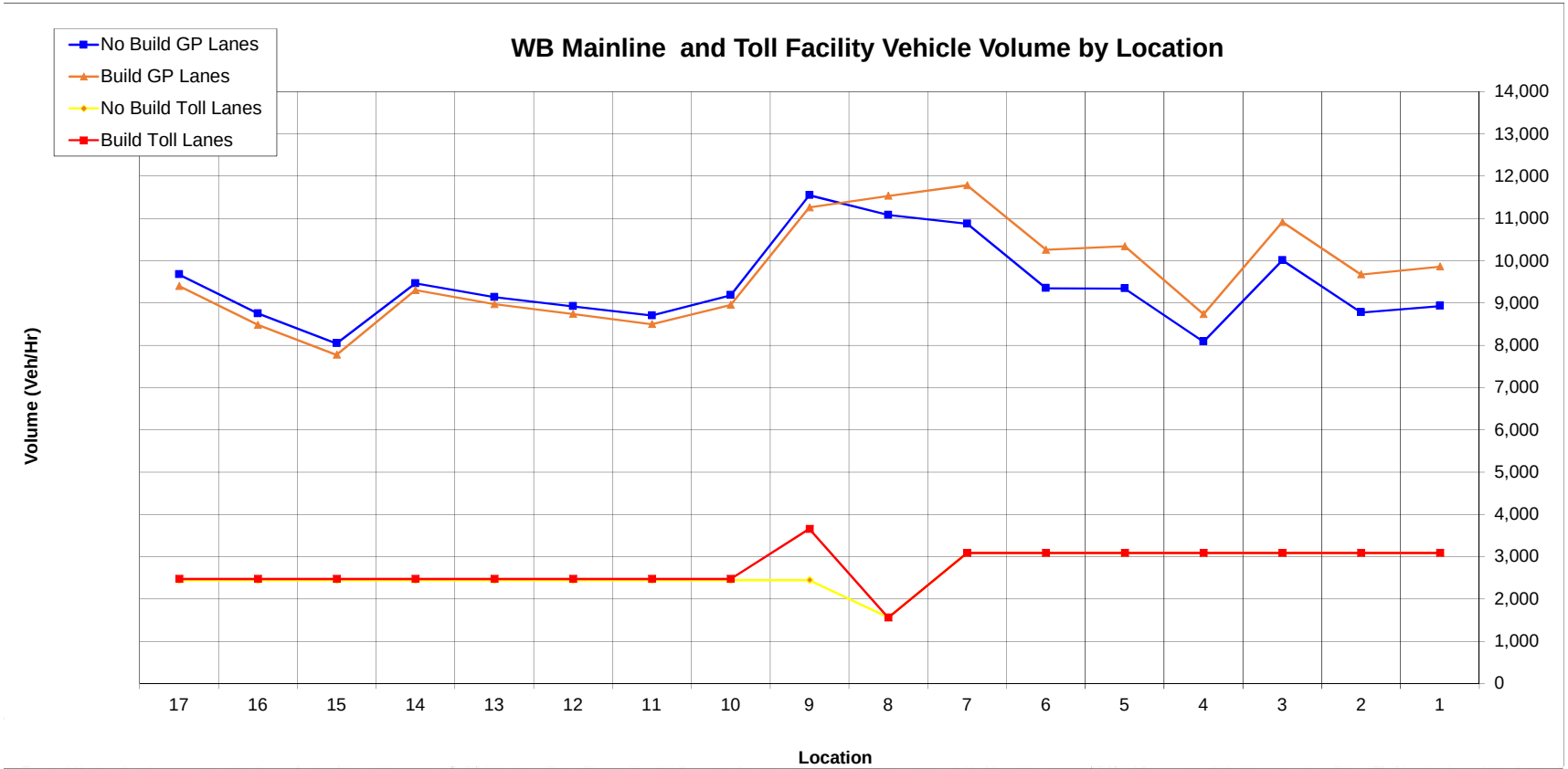
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS

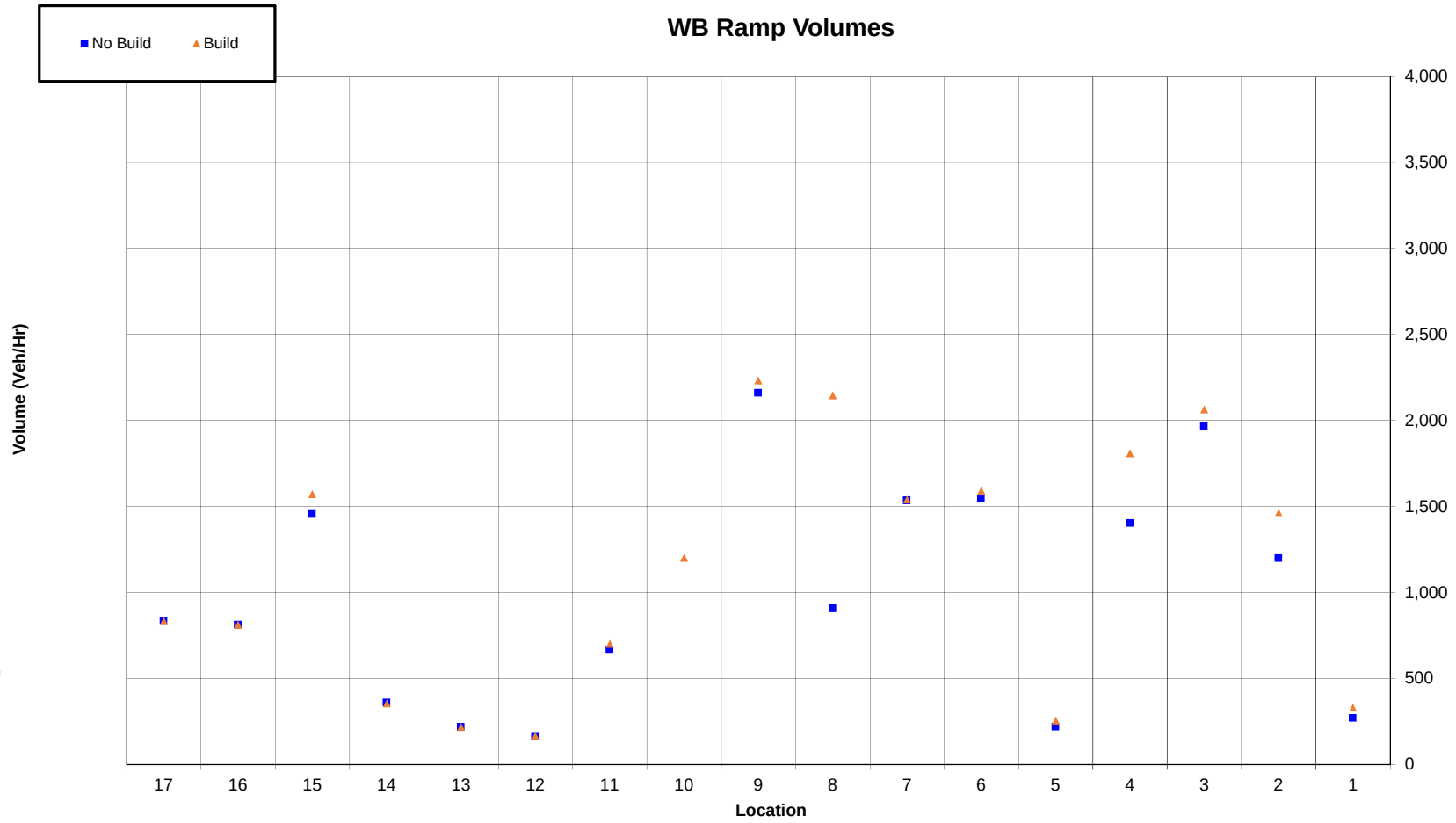


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

Charts 6-7 AM

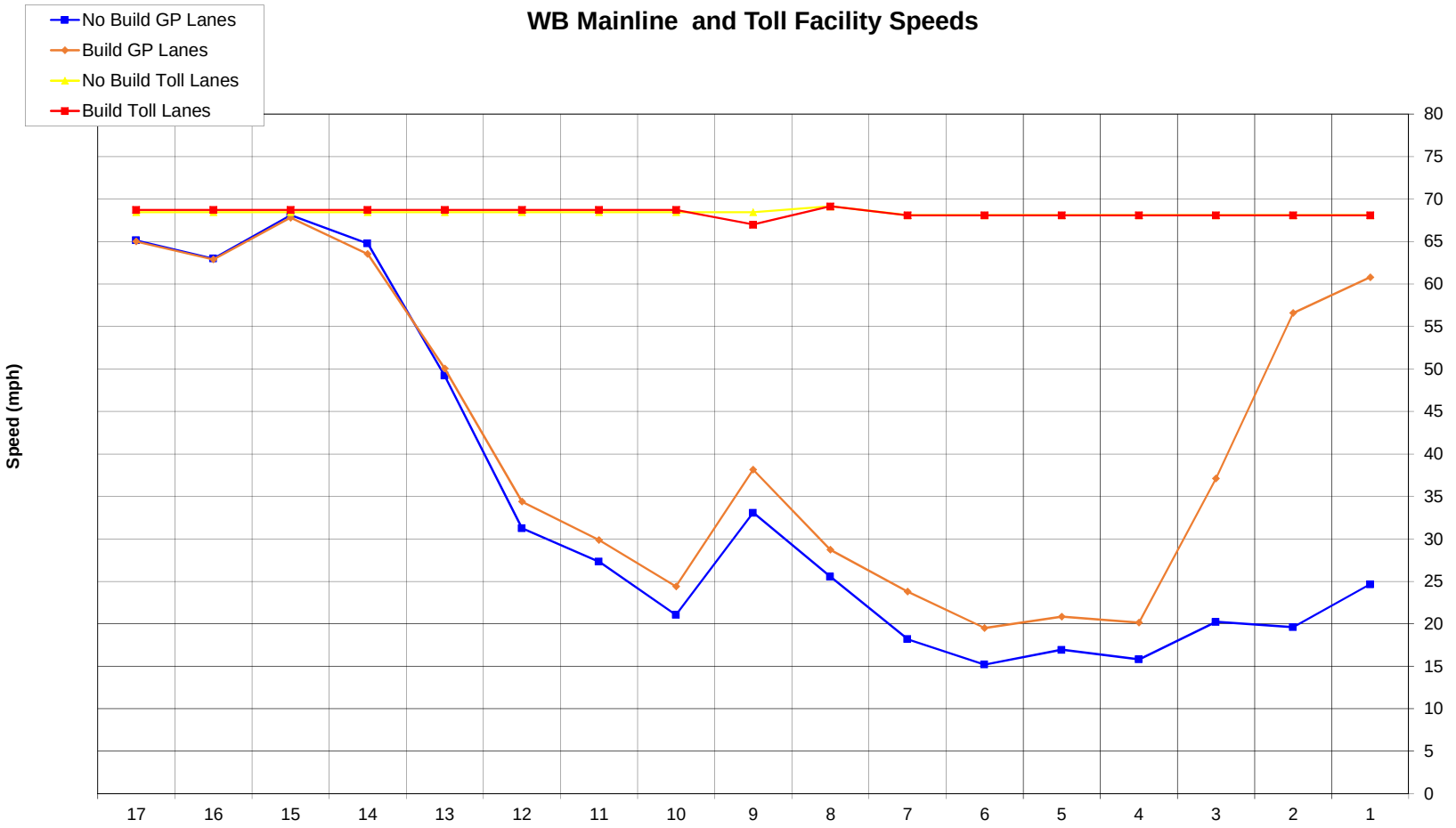


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



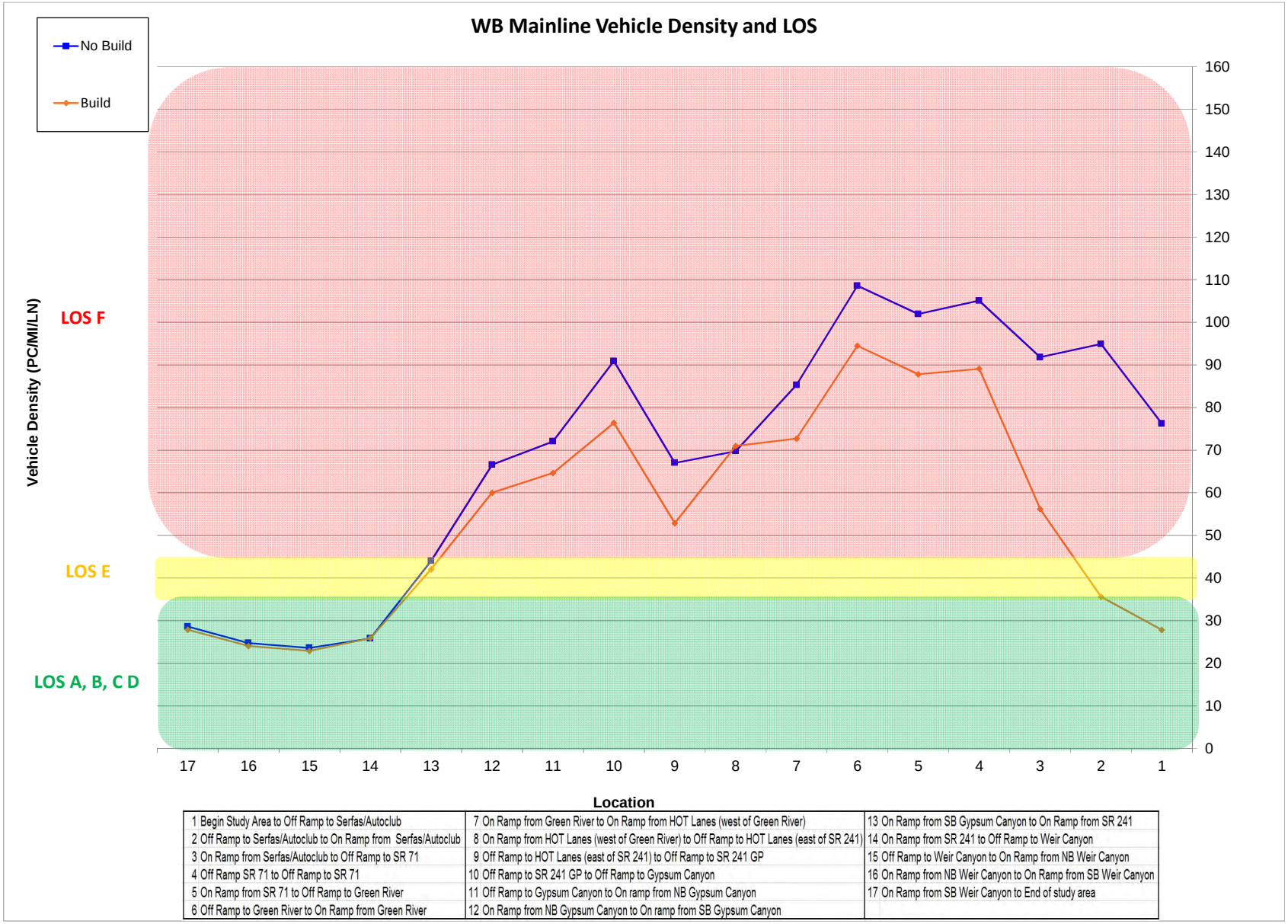
1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOV Exit (west of Green River Rd)	13	On Ramp from SB Gypsum Canyon Rd
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOV Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon Rd
4	On Ramp from SR 71	10	Off Ramp to SR 241 SB HOV	16	On Ramp from NB Weir Canyon Rd
5	Off Ramp to Green River Rd	11	Off Ramp to Gypsum Canyon Rd	17	On Ramp from SB Weir Canyon Rd
6	On Ramp from Green River Rd	12	On Ramp from NB Gypsum Canyon Rd		

Charts 6-7 AM



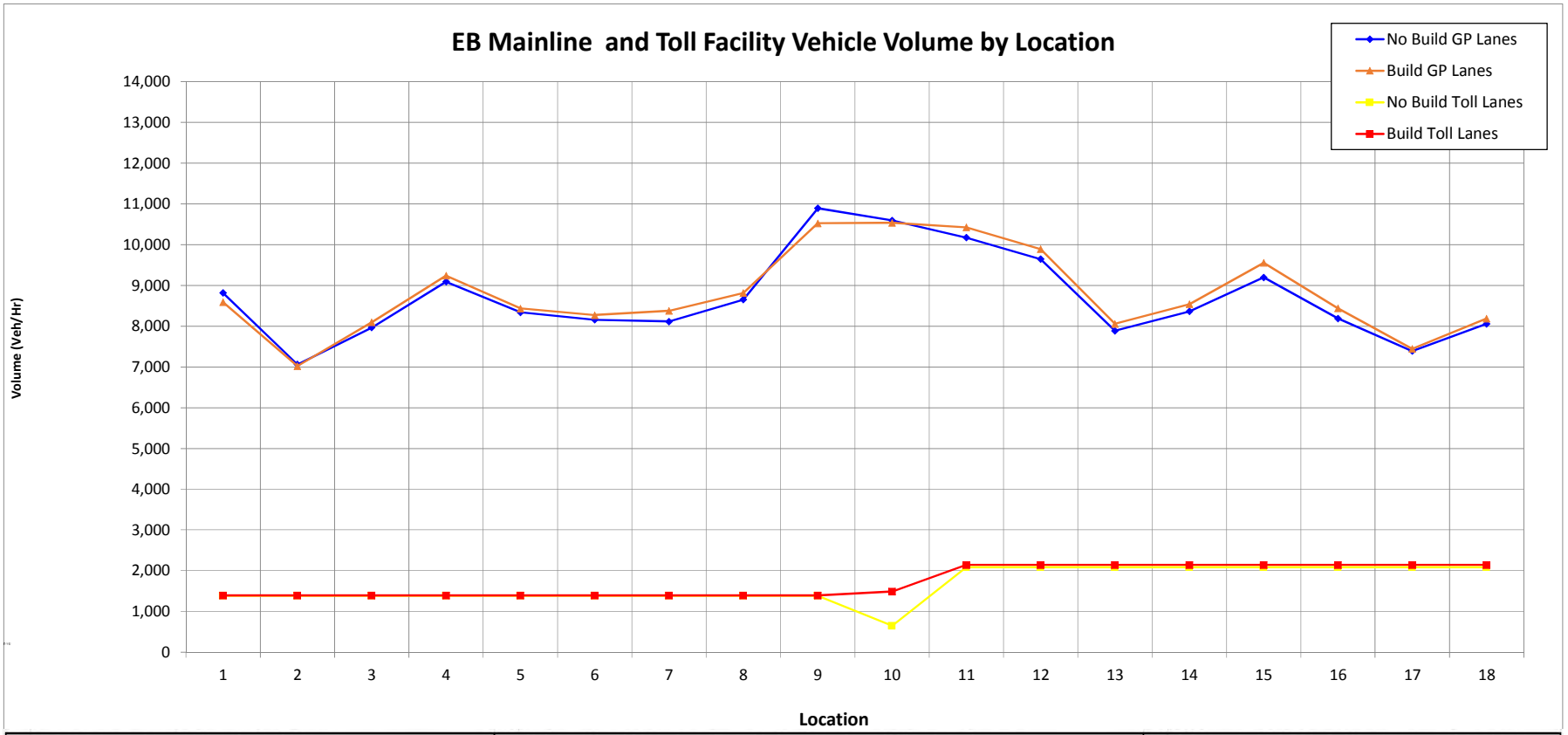
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 6-7 AM



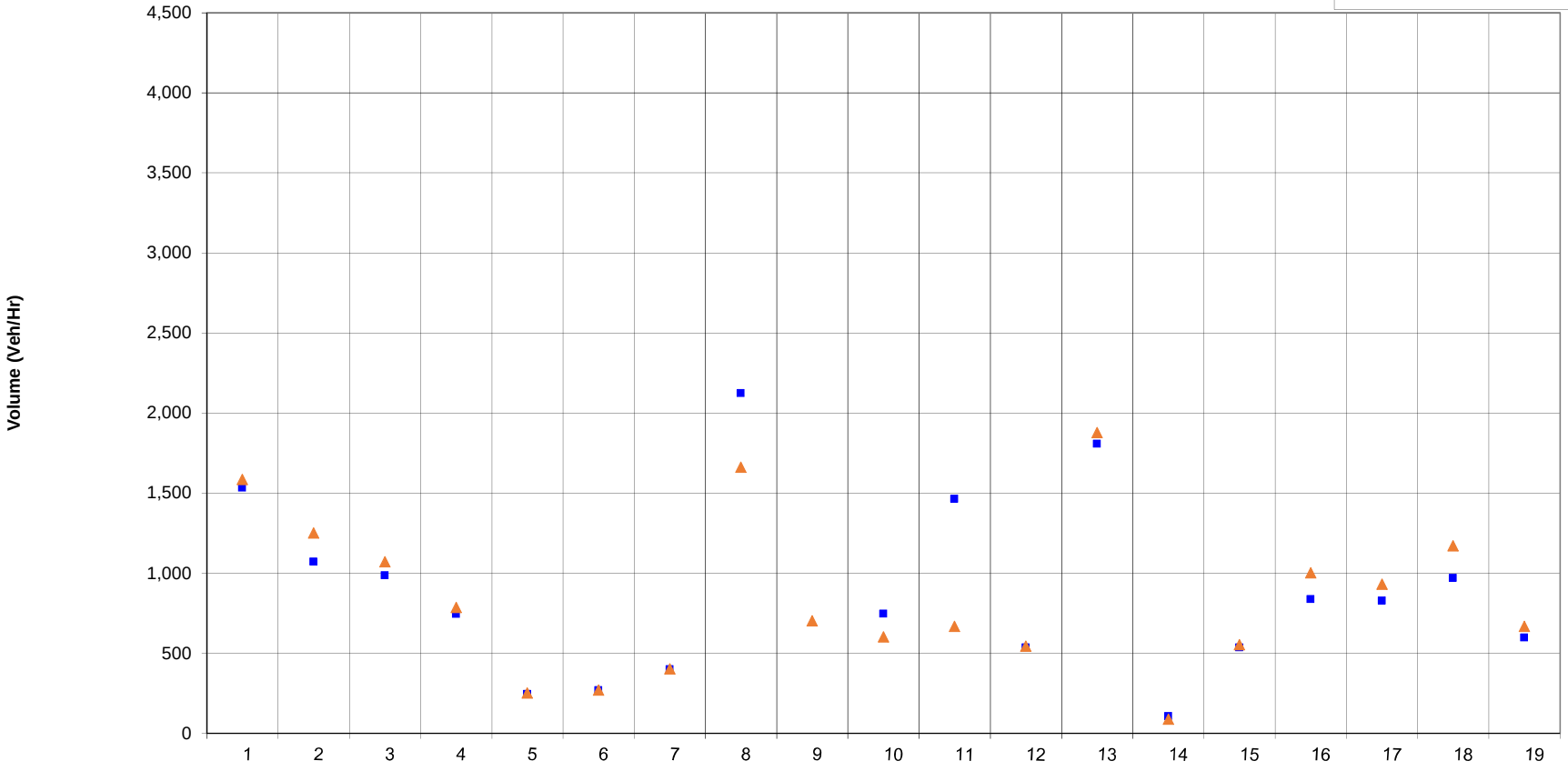
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 6-7 AM



1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area

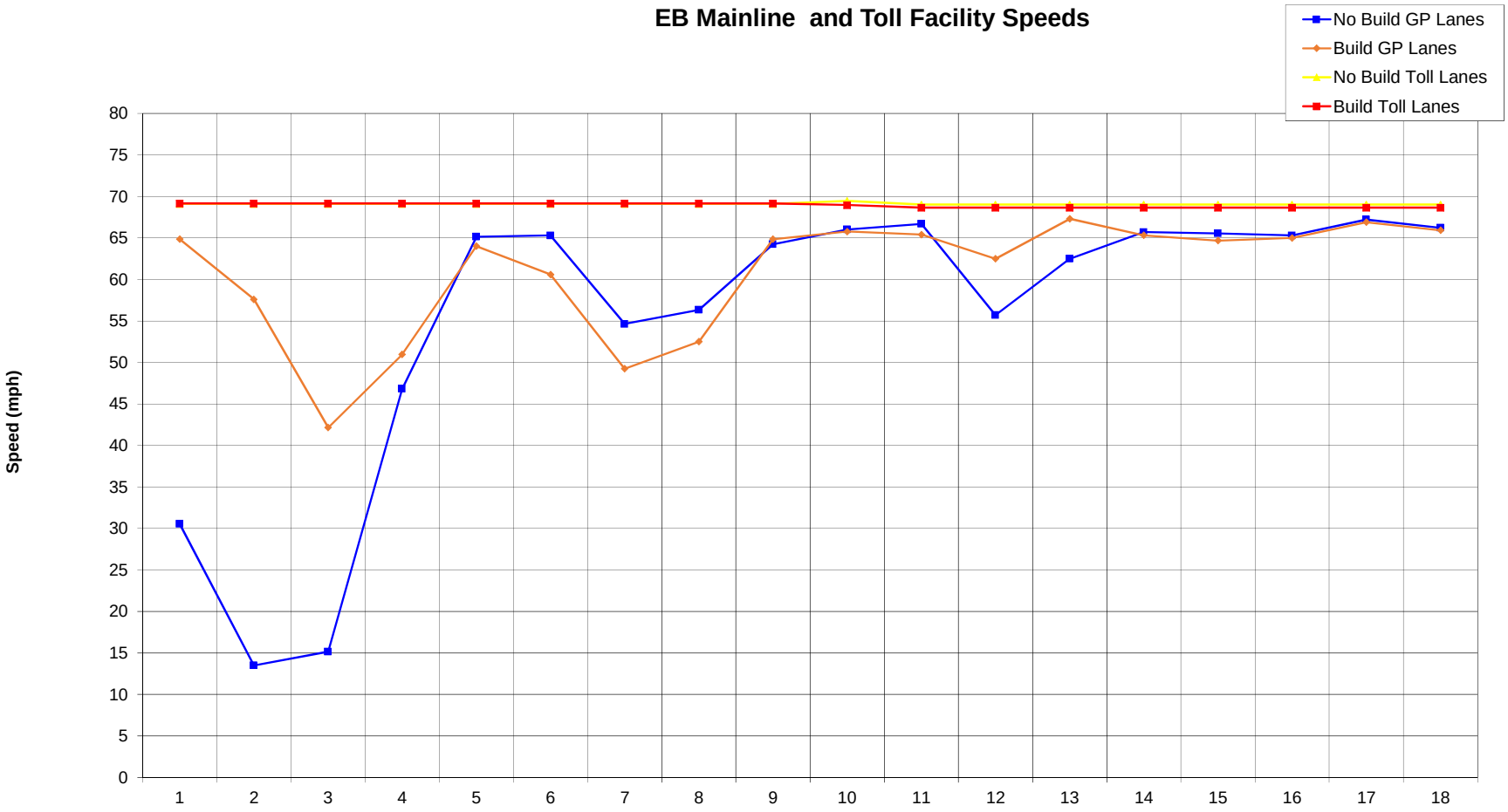
EB Ramp Volumes



1 Off Ramp to Weir Canyon	8 On Ramp from SR 241 GP	15 On Ramp from Green River (to SR 91 EB)
2 On Ramp from SB Weir Canyon	9 On Ramp from SR 241 HOV	16 On Ramp from SR 71
3 On Ramp from NB Weir Canyon	10 On Ramp from HOT Lanes Exit (east of SR 241)	17 Off Ramp to Serfas/Autoclub
4 Off Ramp to SR 241	11 Off Ramp to HOT Lanes Entrance (west of Green River Rd)	18 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	12 Off Ramp to Green River	19 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	13 Off Ramp to SR 71 CD	
7 On Ramp from NB Gypsum Canyon	14 On Ramp from Green River (to SR 71 NB)	

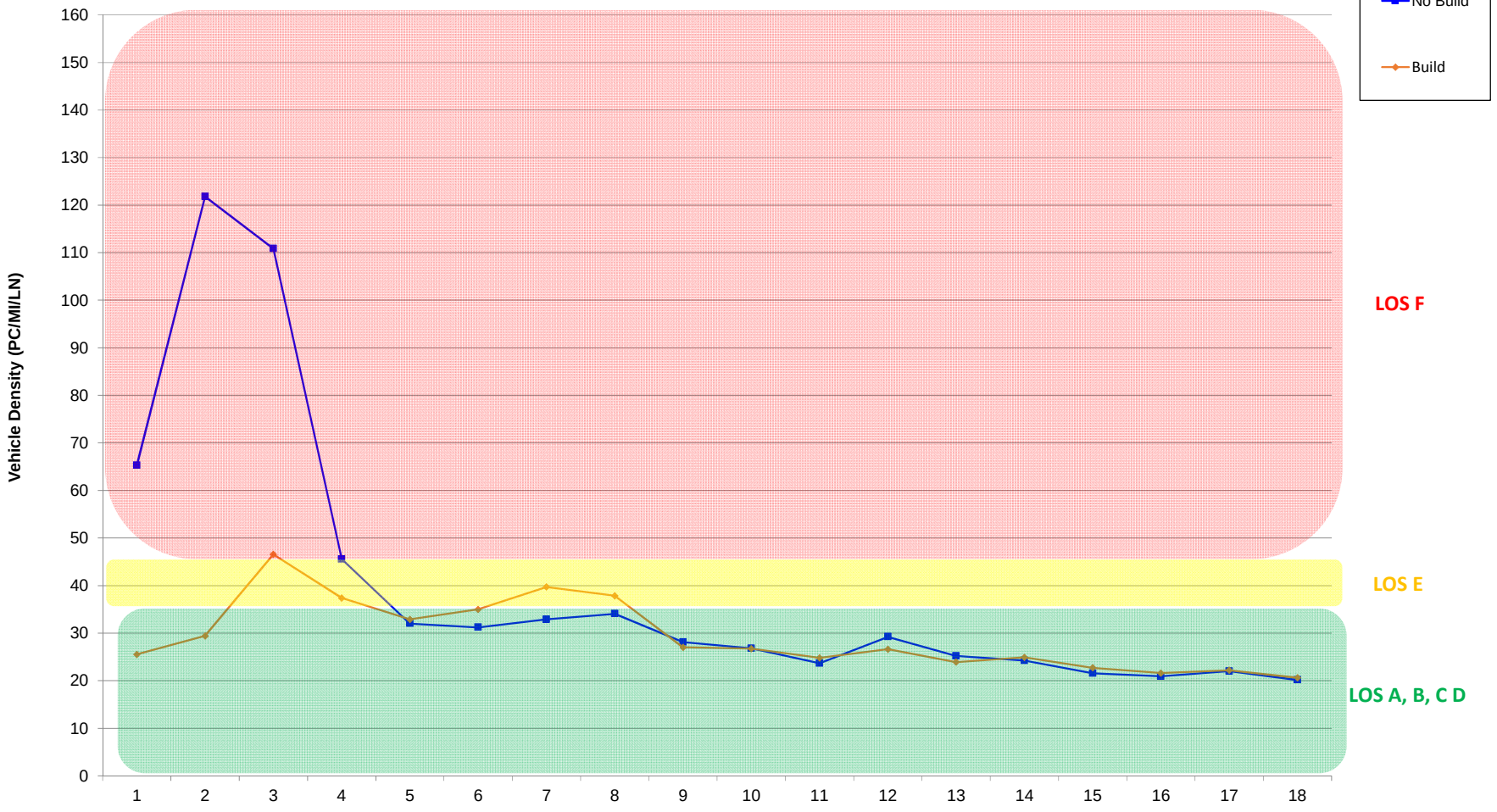
Charts 7-8 AM

EB Mainline and Toll Facility Speeds



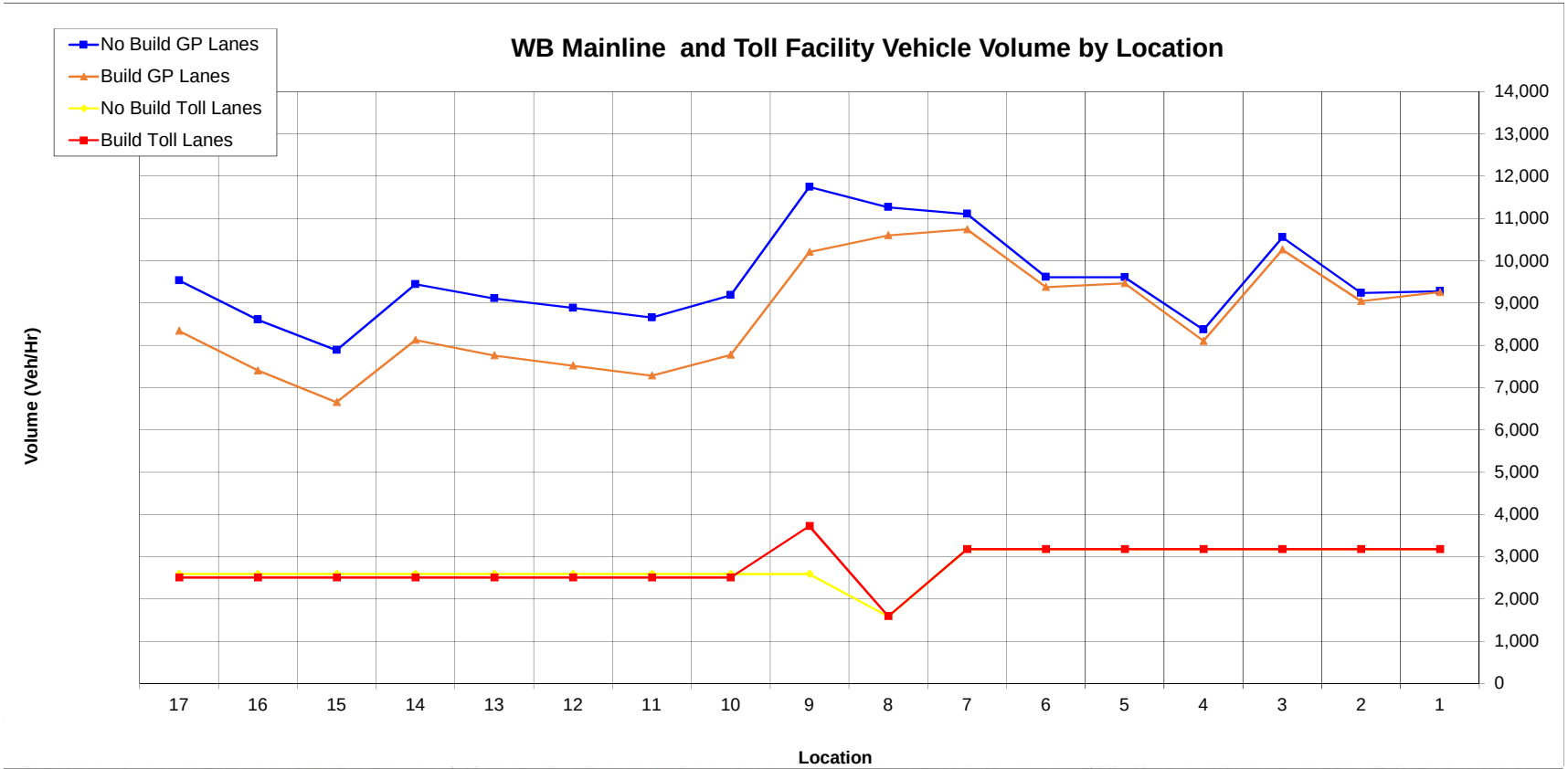
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS

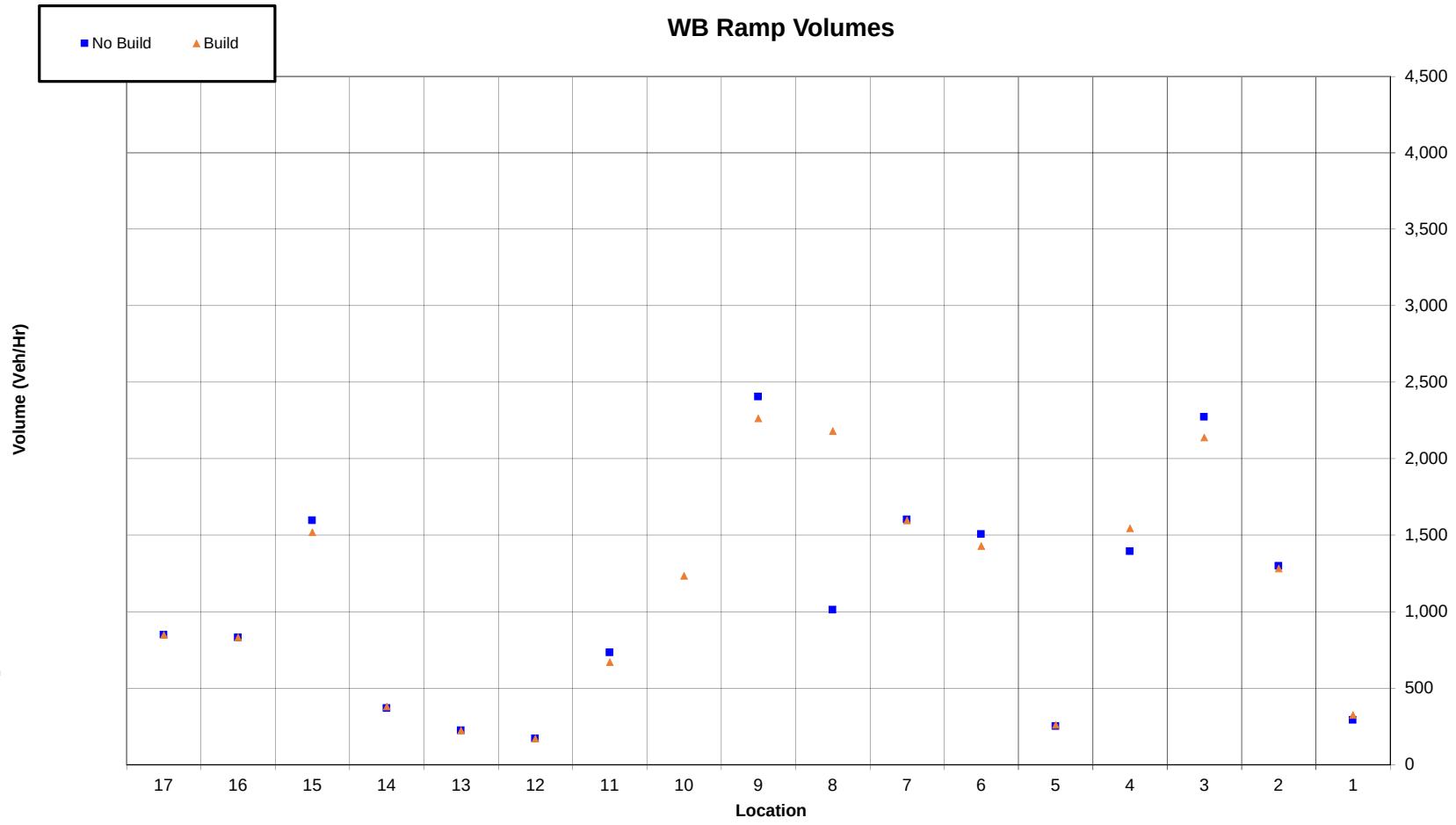


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

Charts 7-8 AM

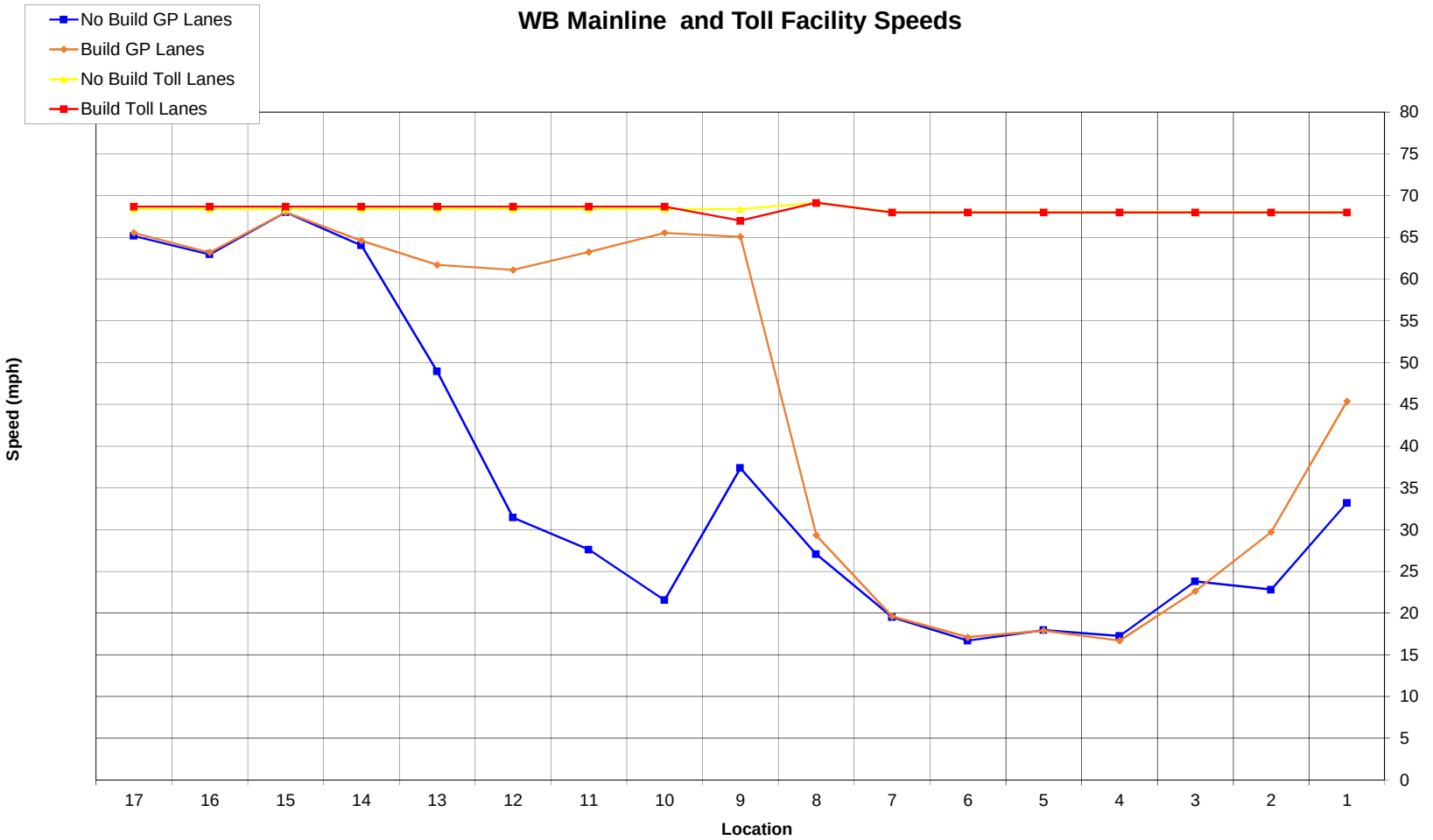


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



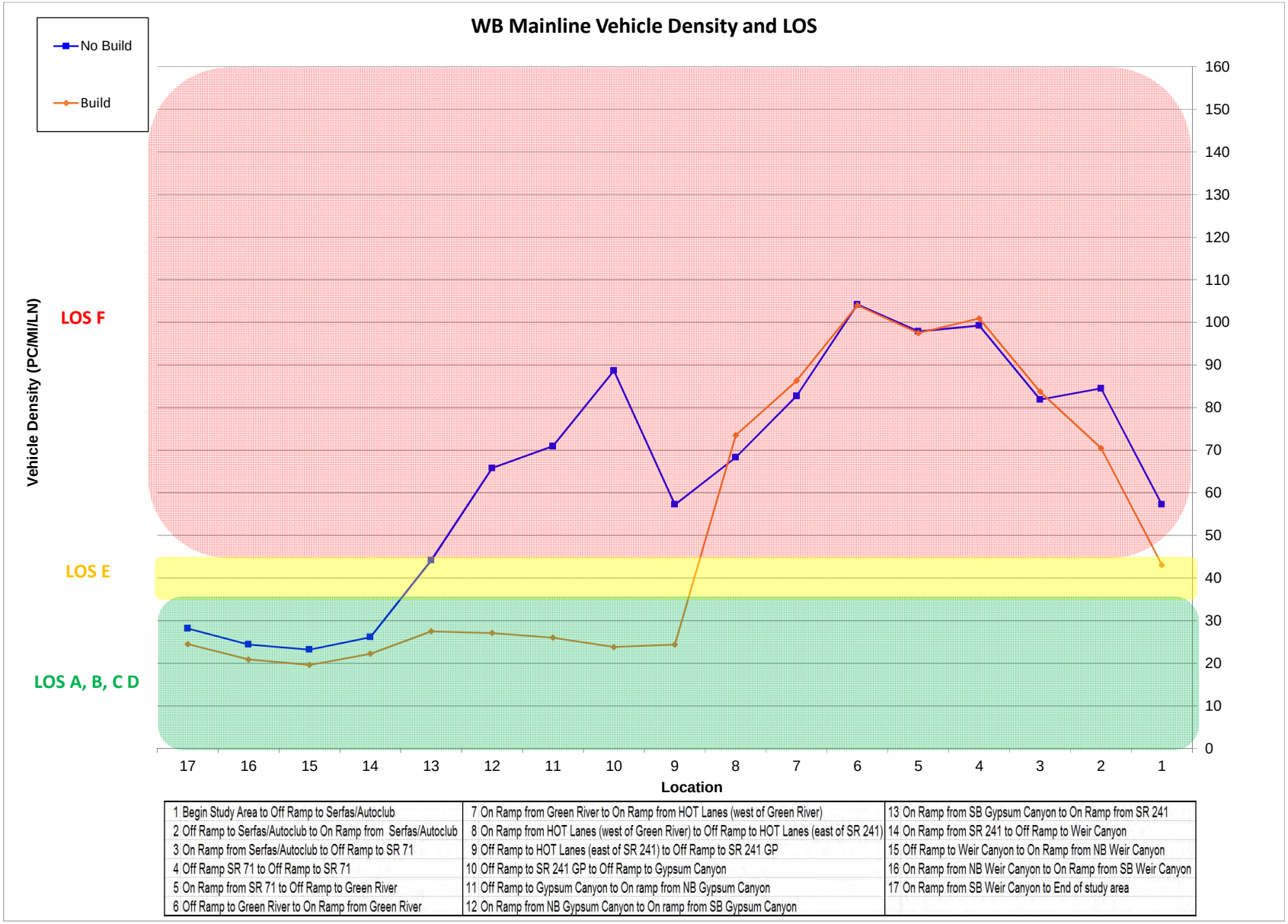
1 Off Ramp to Serfas/Autoclub	7 On Ramp from HOV Exit (west of Green River Rd)	13 On Ramp from SB Gypsum Canyon Rd
2 On Ramp from Serfas/Autoclub	8 Off Ramp to HOV Entrance (east of SR 241)	14 On Ramp from SR 241
3 Off Ramp to SR 71	9 Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon Rd
4 On Ramp from SR 71	10 Off Ramp to SR 241 SB HOV	16 On Ramp from NB Weir Canyon Rd
5 Off Ramp to Green River Rd	11 Off Ramp to Gypsum Canyon Rd	17 On Ramp from SB Weir Canyon Rd
6 On Ramp from Green River Rd	12 On Ramp from NB Gypsum Canyon Rd	

Charts 7-8 AM



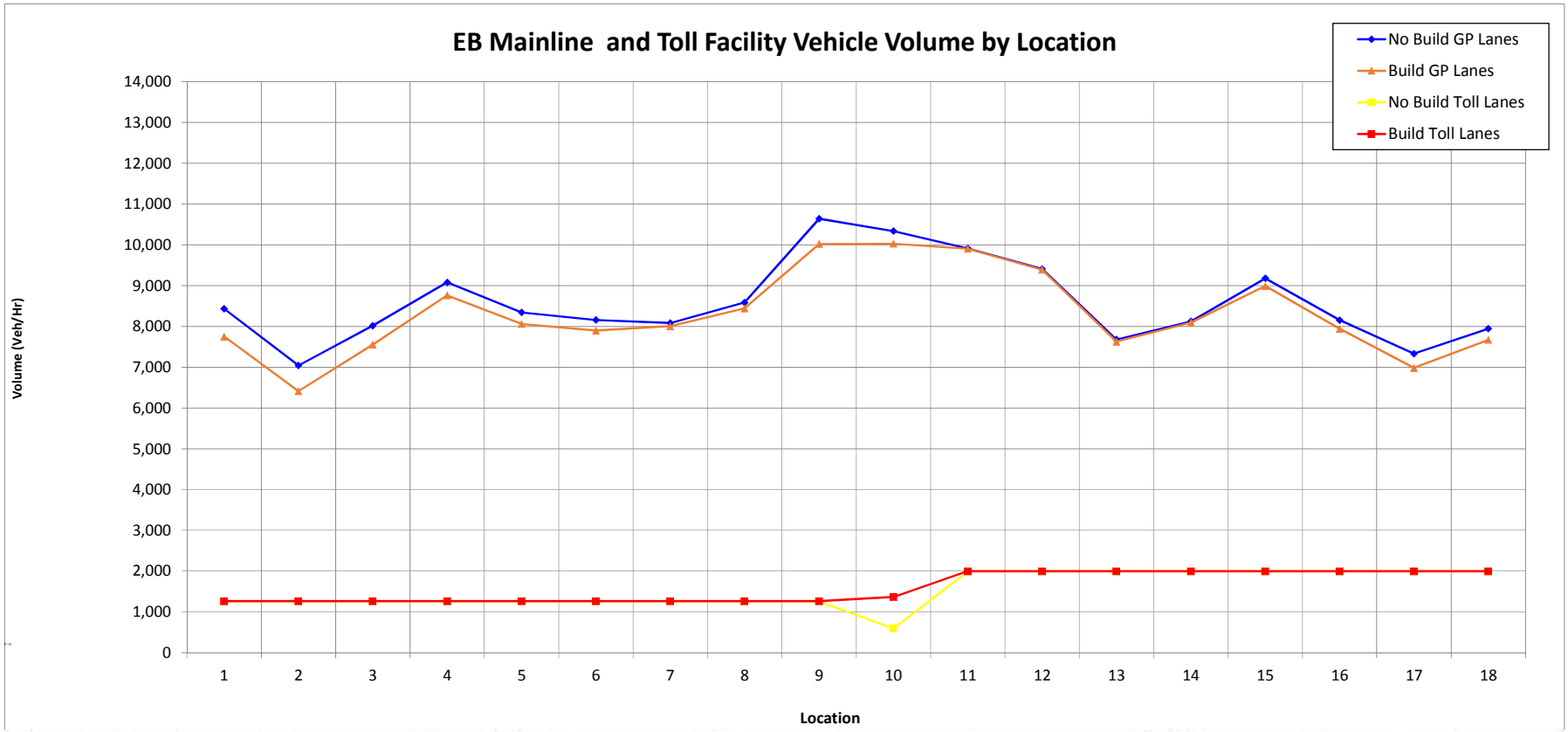
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 7-8 AM

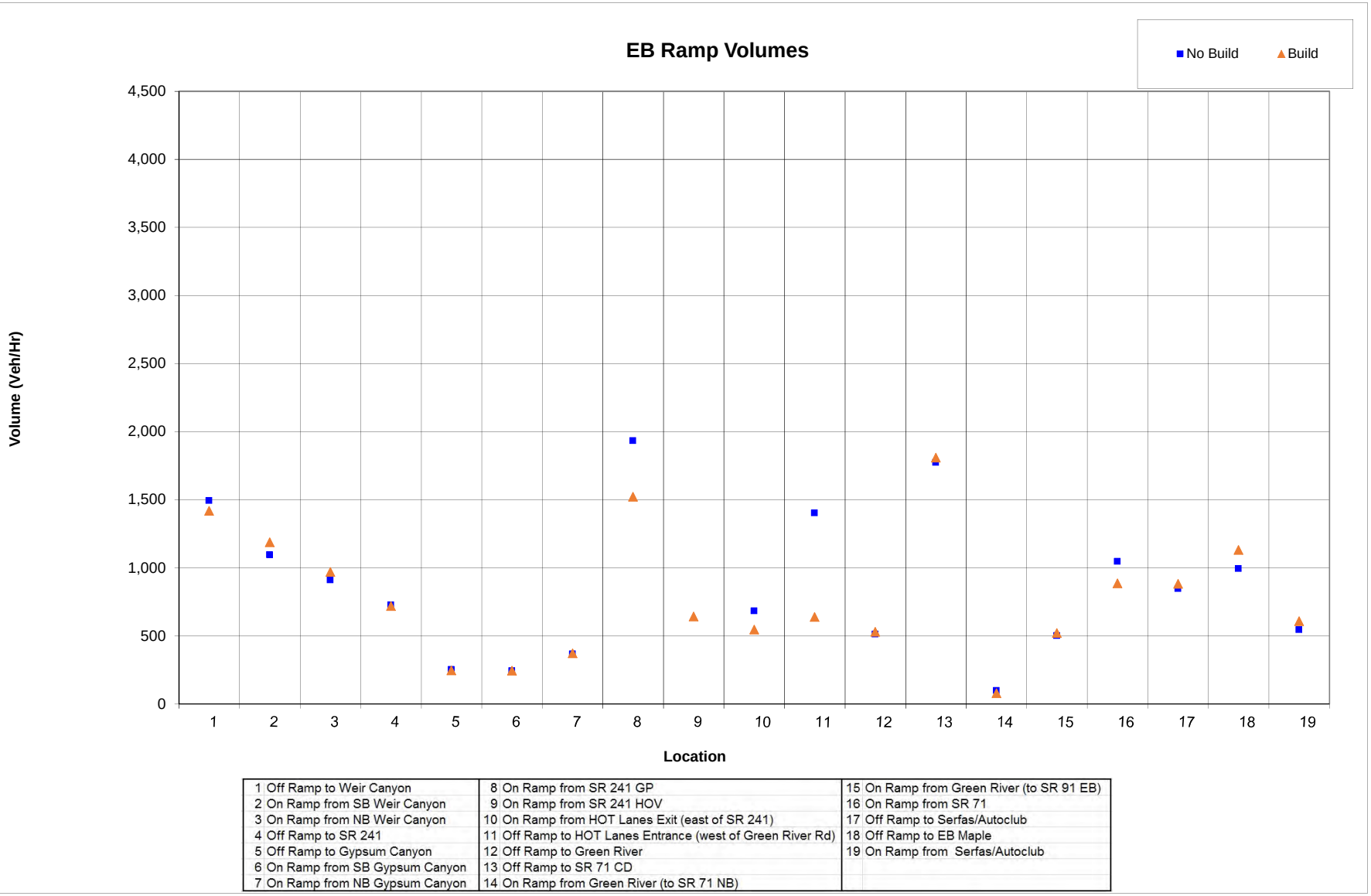


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 7-8 AM



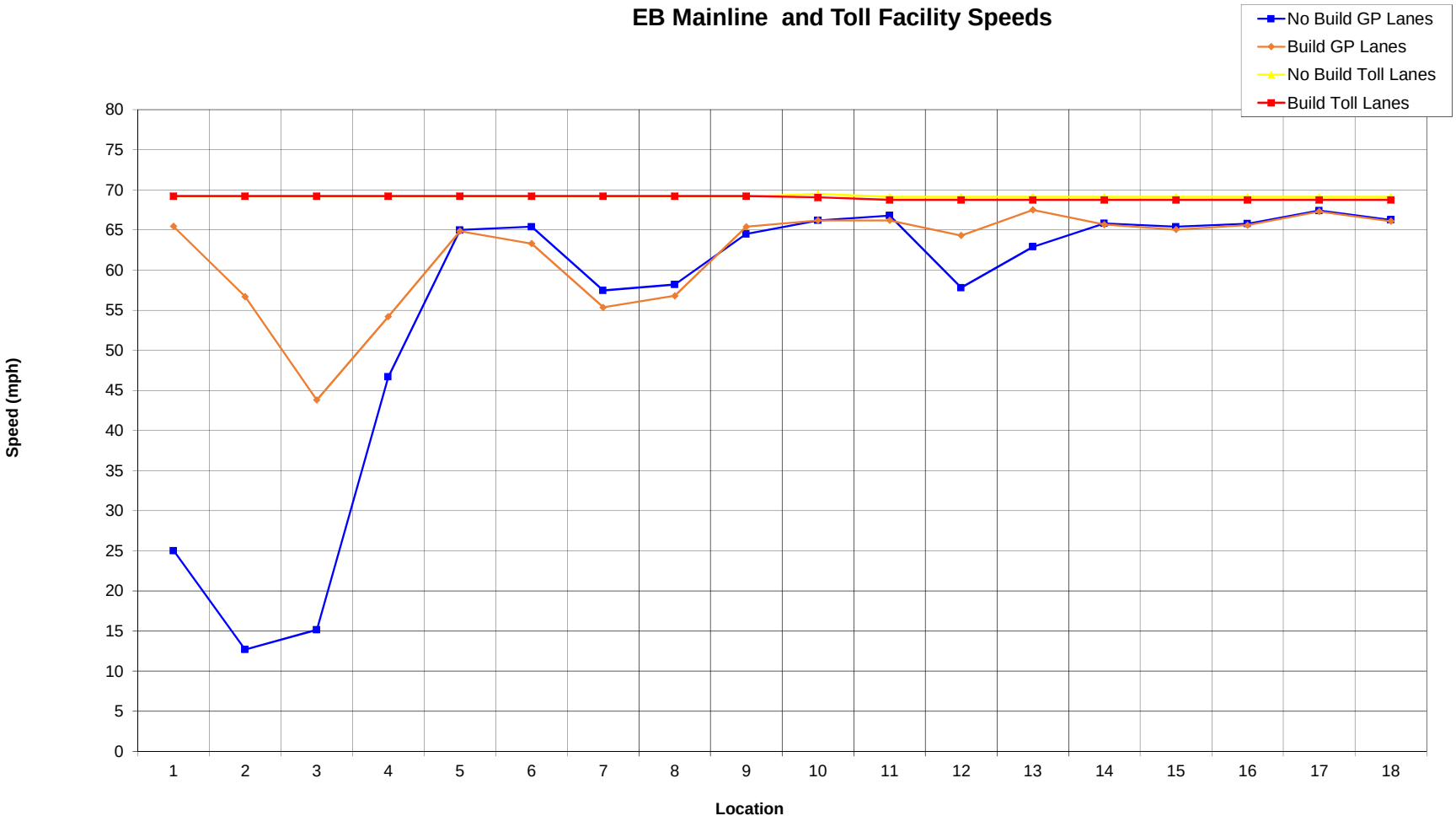
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area



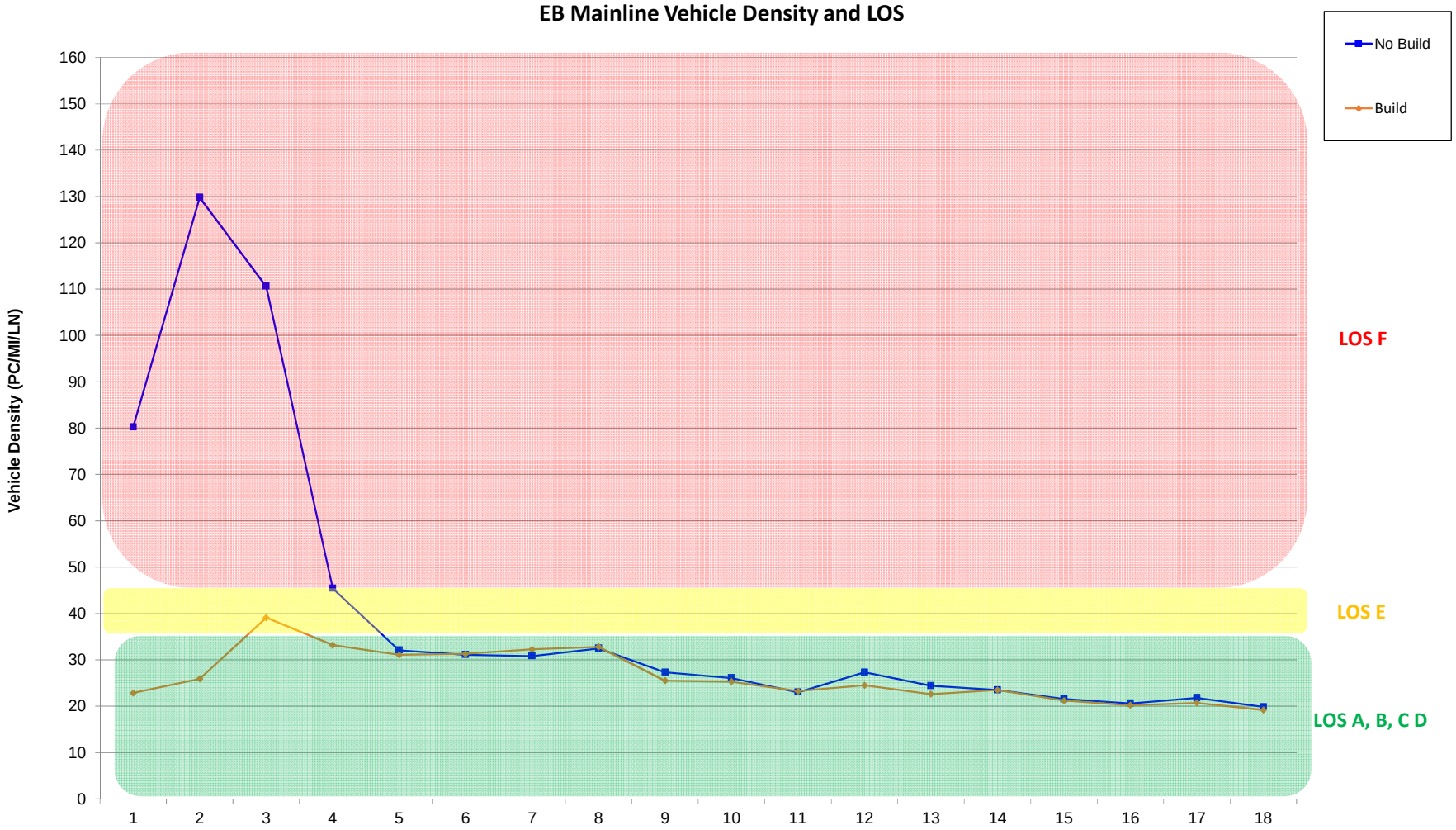
1 Off Ramp to Weir Canyon	8 On Ramp from SR 241 GP	15 On Ramp from Green River (to SR 91 EB)
2 On Ramp from SB Weir Canyon	9 On Ramp from SR 241 HOV	16 On Ramp from SR 71
3 On Ramp from NB Weir Canyon	10 On Ramp from HOT Lanes Exit (east of SR 241)	17 Off Ramp to Serfas/Autoclub
4 Off Ramp to SR 241	11 Off Ramp to HOT Lanes Entrance (west of Green River Rd)	18 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	12 Off Ramp to Green River	19 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	13 Off Ramp to SR 71 CD	
7 On Ramp from NB Gypsum Canyon	14 On Ramp from Green River (to SR 71 NB)	

Charts 8-9 AM

EB Mainline and Toll Facility Speeds

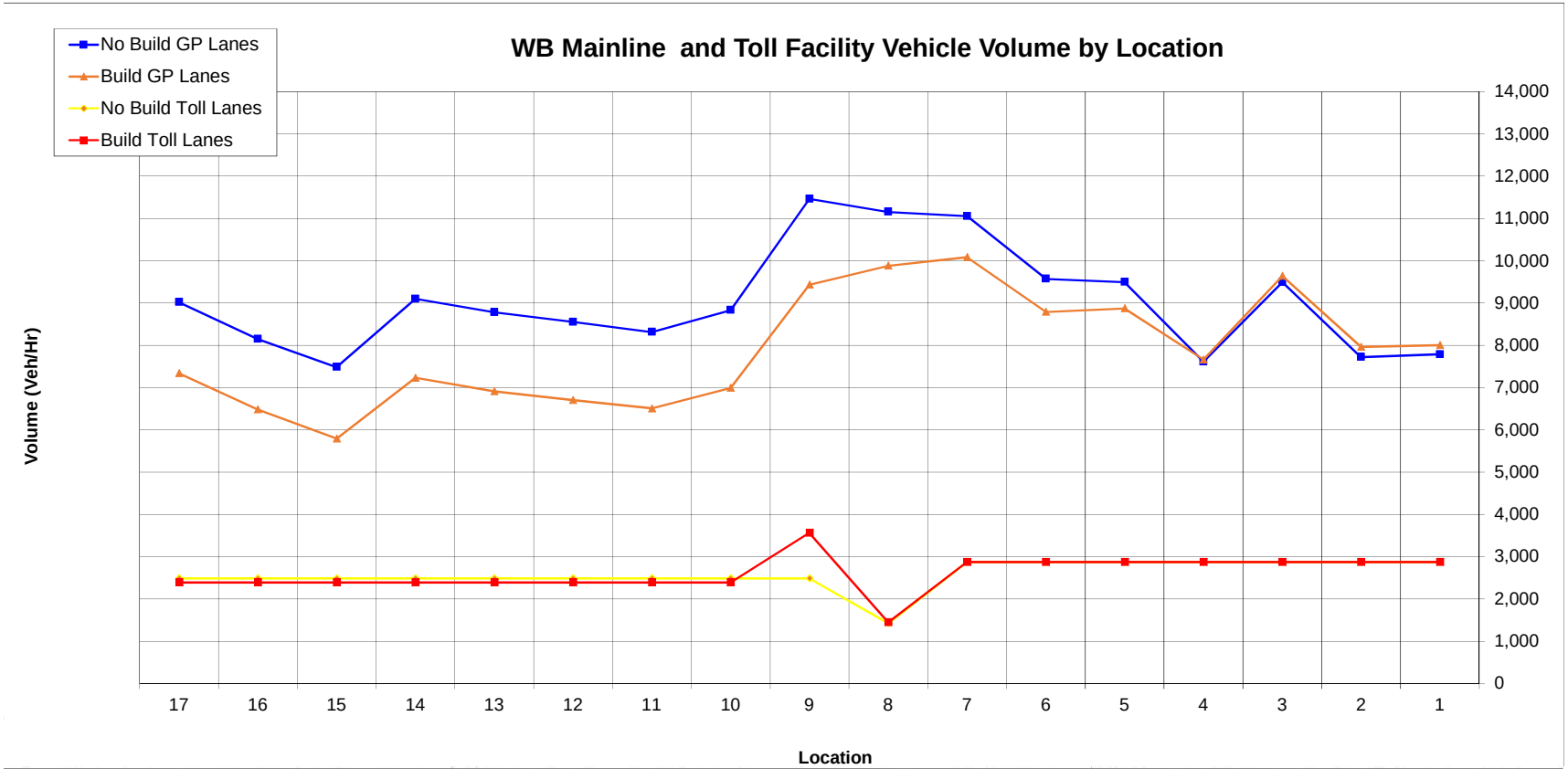


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area



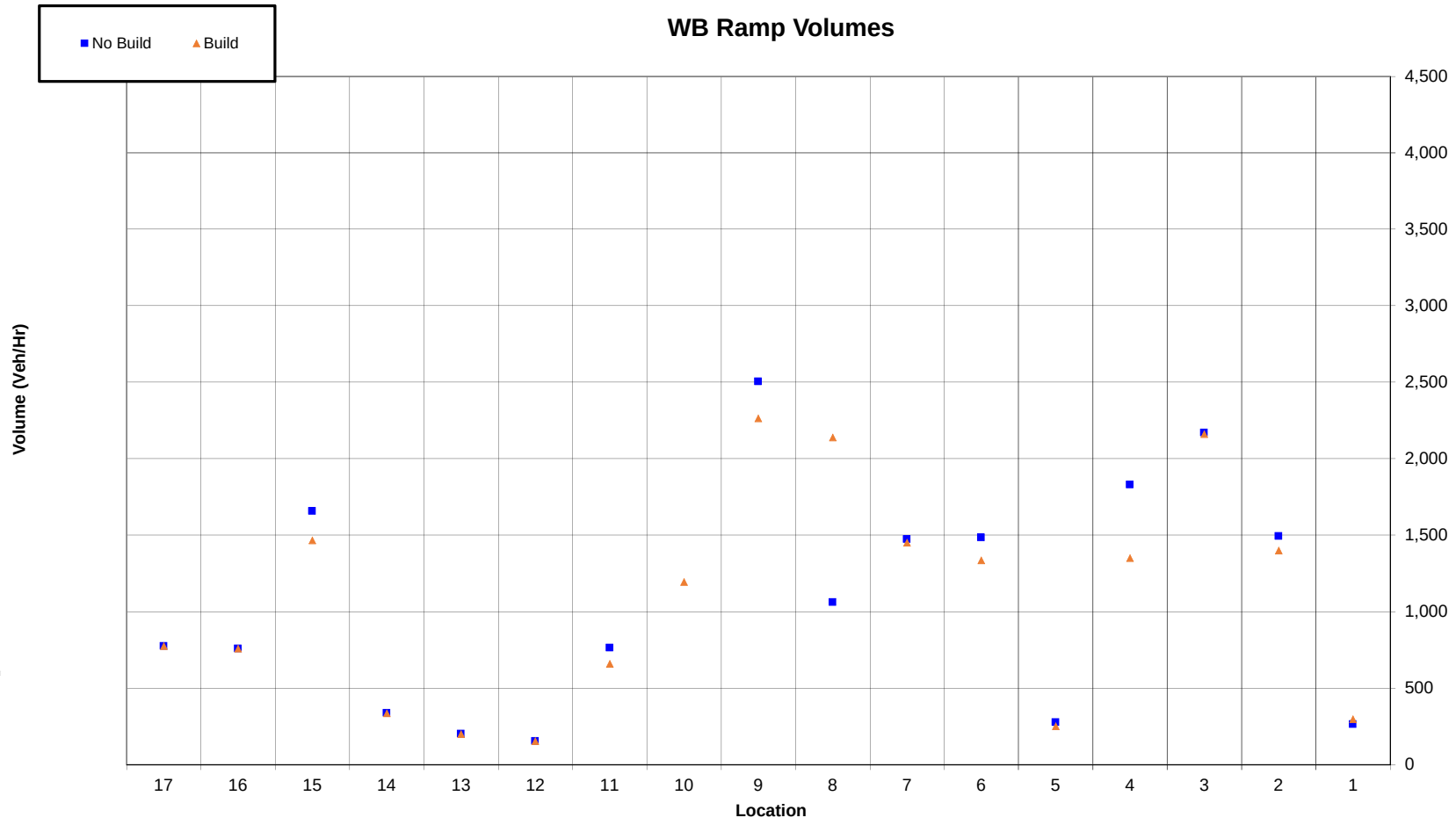
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

Charts 8-9 AM

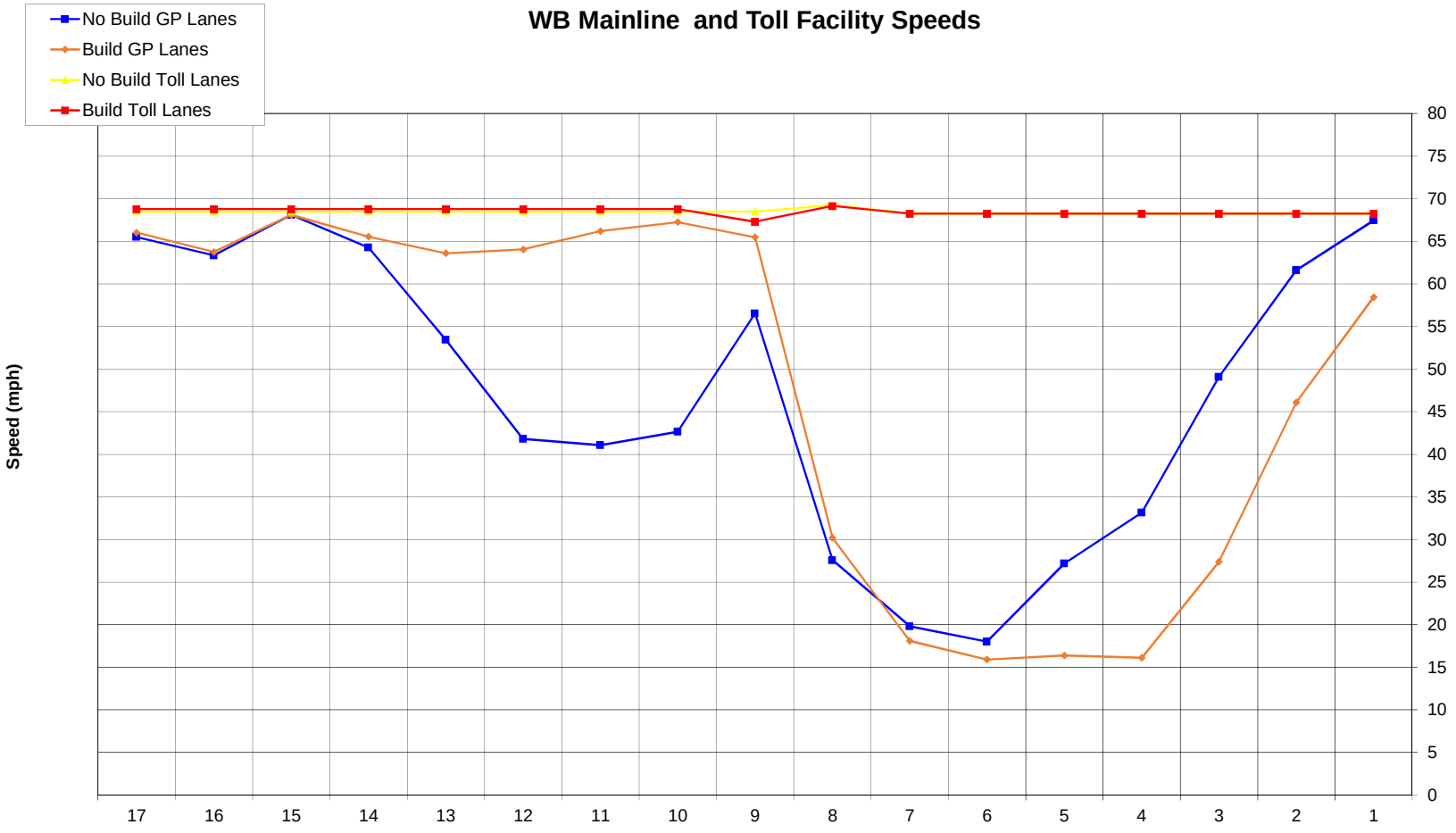


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

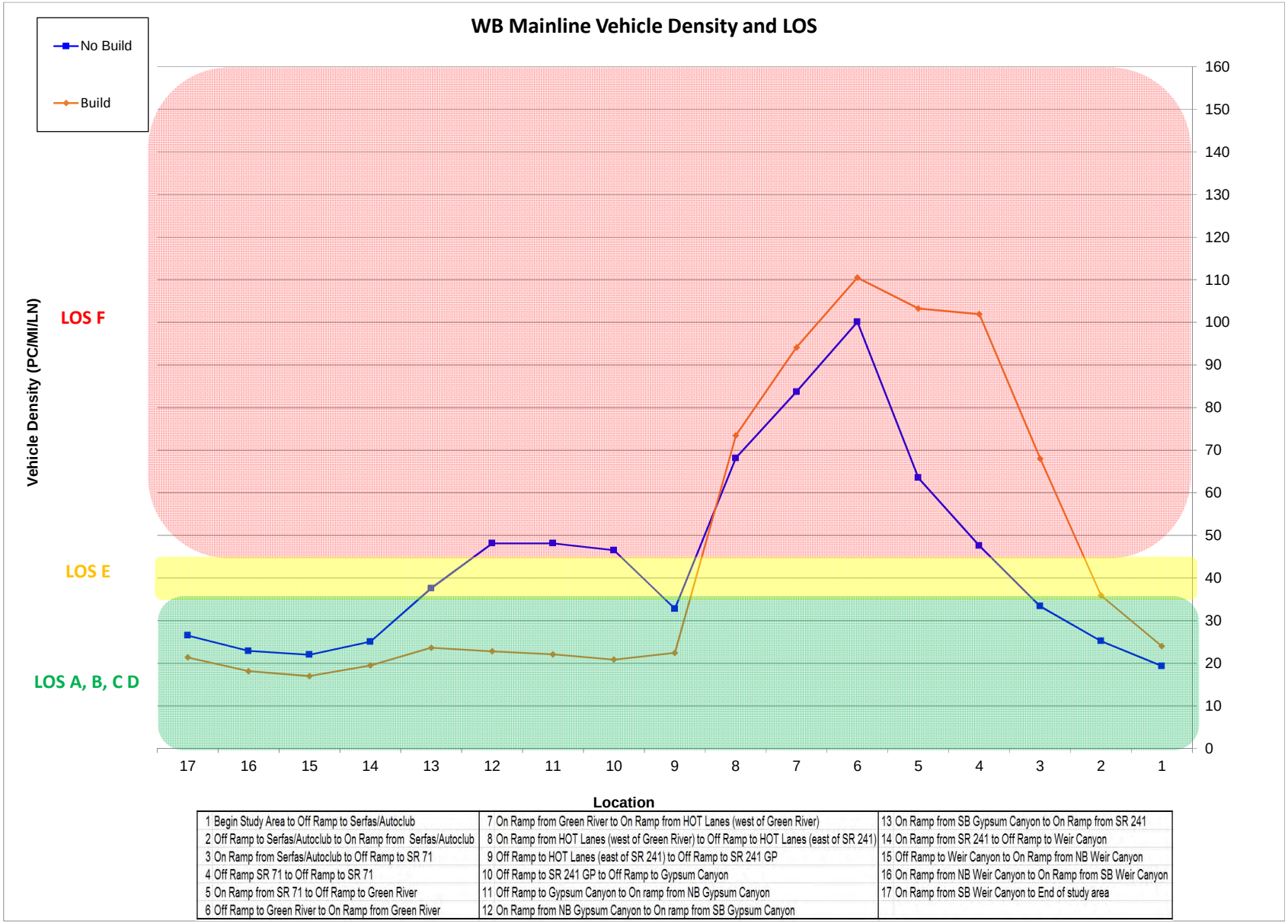
Charts 8-9 AM



1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOV Exit (west of Green River Rd)	13	On Ramp from SB Gypsum Canyon Rd
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOV Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon Rd
4	On Ramp from SR 71	10	Off Ramp to SR 241 SB HOV	16	On Ramp from NB Weir Canyon Rd
5	Off Ramp to Green River Rd	11	Off Ramp to Gypsum Canyon Rd	17	On Ramp from SB Weir Canyon Rd
6	On Ramp from Green River Rd	12	On Ramp from NB Gypsum Canyon Rd		



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

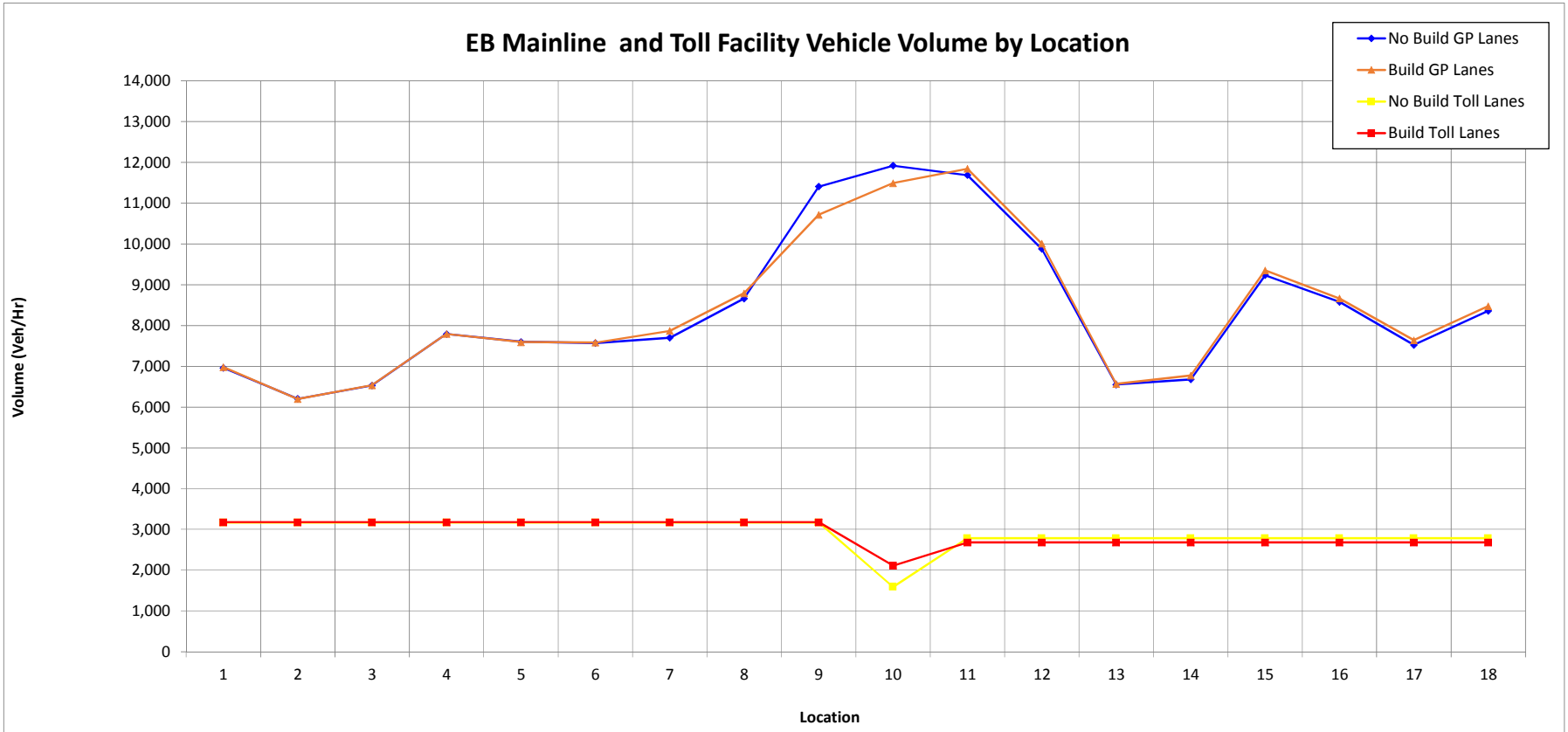
Charts 8-9 AM

SR-91
Vissim Model Summary - 2040 Build Option 2 - PM Peak Period
Network Summary Statistics

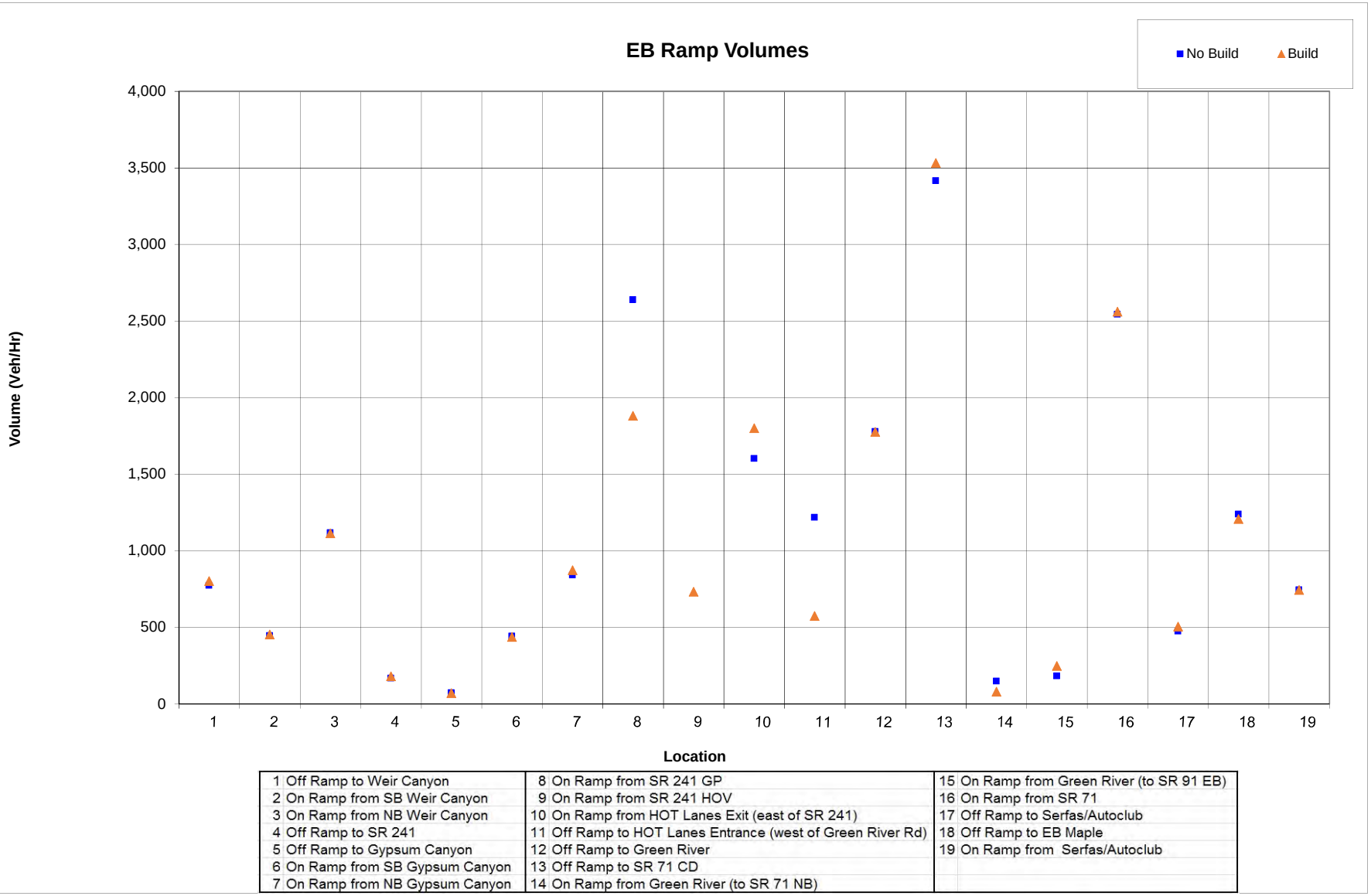
Parameter	2040 No Build	2040 Build Option 2	Difference
Total Vehicle Demand (4 Hr)	168,494	168,944	450
Total number of vehicles that did not reach their desitination	26,918	25,914	-1,004
Totla number of vehicles that have reached their destination	141,576	143,030	1,454
Total vehicle-miles traveled (VMT)	1,173,727	1,193,635	19,909
Total travel time, All Vehicle Types (VHT)	26,063	25,477	-586
Average speed [mph], All Vehicle Types	45.1	46.9	1.8
Average delay time per vehicle [mins], All Vehicle Types	3.45	3.08	-0.37

SR-91
Vissim Model Summary - 2040 Build Option 2 - PM Peak Period
Travel Time Results

#	Origin	#	Destination	p Ke	Hide Travel Time Seg 1	Seg 2	Seg 3	2040 PM No Build VISSIM Travel Time (Minutes) 3-4 PM	4-5 PM	5-6 PM	6-7 PM	2040 PM Build VISSIM Travel Time (Minutes) 3-4 PM	4-5 PM	5-6 PM	6-7 PM	Change VISSIM Travel Time (Minutes) 3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	19.8	20.3	20.9	20.5	19.6	19.7	19.6	18.7	-0.2	-0.6	-1.3	-1.8
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	19.7	20.3	20.8	20.5	19.5	19.7	19.6	18.7	-0.2	-0.6	-1.3	-1.8
		5	SR 241 SB south of SR 91	3	1001			14.7	14.7	14.6	14.3	14.5	14.7	14.6	14.0	-0.2	0.0	0.0	-0.3
		7	SR 71 NB north of SR 91	4	1002	1003	1004	21.2	21.8	22.3	22.0	21.0	21.2	21.1	20.2	-0.2	-0.6	-1.3	-1.8
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.8	9.2	9.7	9.9	8.7	8.7	8.7	8.6	-0.1	-0.5	-1.0	-1.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.4	8.4	8.4	8.4	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.2	10.6	11.2	11.4	10.1	10.2	10.2	10.1	-0.1	-0.5	-1.0	-1.3
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	8.7	8.7	8.7	8.5	8.5	8.5	8.5	8.5	-0.1	-0.2	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.4	-0.1	-0.1	-0.1	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	11.0	11.1	11.0	10.9	10.9	11.0	10.9	10.9	-0.1	-0.1	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a	n/a	10.9	10.9	10.8	10.8	-0.2	-0.2	-0.2	-0.1
		7	SR 71 NB north of SR 91	12	1010			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	8.6	8.7	8.6	8.5	8.5	8.5	8.5	8.5	-0.1	-0.1	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4	8.3	8.4	8.4	8.4	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	11.0	11.0	11.0	10.9	10.9	10.9	10.9	10.9	-0.1	-0.1	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a	n/a	10.8	10.8	10.7	10.7	-0.2	-0.3	-0.3	-0.2
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.2	7.2	7.5	7.3	7.2	7.2	7.3	7.2	0.0	0.0	-0.2	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.2	11.6	12.7	12.6	11.0	11.1	11.1	11.0	-0.2	-0.6	-1.6	-1.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	11.2	11.6	12.7	12.5	11.0	11.0	11.0	11.0	-0.2	-0.5	-1.6	-1.5
		7	SR 71 NB north of SR 91	20	1007	1003	1004	12.6	13.1	14.2	14.0	12.5	12.5	12.5	12.5	-0.2	-0.5	-1.6	-1.5
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a	n/a	11.0	11.0	11.1	11.0	-0.2	-0.6	-1.6	-1.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.8	-0.3	-0.7	-1.8	-1.7
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a	n/a	12.5	12.5	12.5	12.5	-0.2	-0.6	-1.6	-1.6
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	10.0	10.1	10.0	9.8	9.9	9.9	9.9	9.8	-0.1	-0.2	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	9.9	10.0	9.9	9.8	9.8	9.8	9.8	9.7	-0.1	-0.2	-0.1	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			5.7	5.7	5.6	5.4	5.8	5.9	5.6	5.4	0.0	0.1	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	12.4	12.5	12.4	12.2	12.3	12.3	12.3	12.2	-0.1	-0.2	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a	n/a	12.2	12.2	12.2	12.1	-0.2	-0.2	-0.2	-0.1

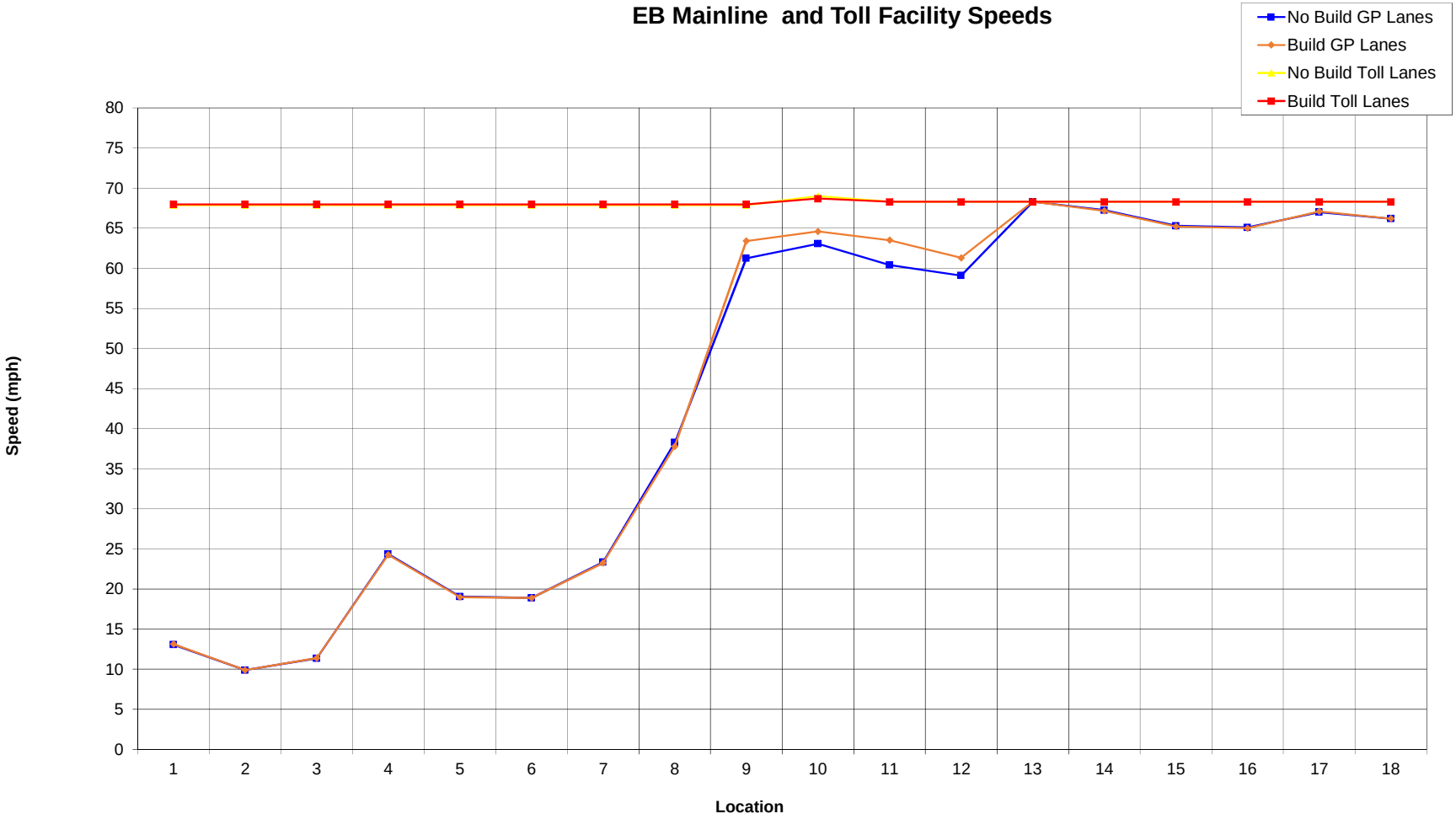


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area



1 Off Ramp to Weir Canyon	8 On Ramp from SR 241 GP	15 On Ramp from Green River (to SR 91 EB)
2 On Ramp from SB Weir Canyon	9 On Ramp from SR 241 HOV	16 On Ramp from SR 71
3 On Ramp from NB Weir Canyon	10 On Ramp from HOT Lanes Exit (east of SR 241)	17 Off Ramp to Serfas/Autoclub
4 Off Ramp to SR 241	11 Off Ramp to HOT Lanes Entrance (west of Green River Rd)	18 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	12 Off Ramp to Green River	19 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	13 Off Ramp to SR 71 CD	
7 On Ramp from NB Gypsum Canyon	14 On Ramp from Green River (to SR 71 NB)	

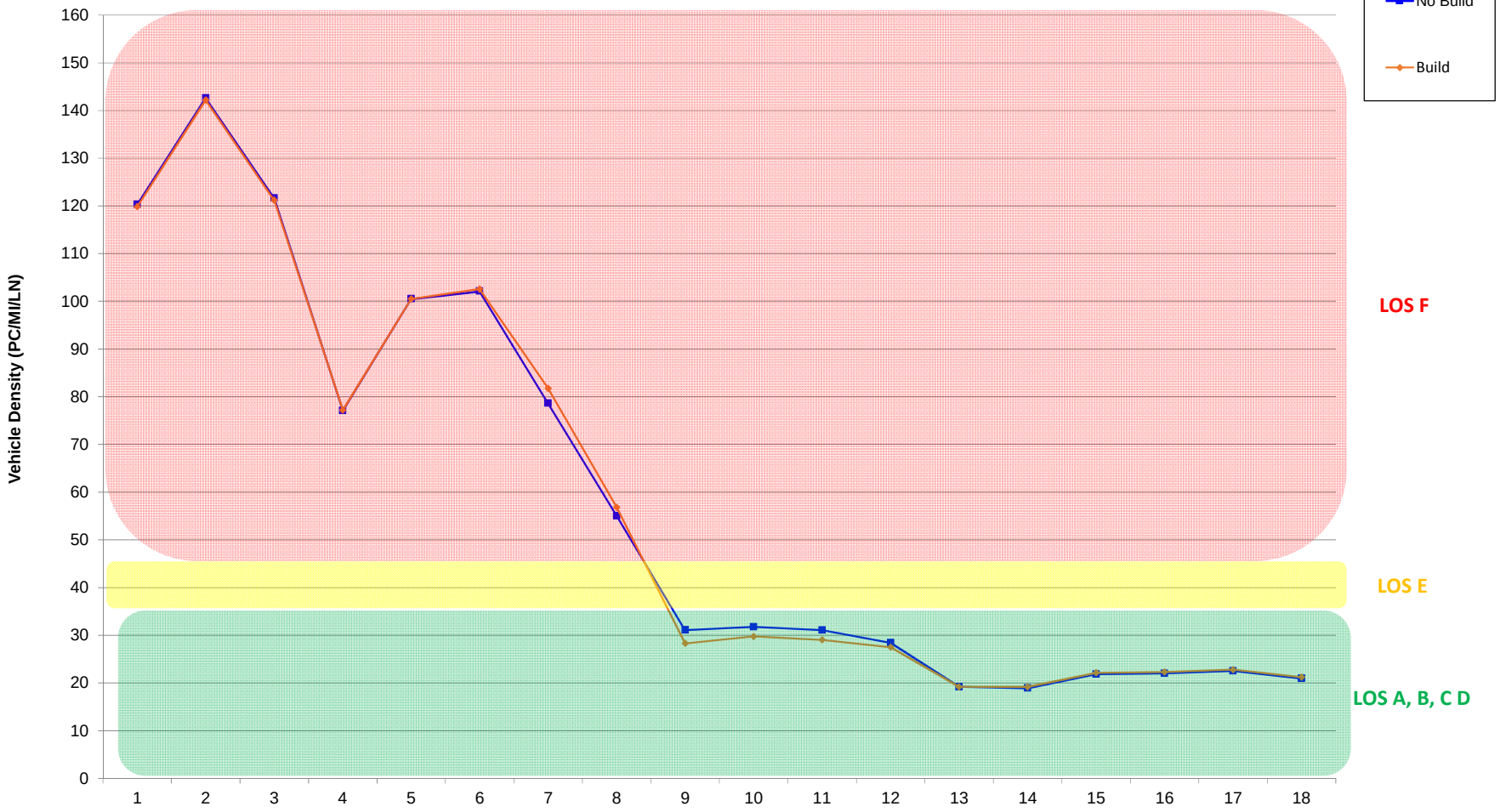
Charts 3-4 PM



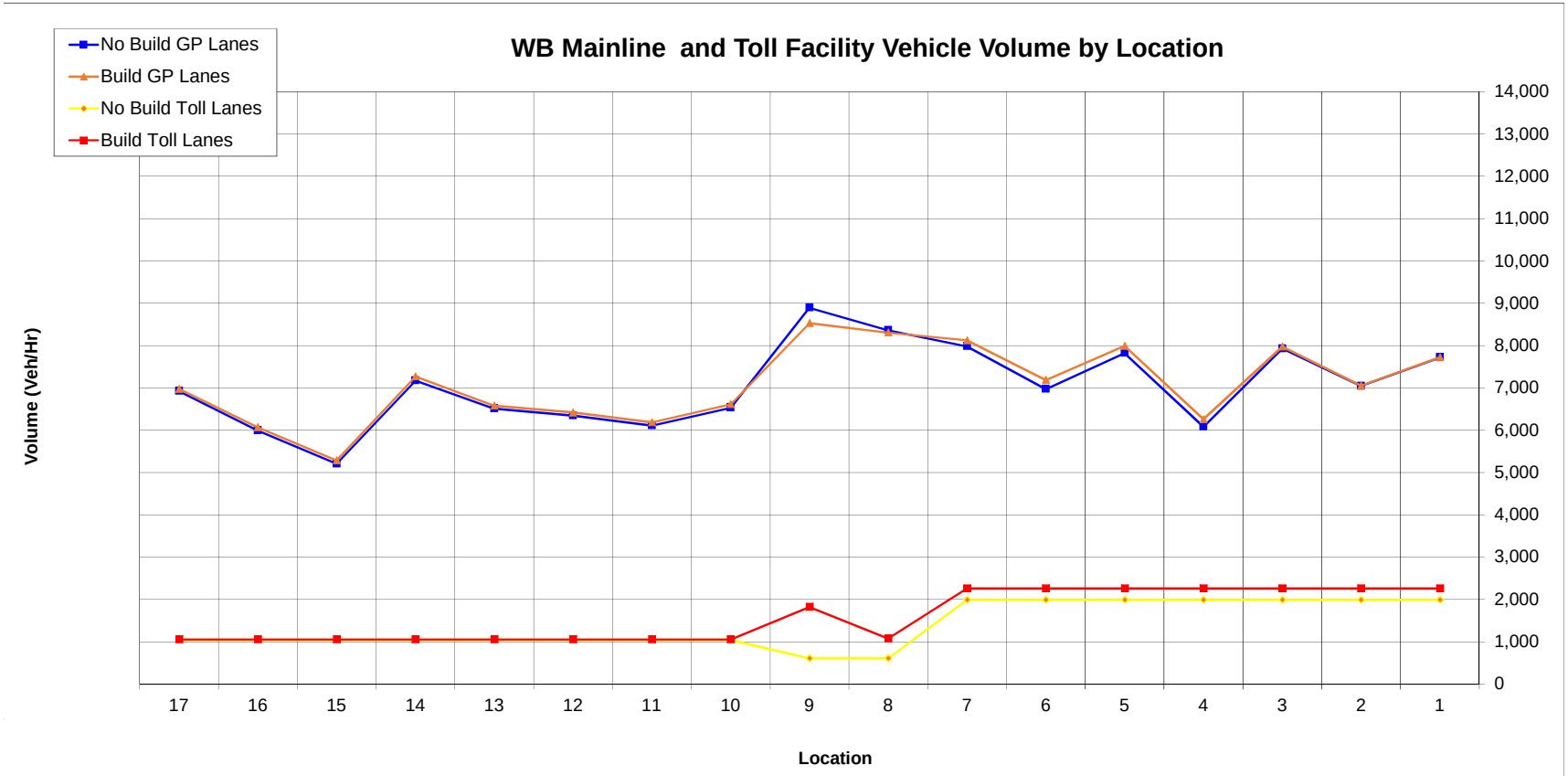
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 3-4 PM

EB Mainline Vehicle Density and LOS

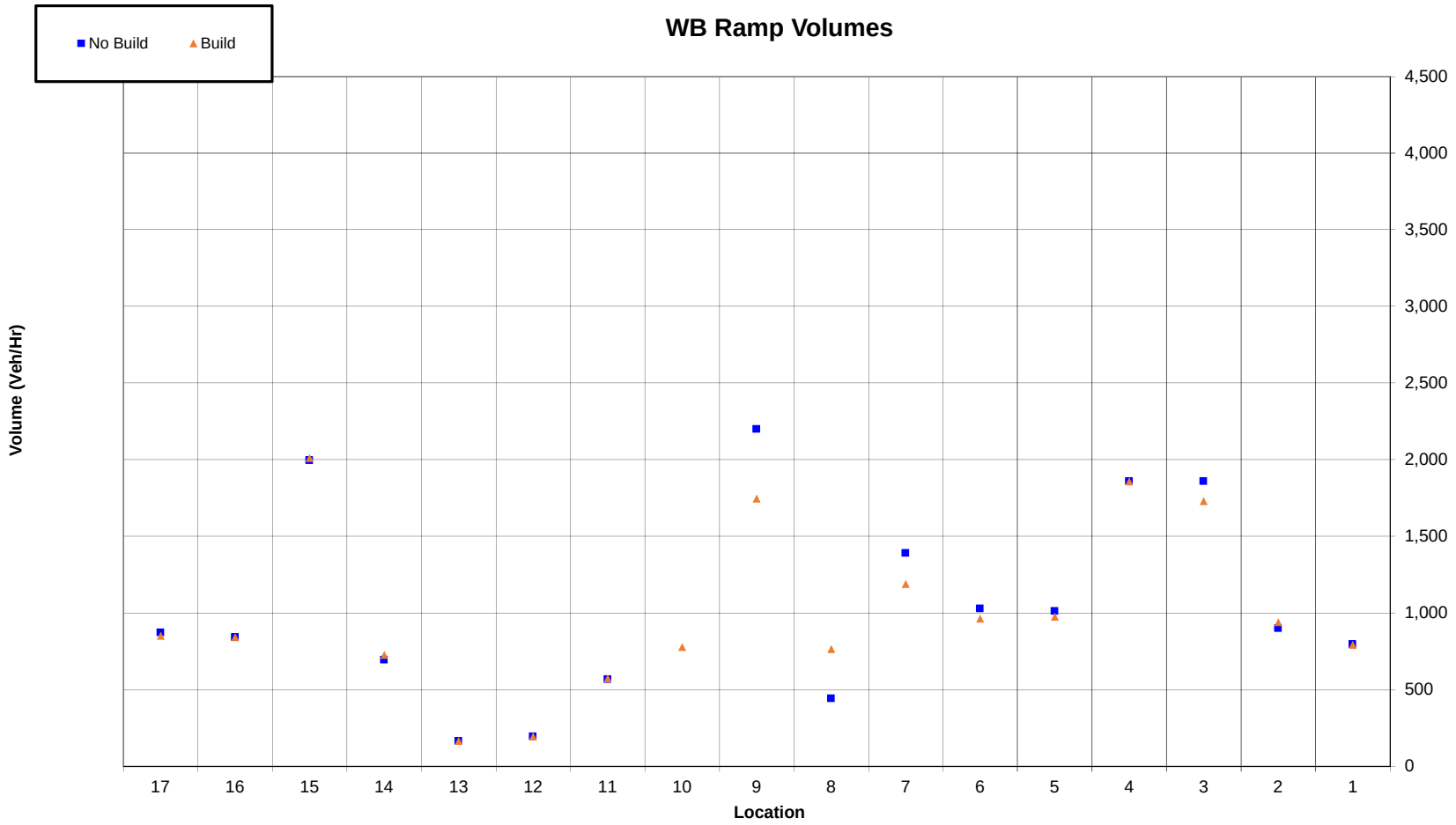


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

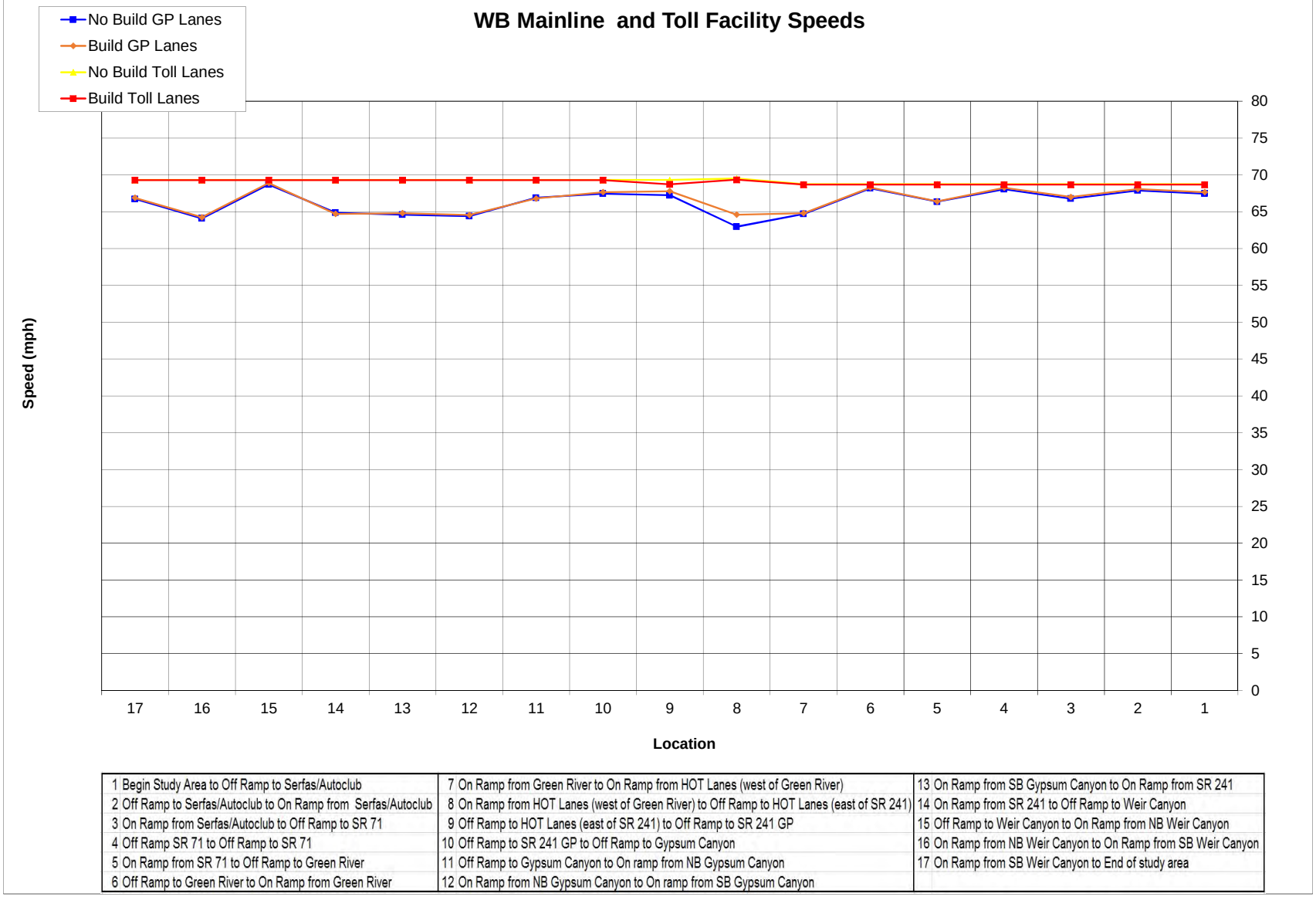


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

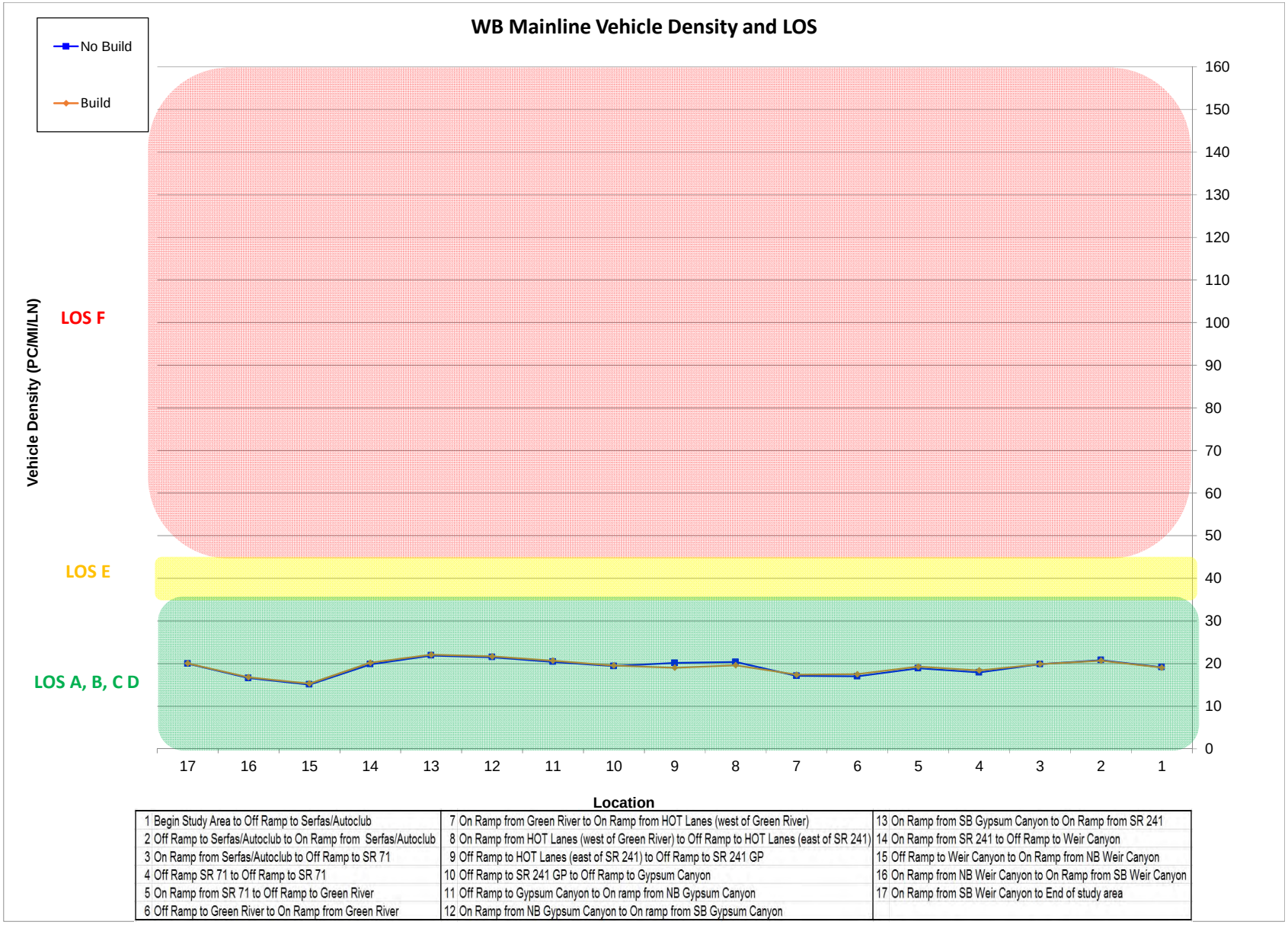
Charts 3-4 PM



1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOV Exit (west of Green River Rd)	13	On Ramp from SB Gypsum Canyon Rd
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOV Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon Rd
4	On Ramp from SR 71	10	Off Ramp to SR 241 SB HOV	16	On Ramp from NB Weir Canyon Rd
5	Off Ramp to Green River Rd	11	Off Ramp to Gypsum Canyon Rd	17	On Ramp from SB Weir Canyon Rd
6	On Ramp from Green River Rd	12	On Ramp from NB Gypsum Canyon Rd		

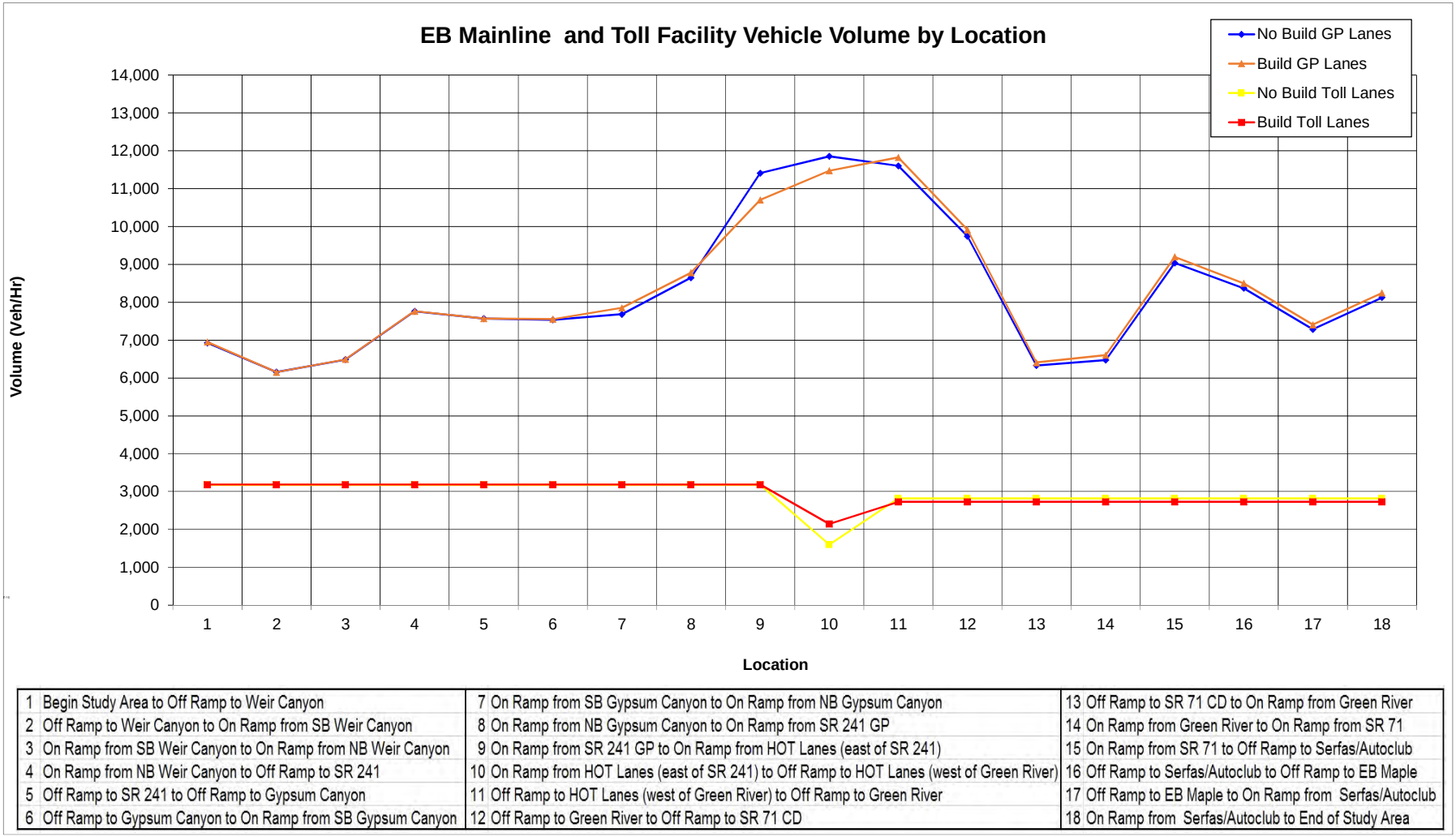


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



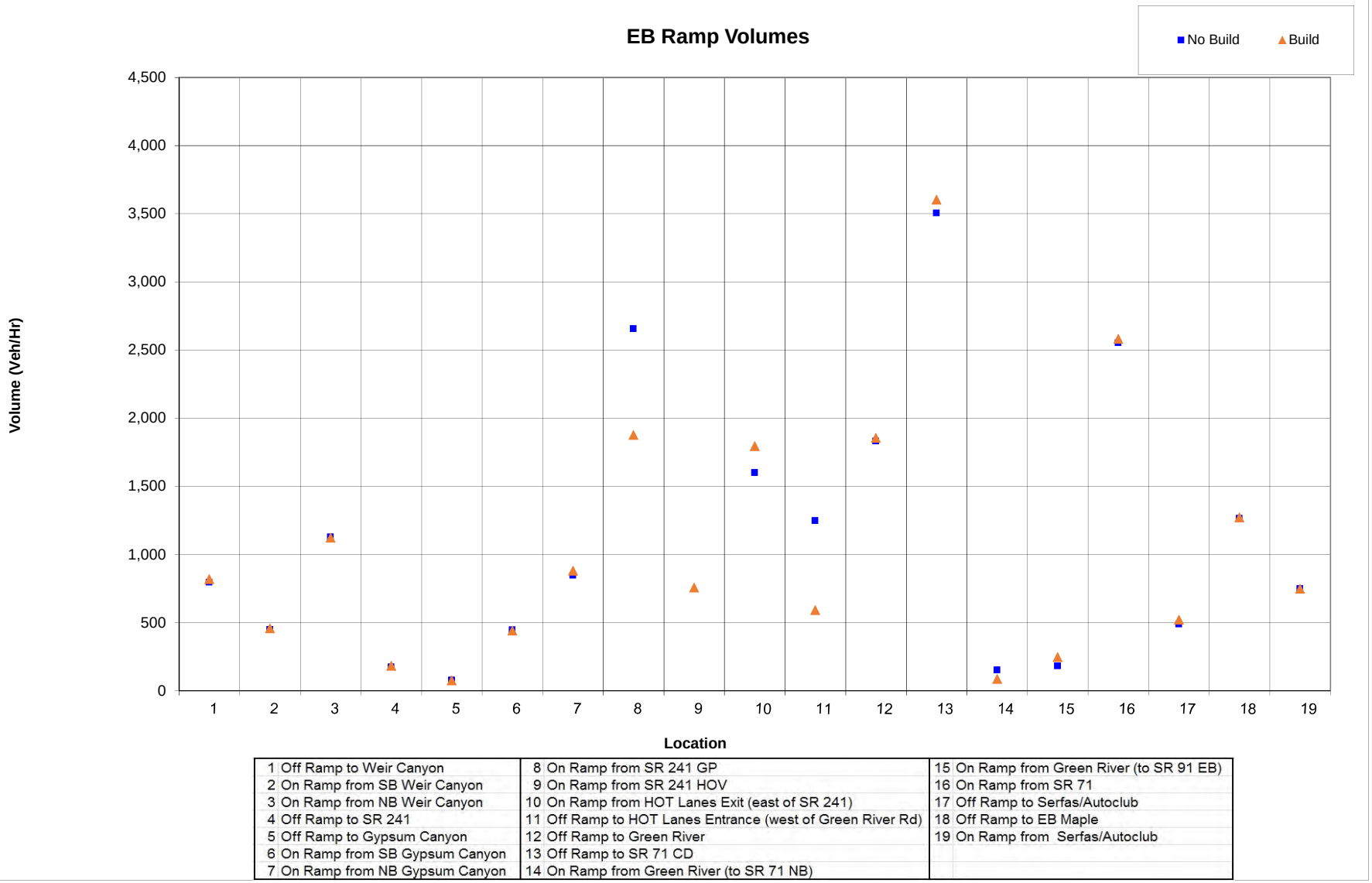
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 3-4 PM



1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area

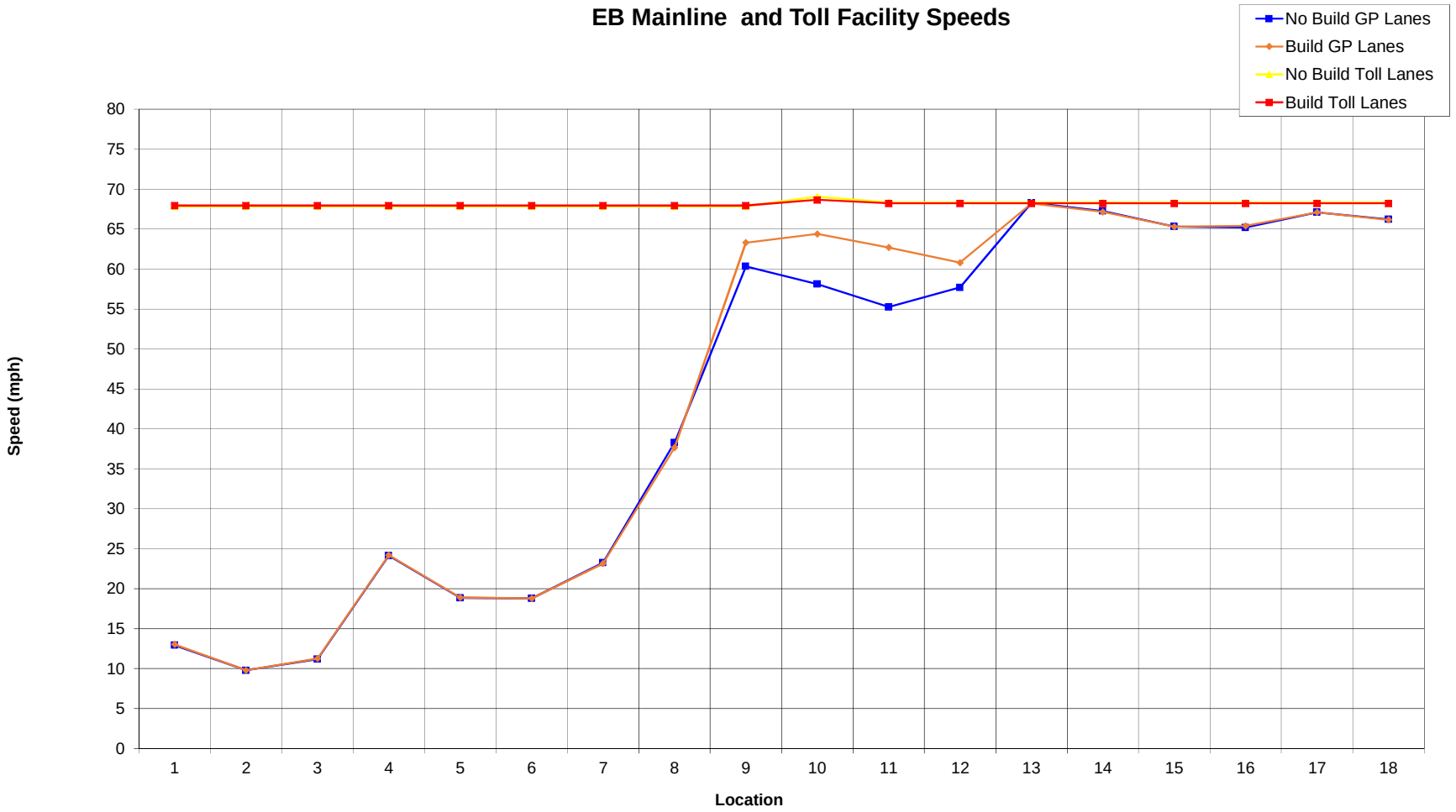
Charts 4-5 PM



1 Off Ramp to Weir Canyon	8 On Ramp from SR 241 GP	15 On Ramp from Green River (to SR 91 EB)
2 On Ramp from SB Weir Canyon	9 On Ramp from SR 241 HOV	16 On Ramp from SR 71
3 On Ramp from NB Weir Canyon	10 On Ramp from HOT Lanes Exit (east of SR 241)	17 Off Ramp to Serfas/Autoclub
4 Off Ramp to SR 241	11 Off Ramp to HOT Lanes Entrance (west of Green River Rd)	18 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	12 Off Ramp to Green River	19 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	13 Off Ramp to SR 71 CD	
7 On Ramp from NB Gypsum Canyon	14 On Ramp from Green River (to SR 71 NB)	

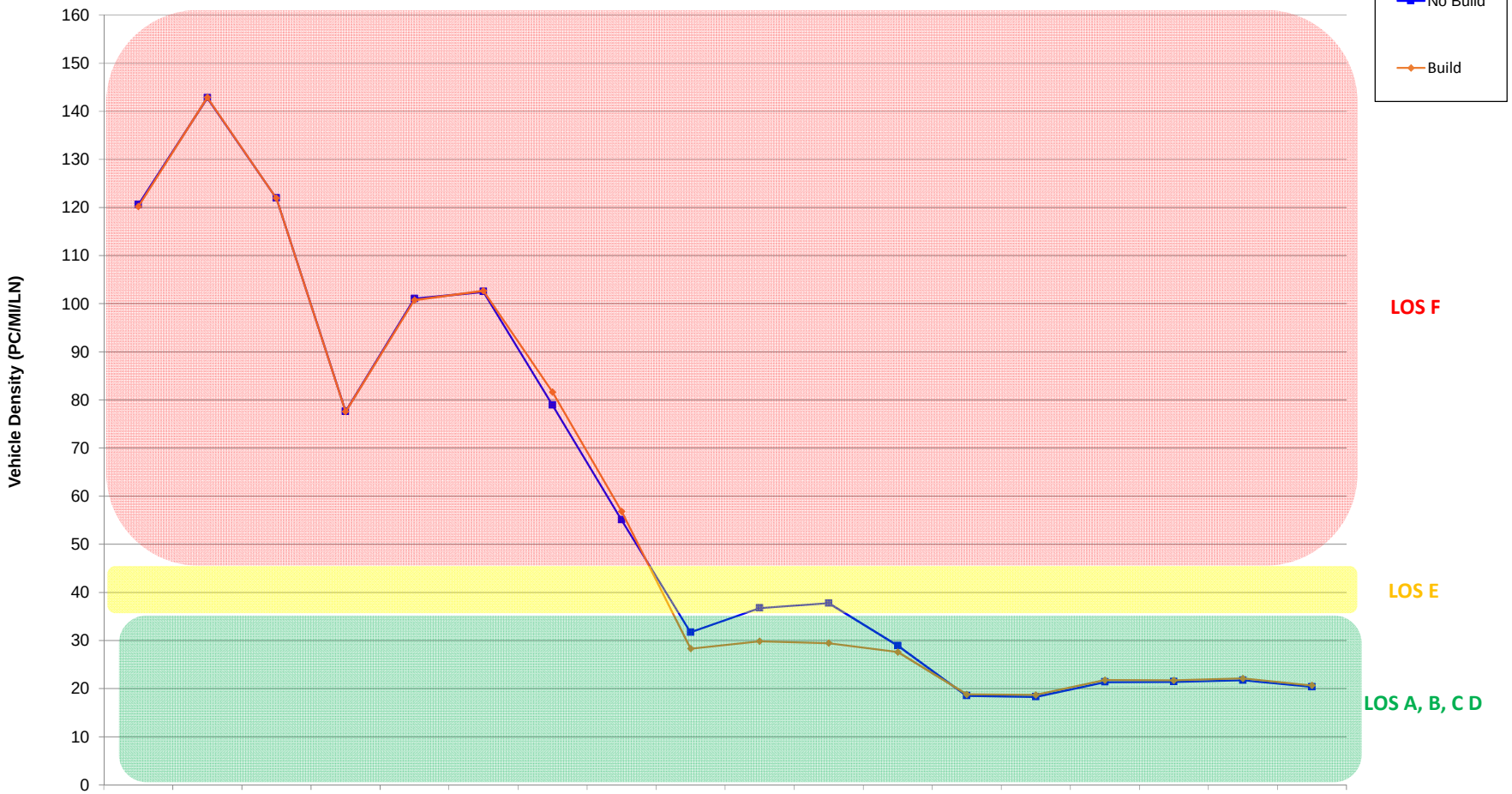
Charts 4-5 PM

EB Mainline and Toll Facility Speeds



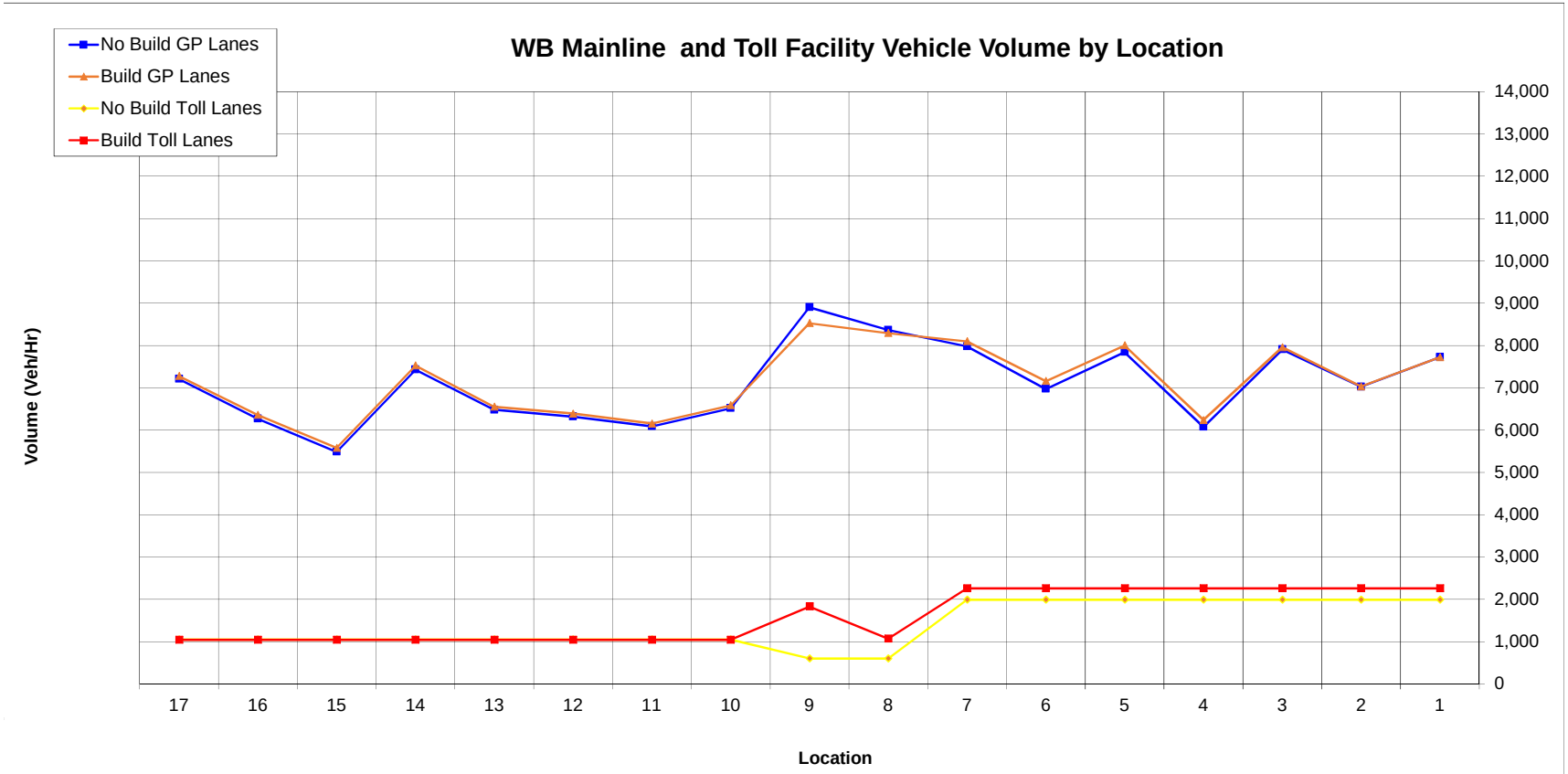
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



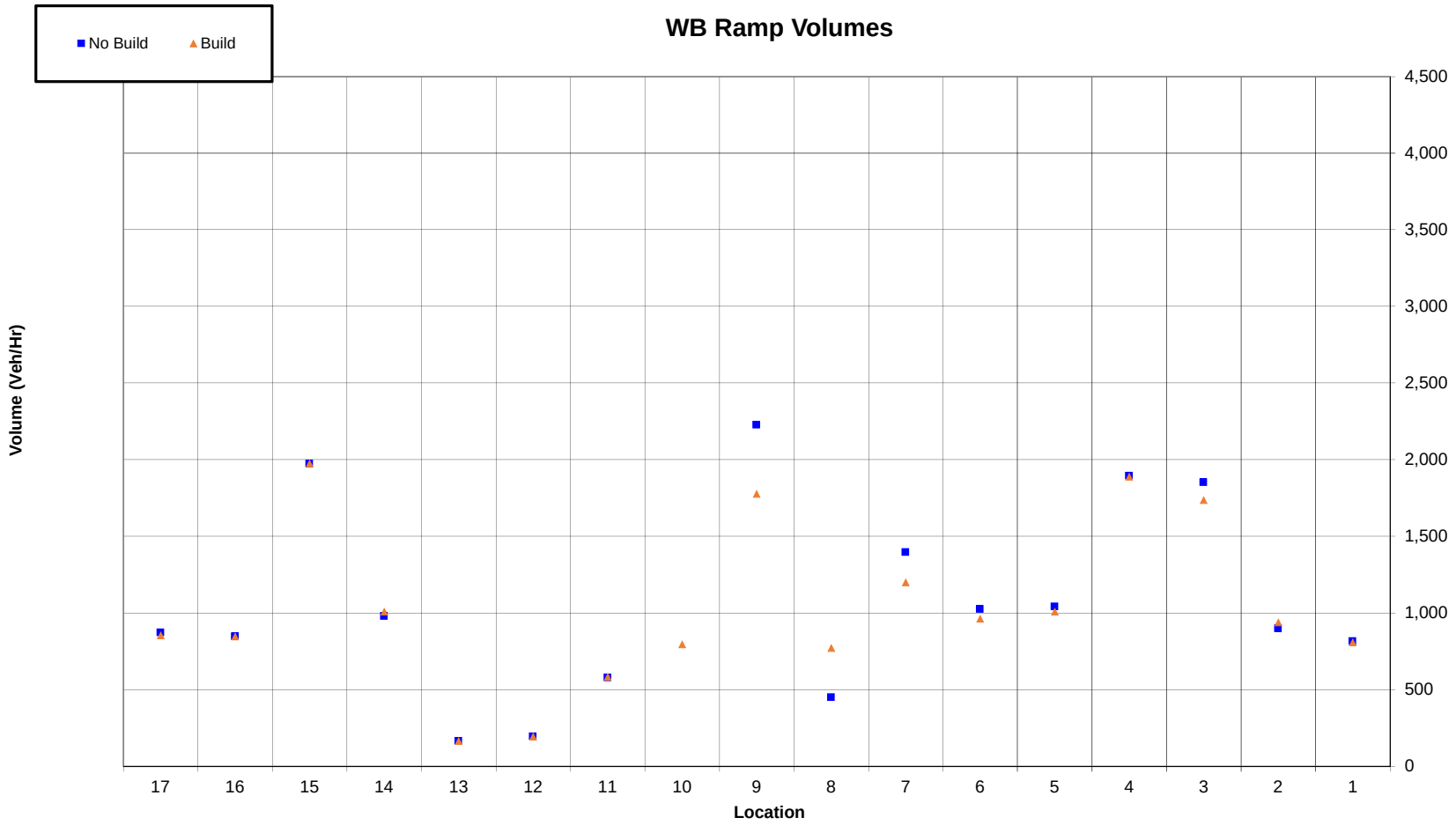
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

Charts 4-5 PM

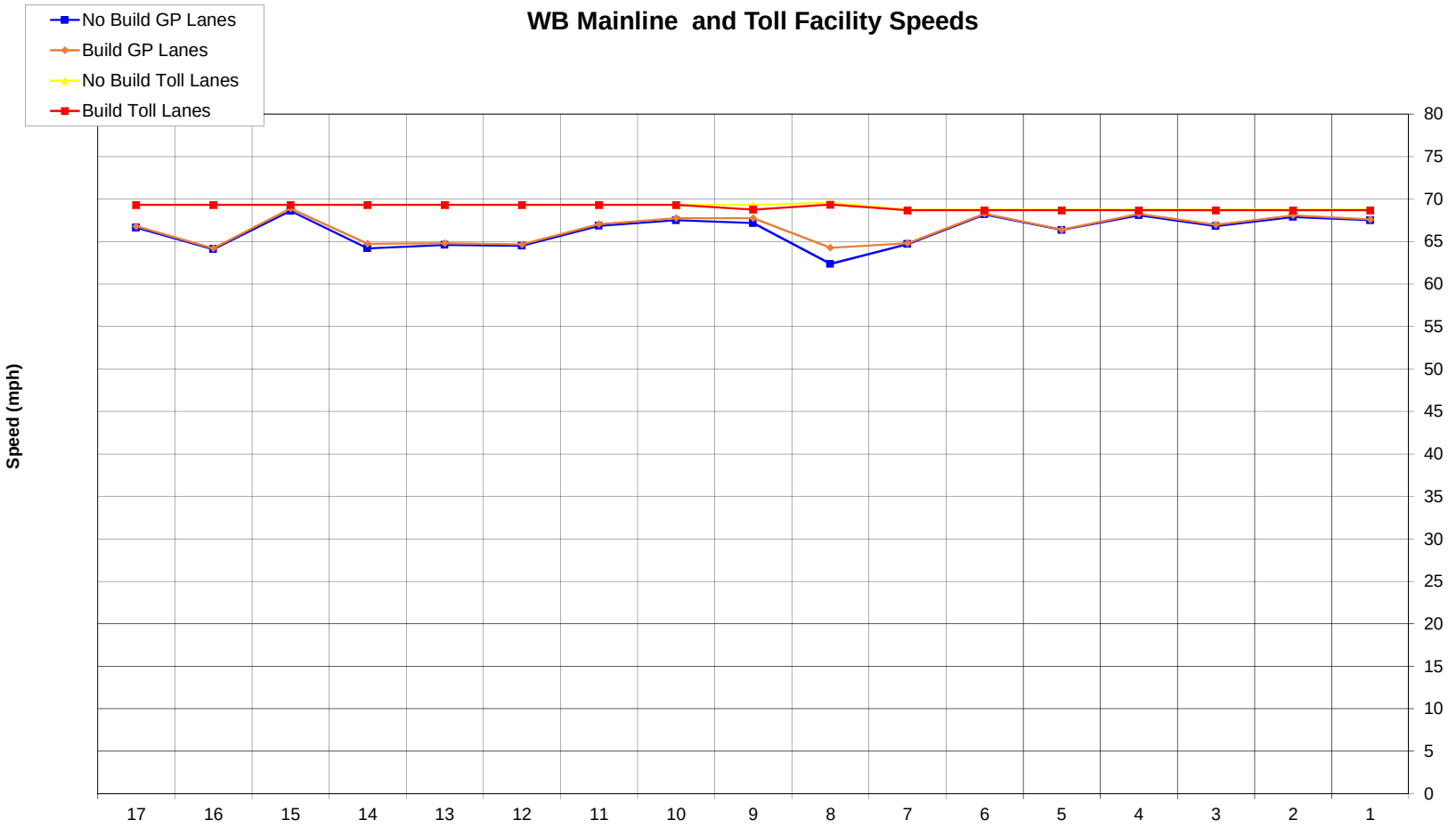


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

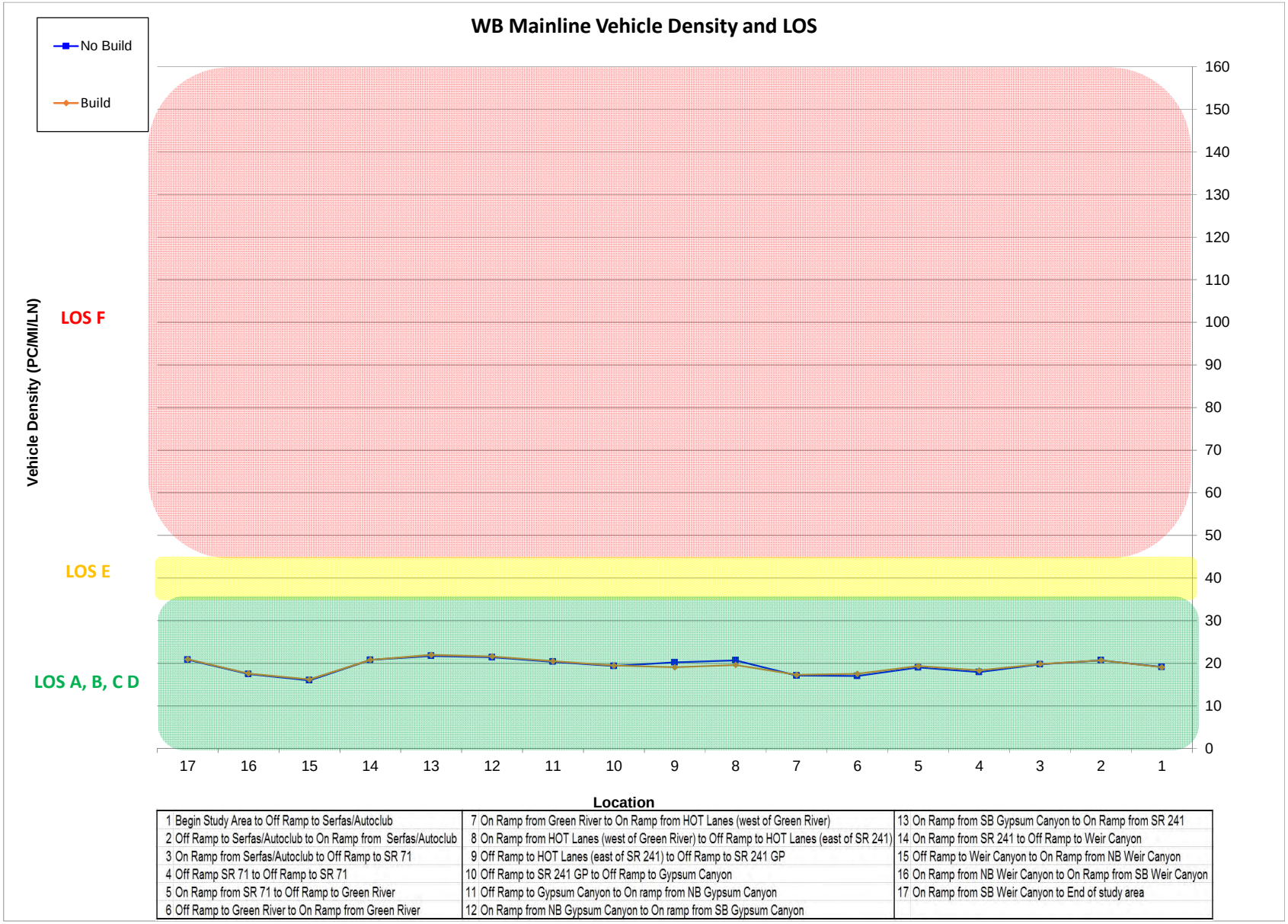
Charts 4-5 PM



1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOV Exit (west of Green River Rd)	13	On Ramp from SB Gypsum Canyon Rd
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOV Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon Rd
4	On Ramp from SR 71	10	Off Ramp to SR 241 SB HOV	16	On Ramp from NB Weir Canyon Rd
5	Off Ramp to Green River Rd	11	Off Ramp to Gypsum Canyon Rd	17	On Ramp from SB Weir Canyon Rd
6	On Ramp from Green River Rd	12	On Ramp from NB Gypsum Canyon Rd		

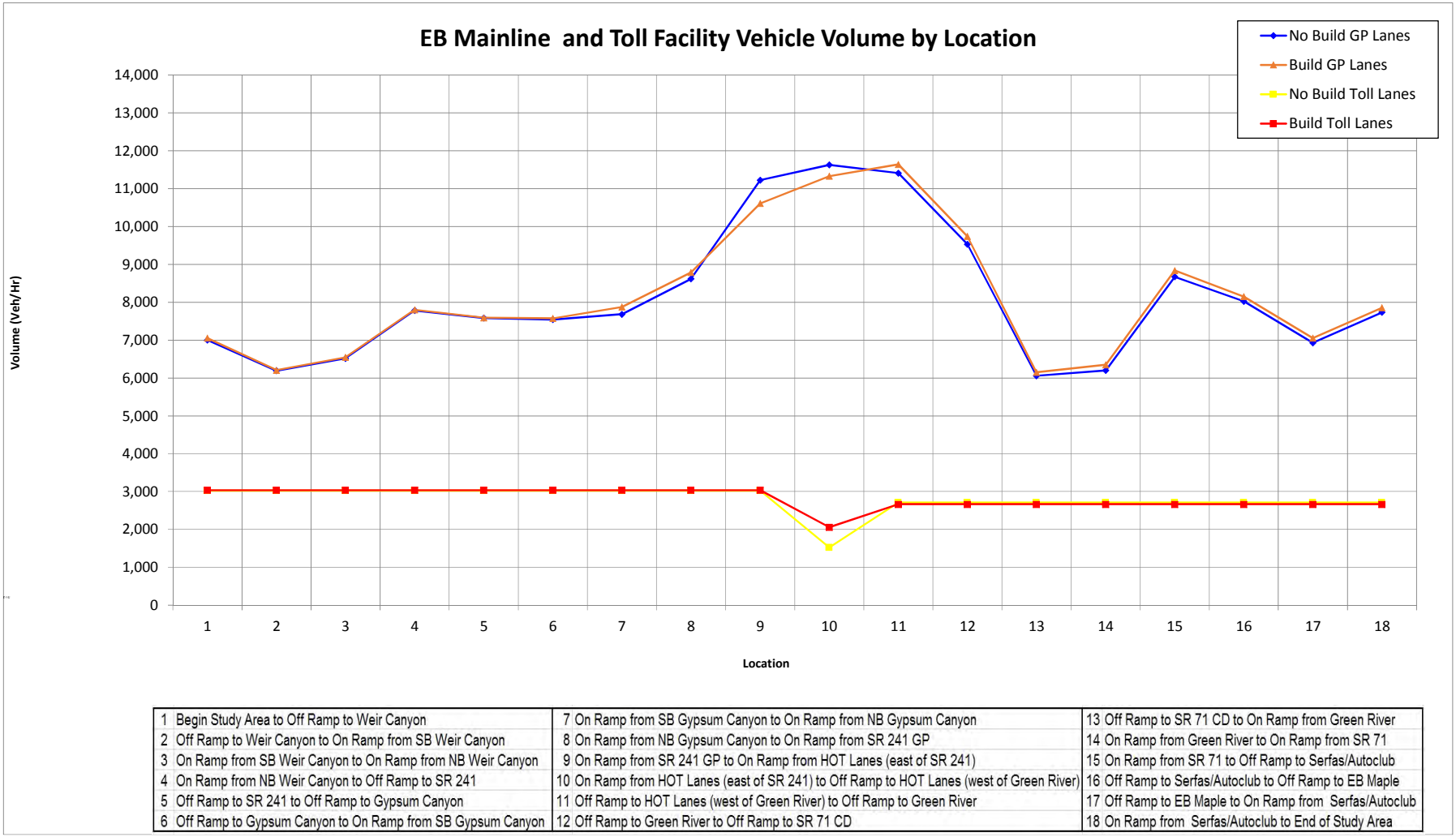


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



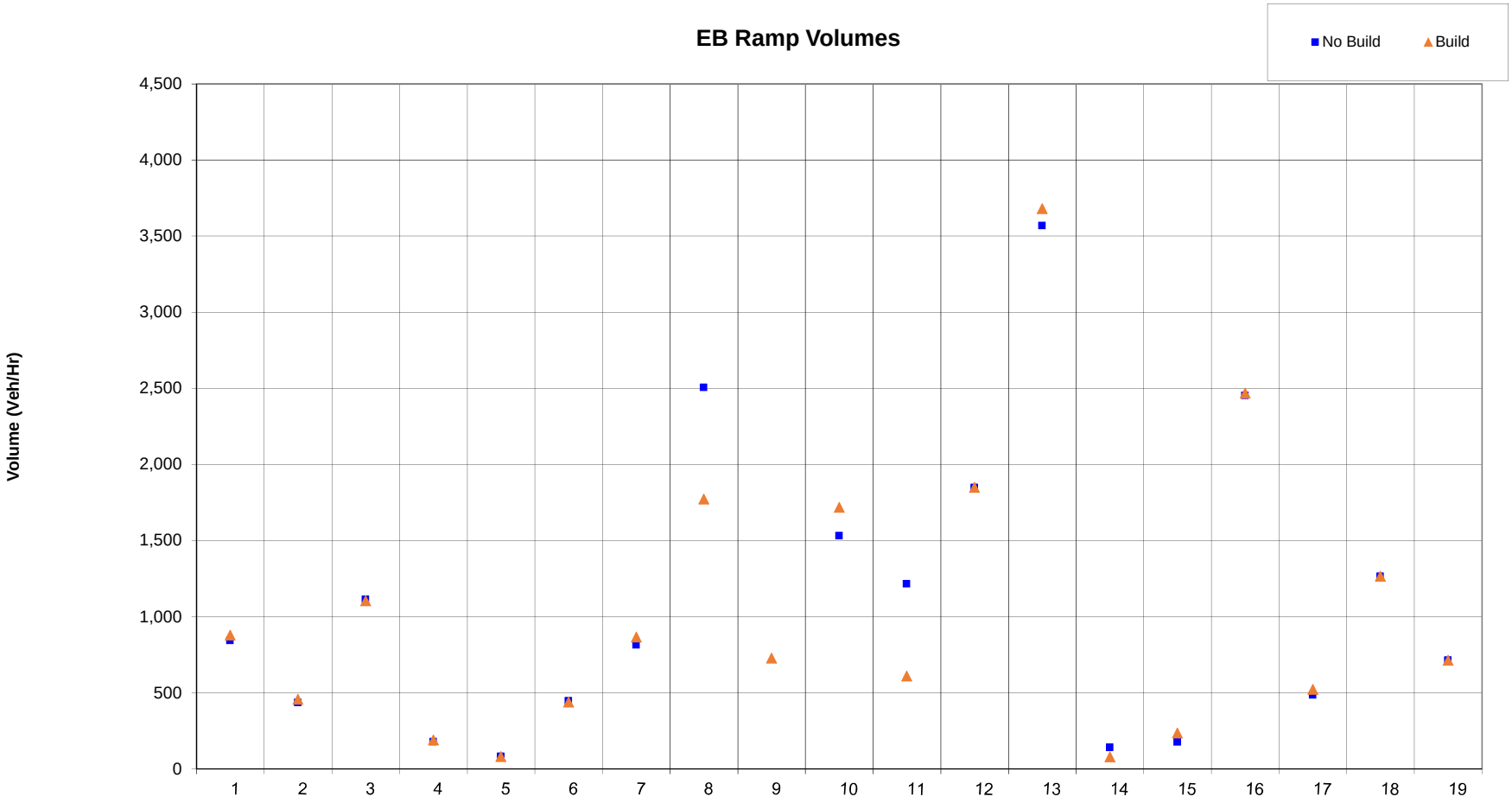
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 4-5 PM



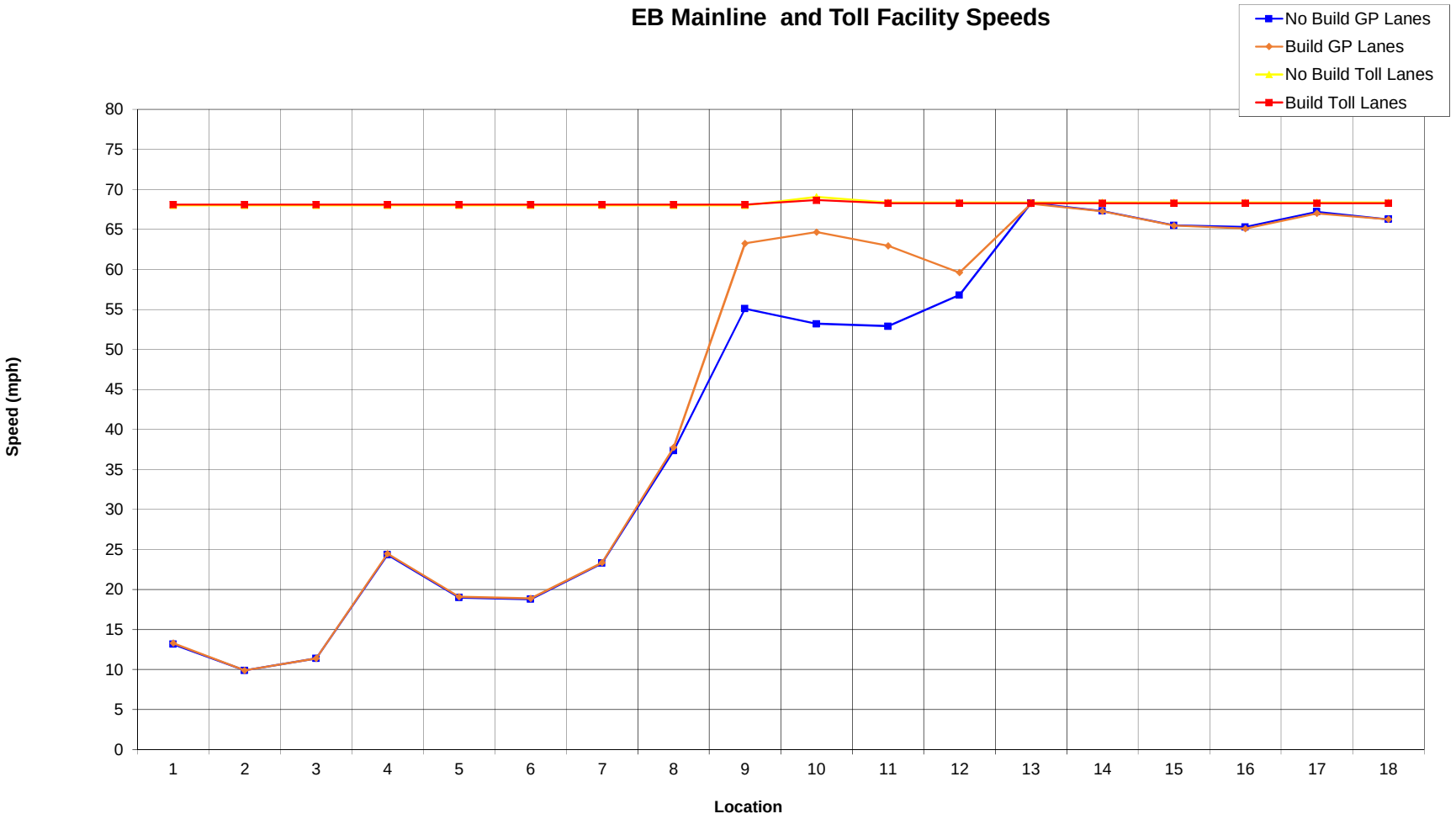
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 5-6 PM



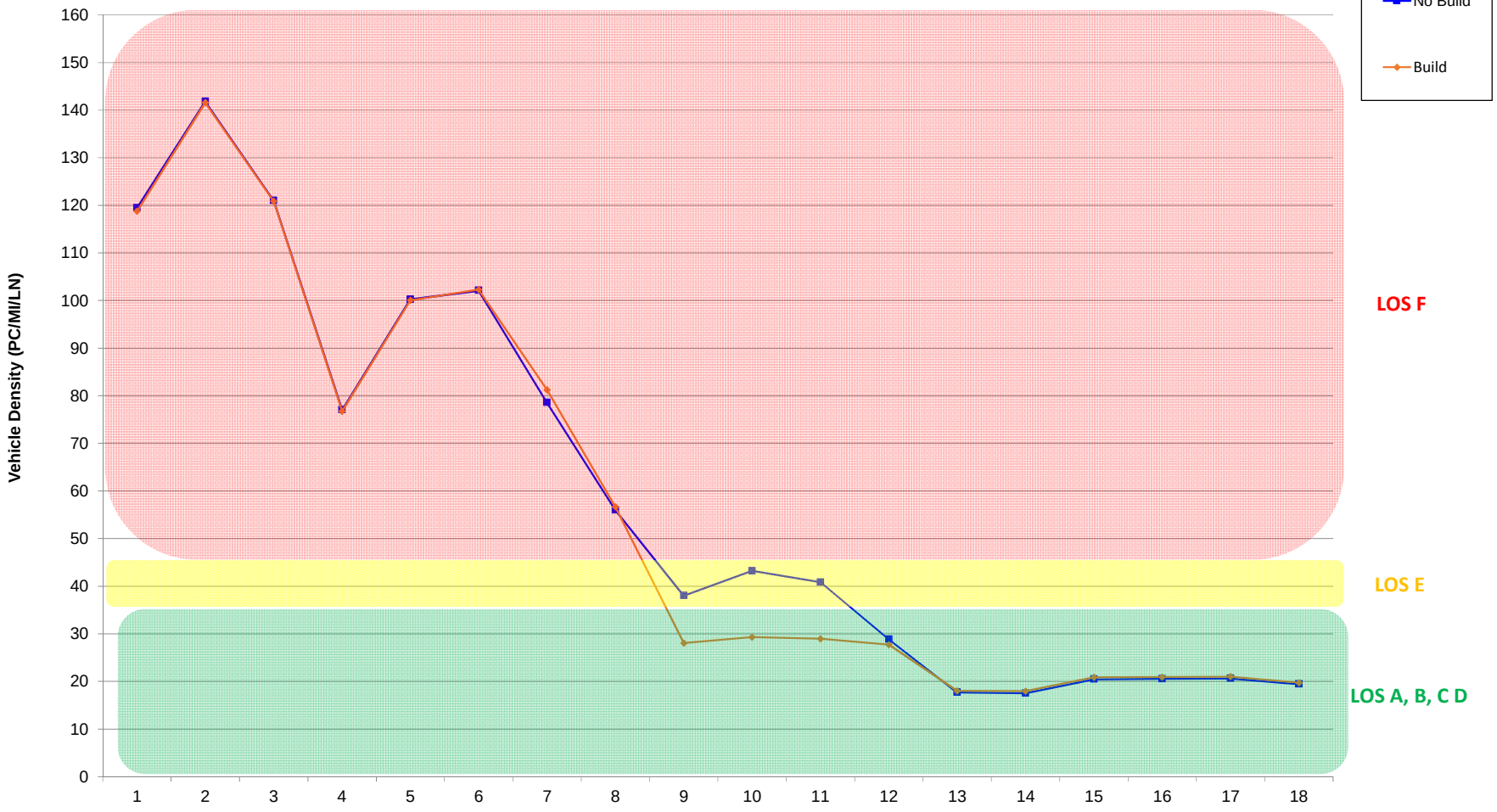
1	Off Ramp to Weir Canyon	8	On Ramp from SR 241 GP	15	On Ramp from Green River (to SR 91 EB)
2	On Ramp from SB Weir Canyon	9	On Ramp from SR 241 HOV	16	On Ramp from SR 71
3	On Ramp from NB Weir Canyon	10	On Ramp from HOT Lanes Exit (east of SR 241)	17	Off Ramp to Serfas/Autoclub
4	Off Ramp to SR 241	11	Off Ramp to HOT Lanes Entrance (west of Green River Rd)	18	Off Ramp to EB Maple
5	Off Ramp to Gypsum Canyon	12	Off Ramp to Green River	19	On Ramp from Serfas/Autoclub
6	On Ramp from SB Gypsum Canyon	13	Off Ramp to SR 71 CD		
7	On Ramp from NB Gypsum Canyon	14	On Ramp from Green River (to SR 71 NB)		

EB Mainline and Toll Facility Speeds



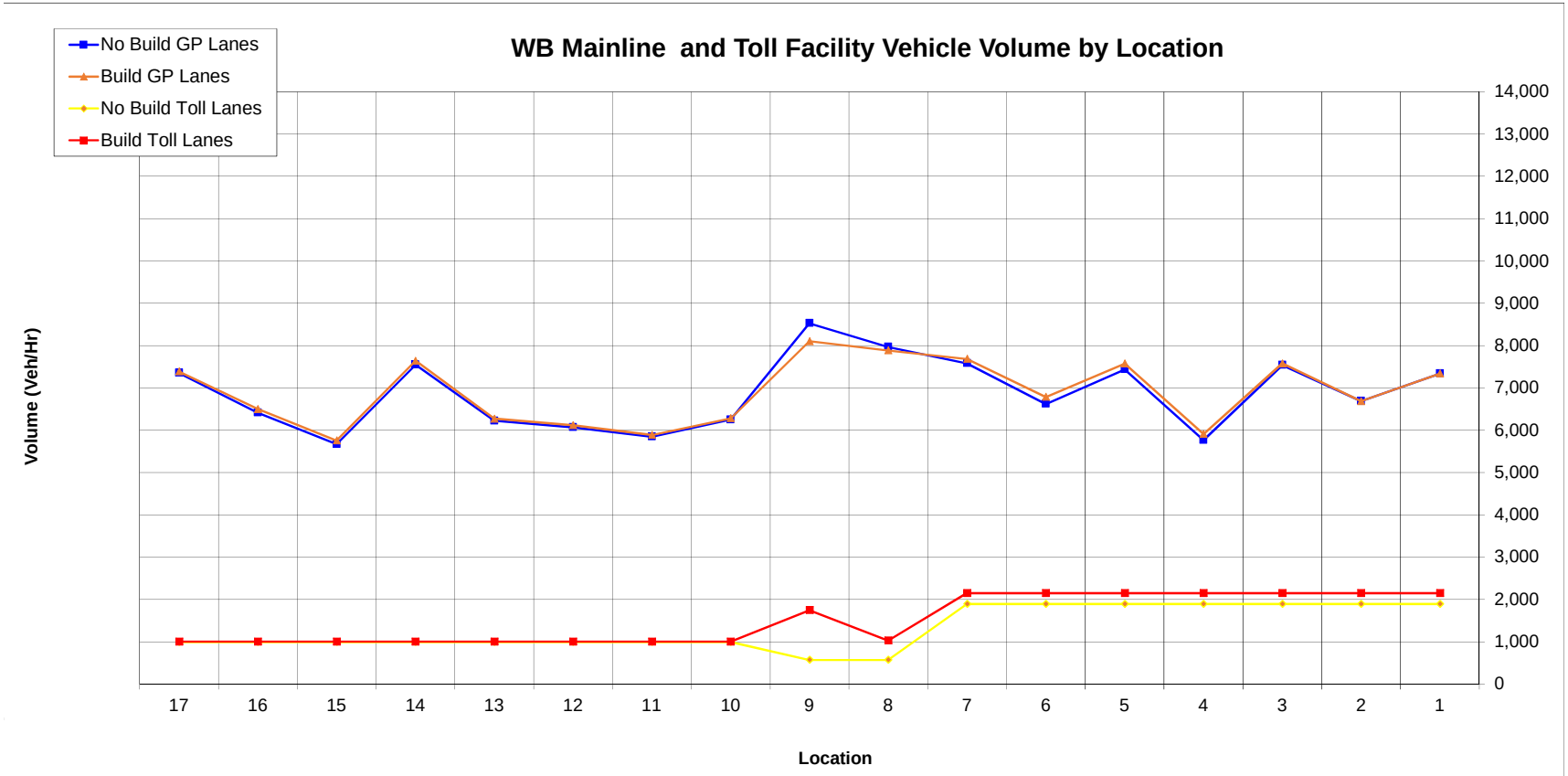
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



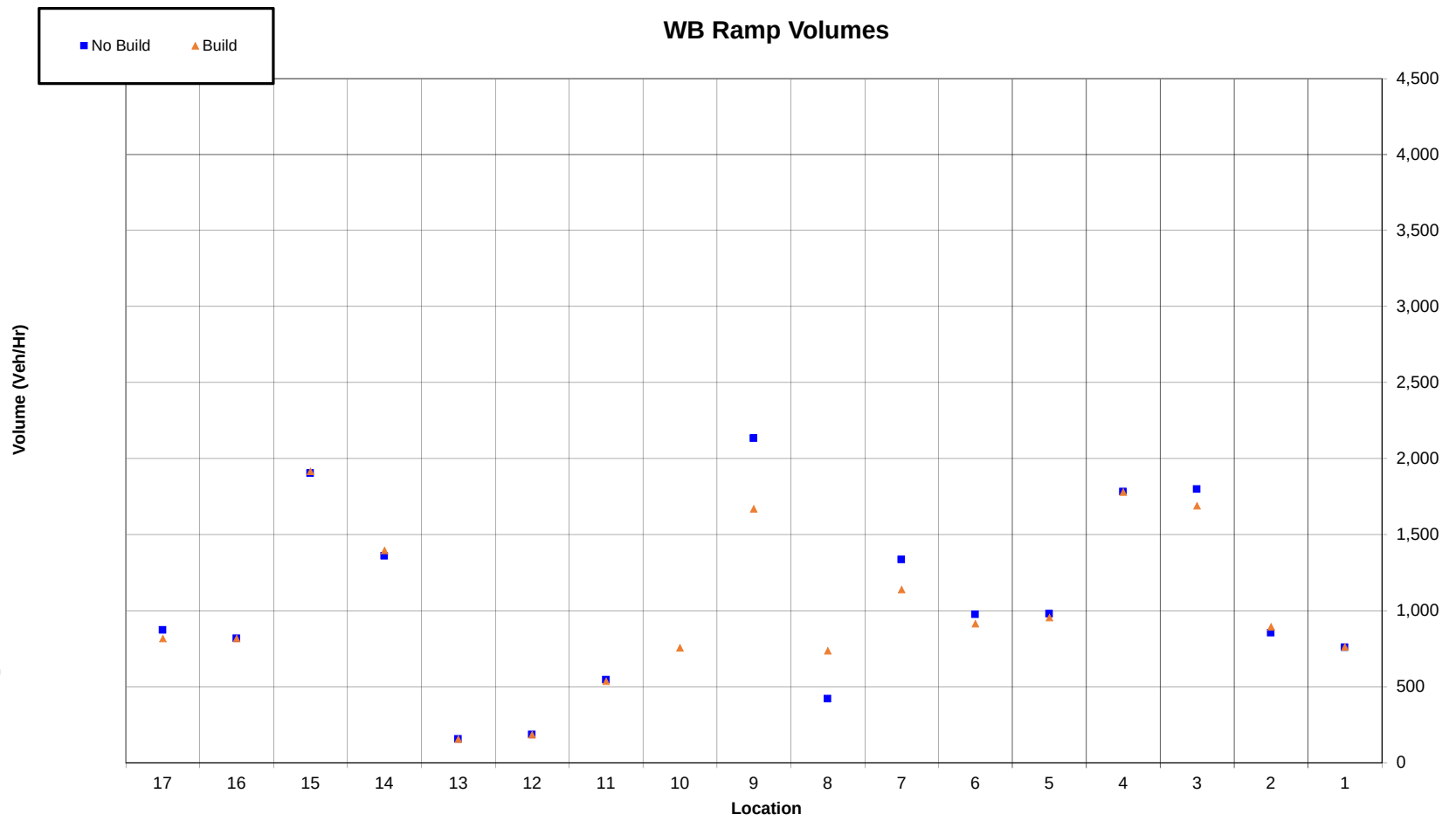
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

Charts 5-6 PM



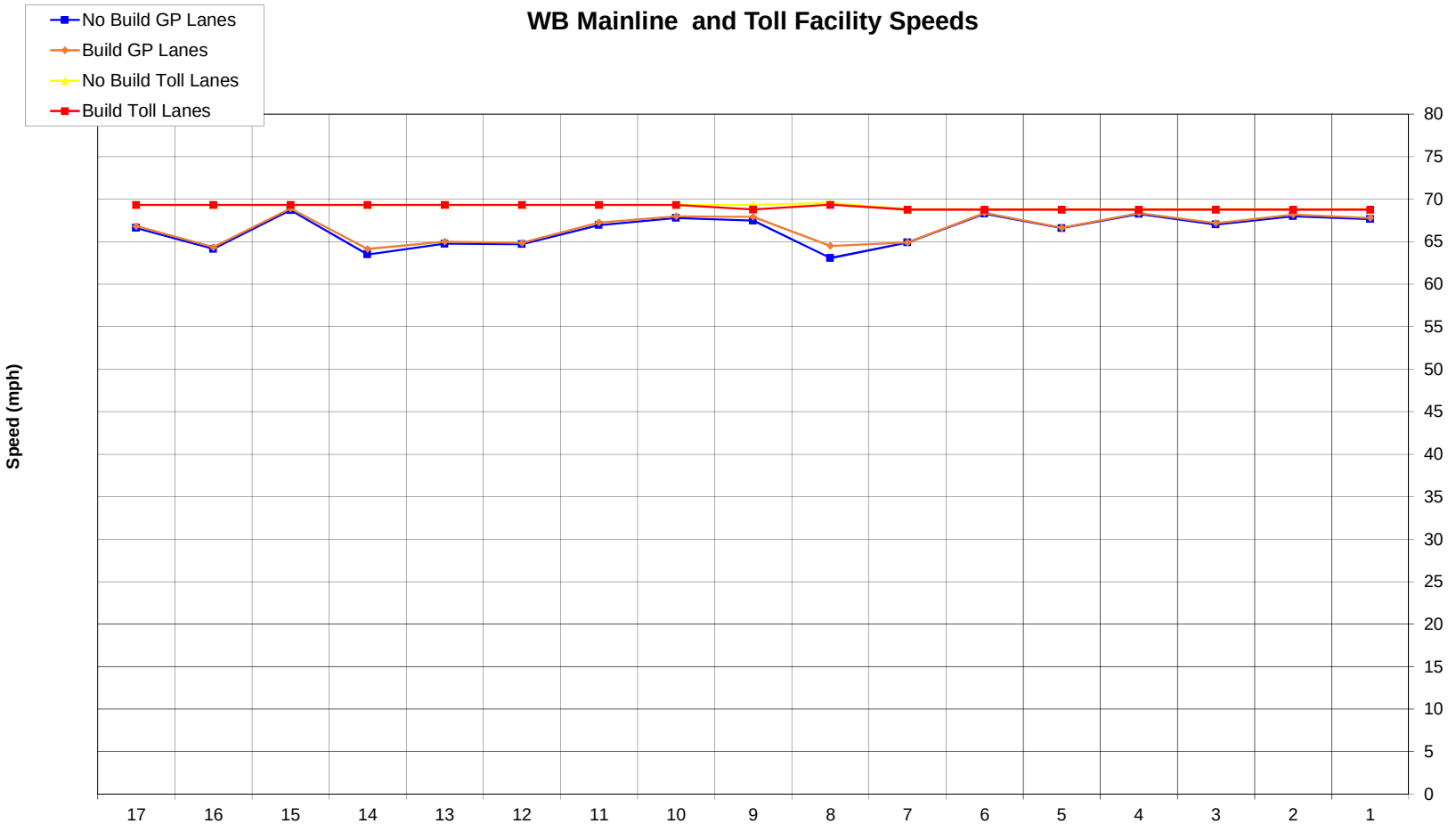
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 5-6 PM

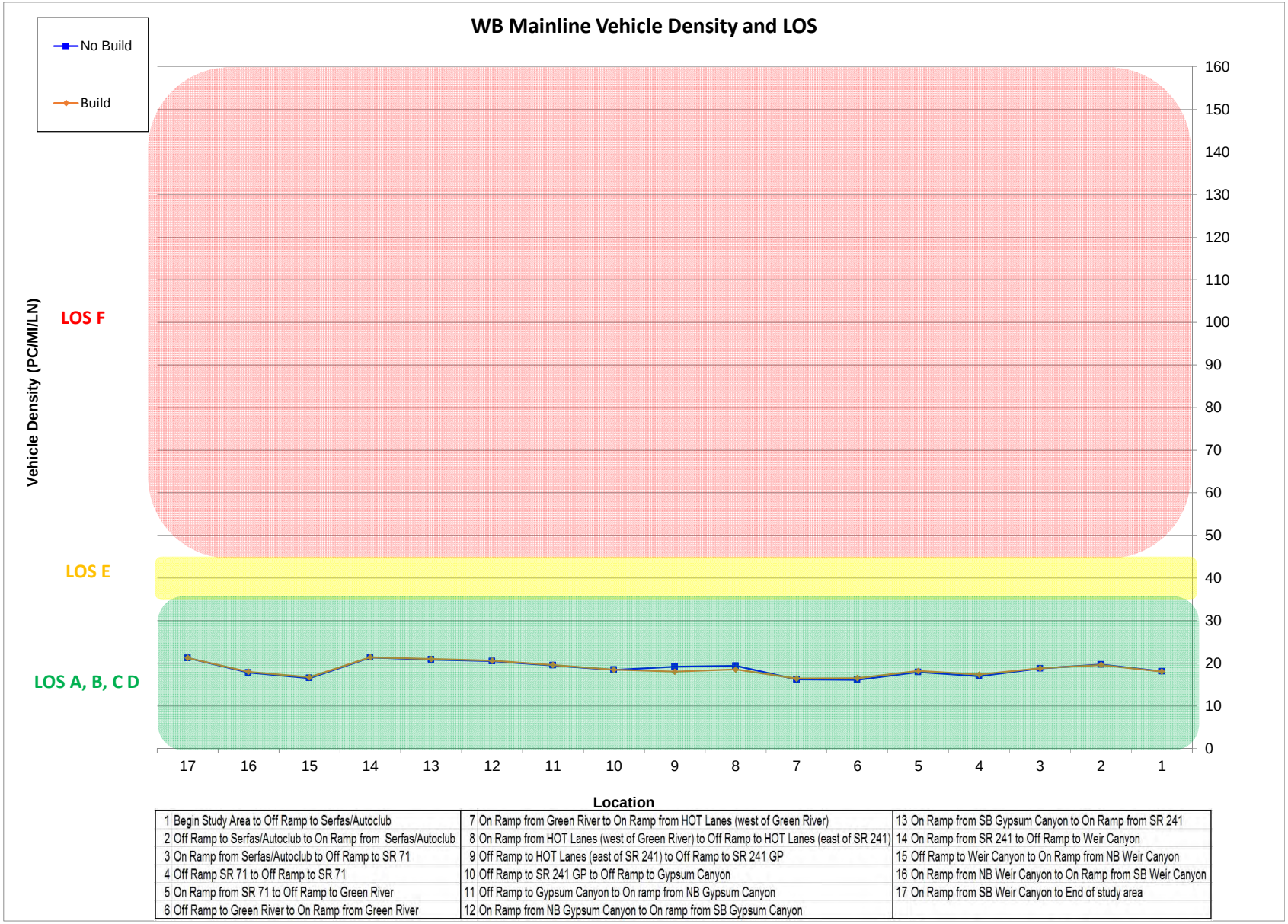


1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOV Exit (west of Green River Rd)	13	On Ramp from SB Gypsum Canyon Rd
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOV Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon Rd
4	On Ramp from SR 71	10	Off Ramp to SR 241 SB HOV	16	On Ramp from NB Weir Canyon Rd
5	Off Ramp to Green River Rd	11	Off Ramp to Gypsum Canyon Rd	17	On Ramp from SB Weir Canyon Rd
6	On Ramp from Green River Rd	12	On Ramp from NB Gypsum Canyon Rd		

Charts 5-6 PM

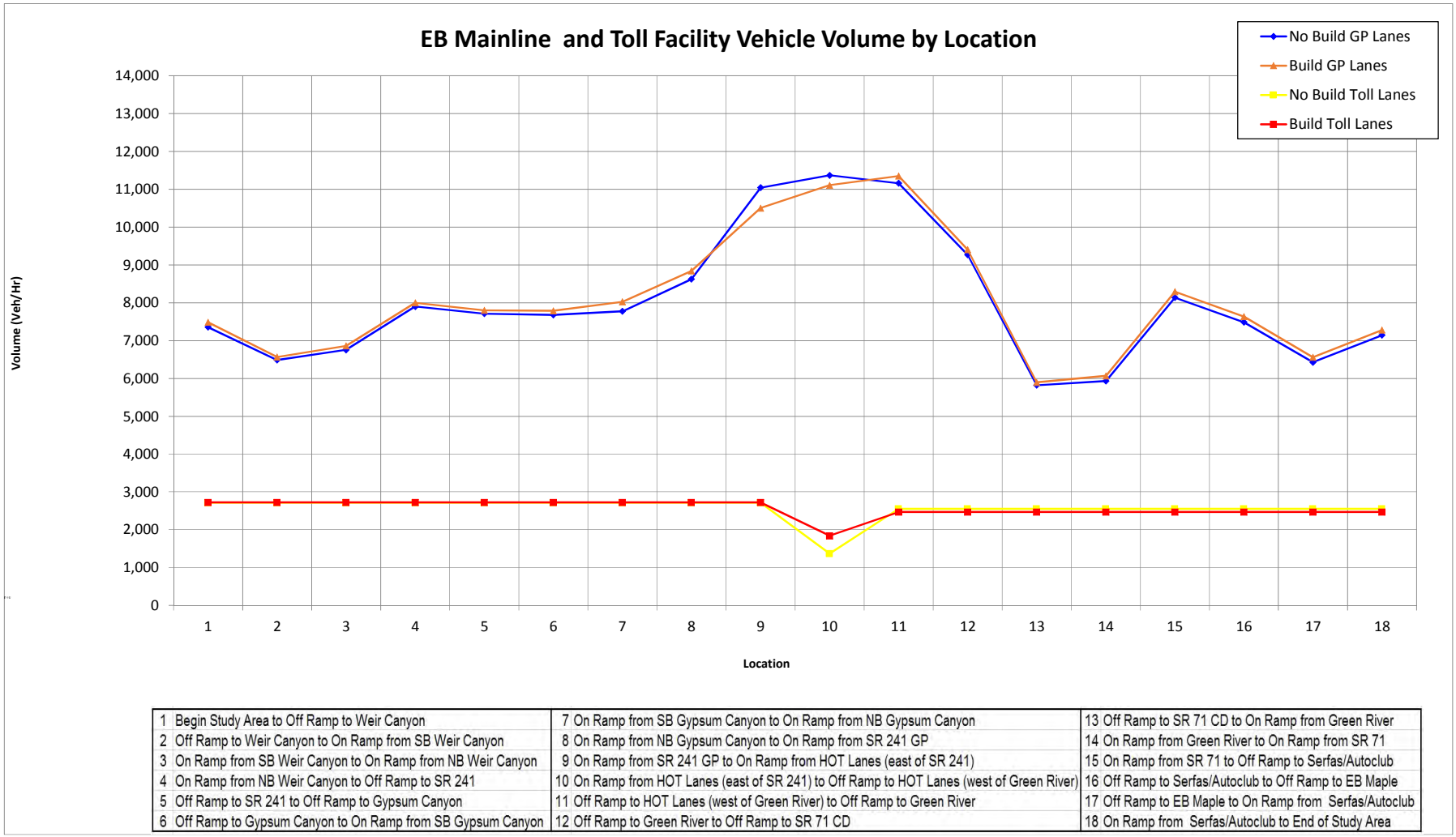


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



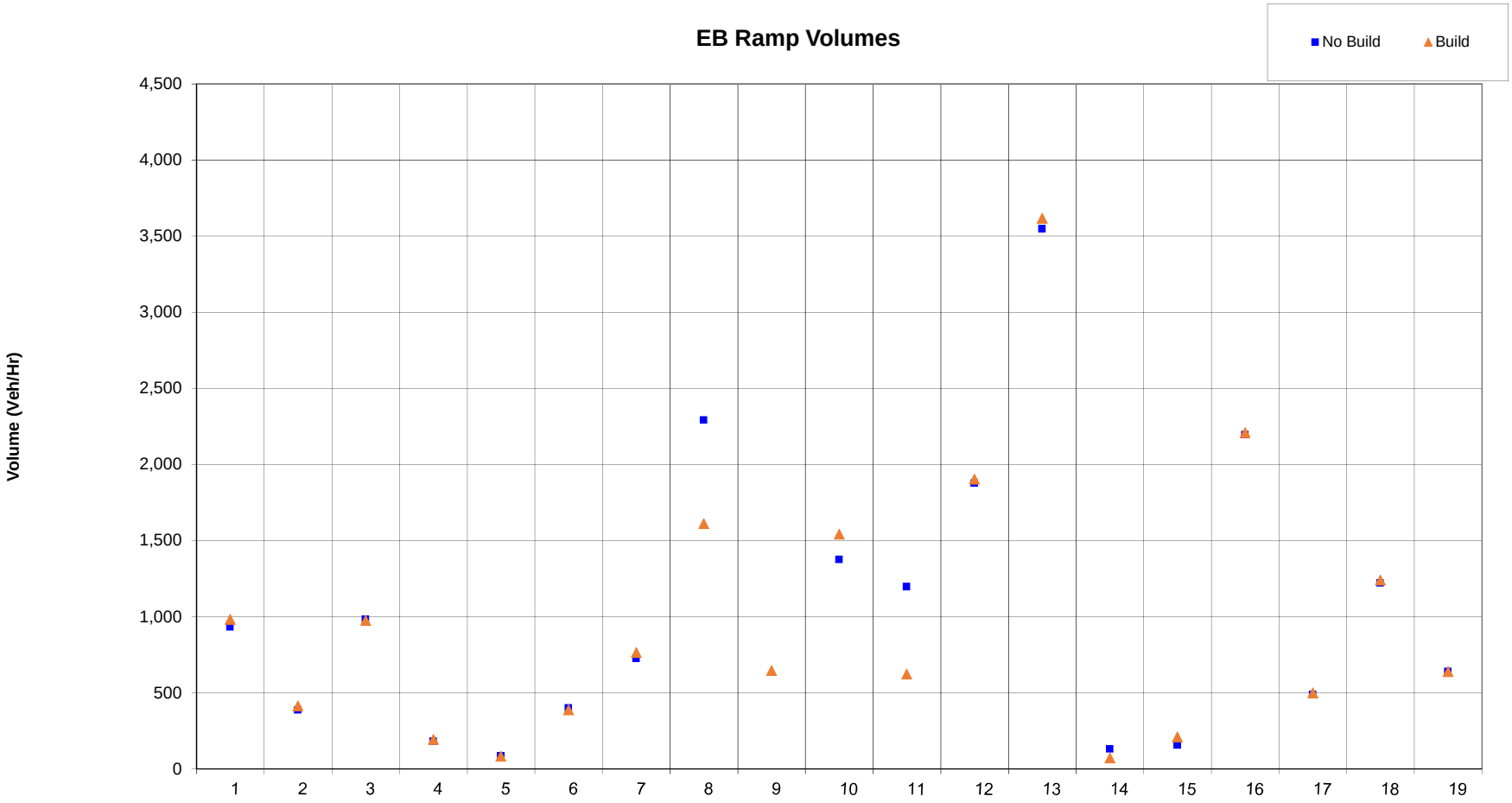
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 5-6 PM



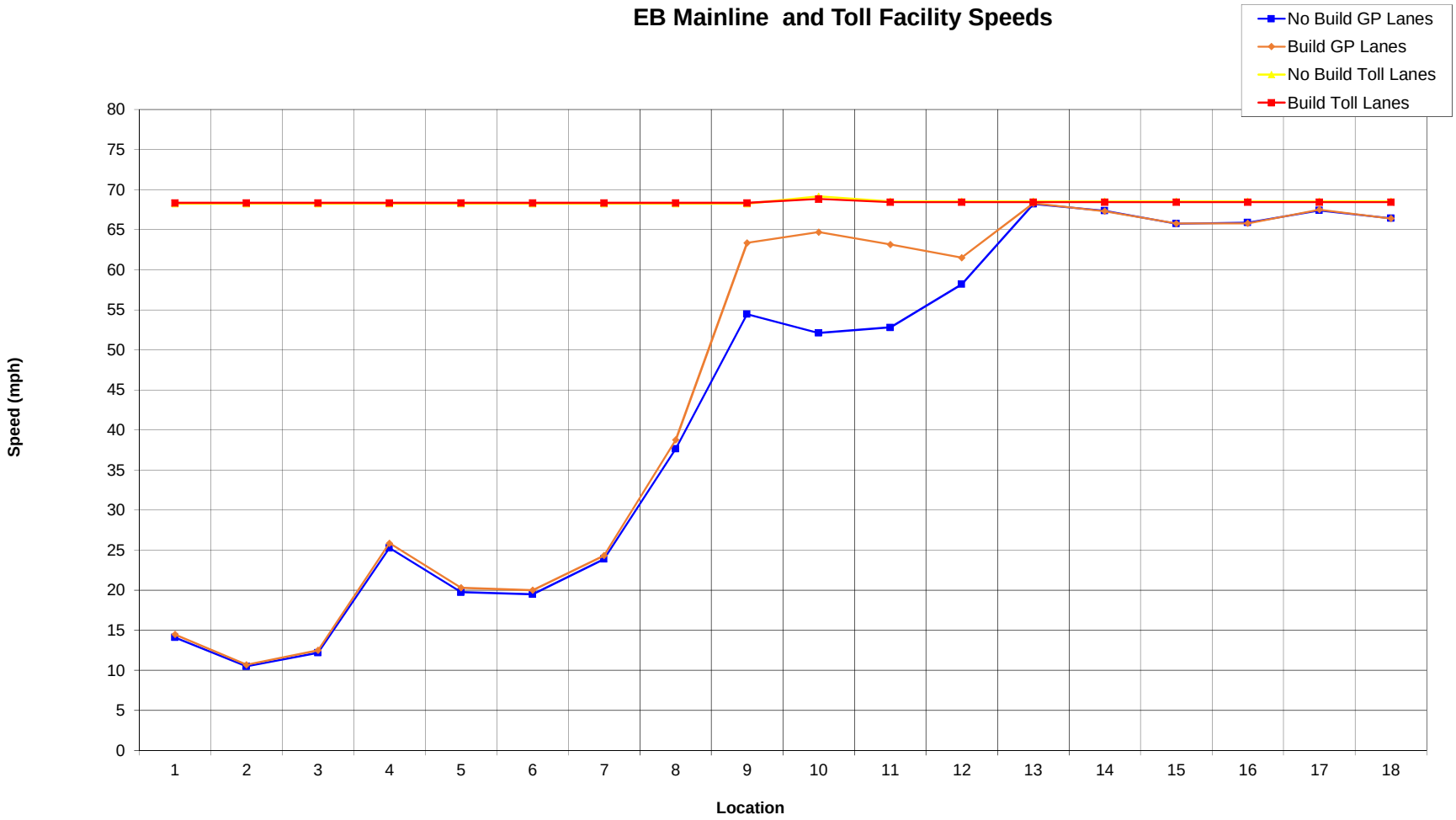
1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area

Charts 6-7 PM

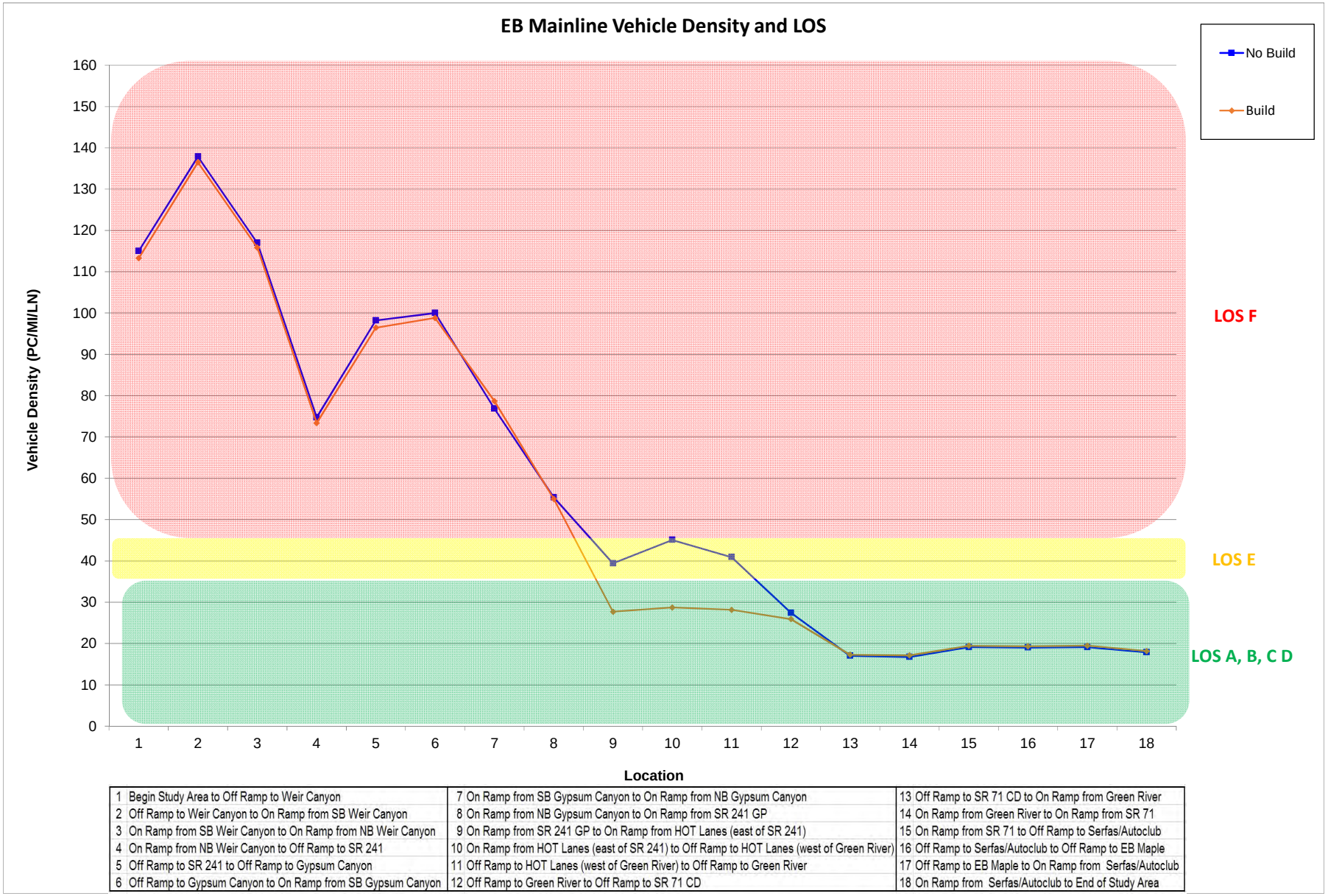


1 Off Ramp to Weir Canyon	8 On Ramp from SR 241 GP	15 On Ramp from Green River (to SR 91 EB)
2 On Ramp from SB Weir Canyon	9 On Ramp from SR 241 HOV	16 On Ramp from SR 71
3 On Ramp from NB Weir Canyon	10 On Ramp from HOT Lanes Exit (east of SR 241)	17 Off Ramp to Serfas/Autoclub
4 Off Ramp to SR 241	11 Off Ramp to HOT Lanes Entrance (west of Green River Rd)	18 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	12 Off Ramp to Green River	19 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	13 Off Ramp to SR 71 CD	
7 On Ramp from NB Gypsum Canyon	14 On Ramp from Green River (to SR 71 NB)	

Charts 6-7 PM

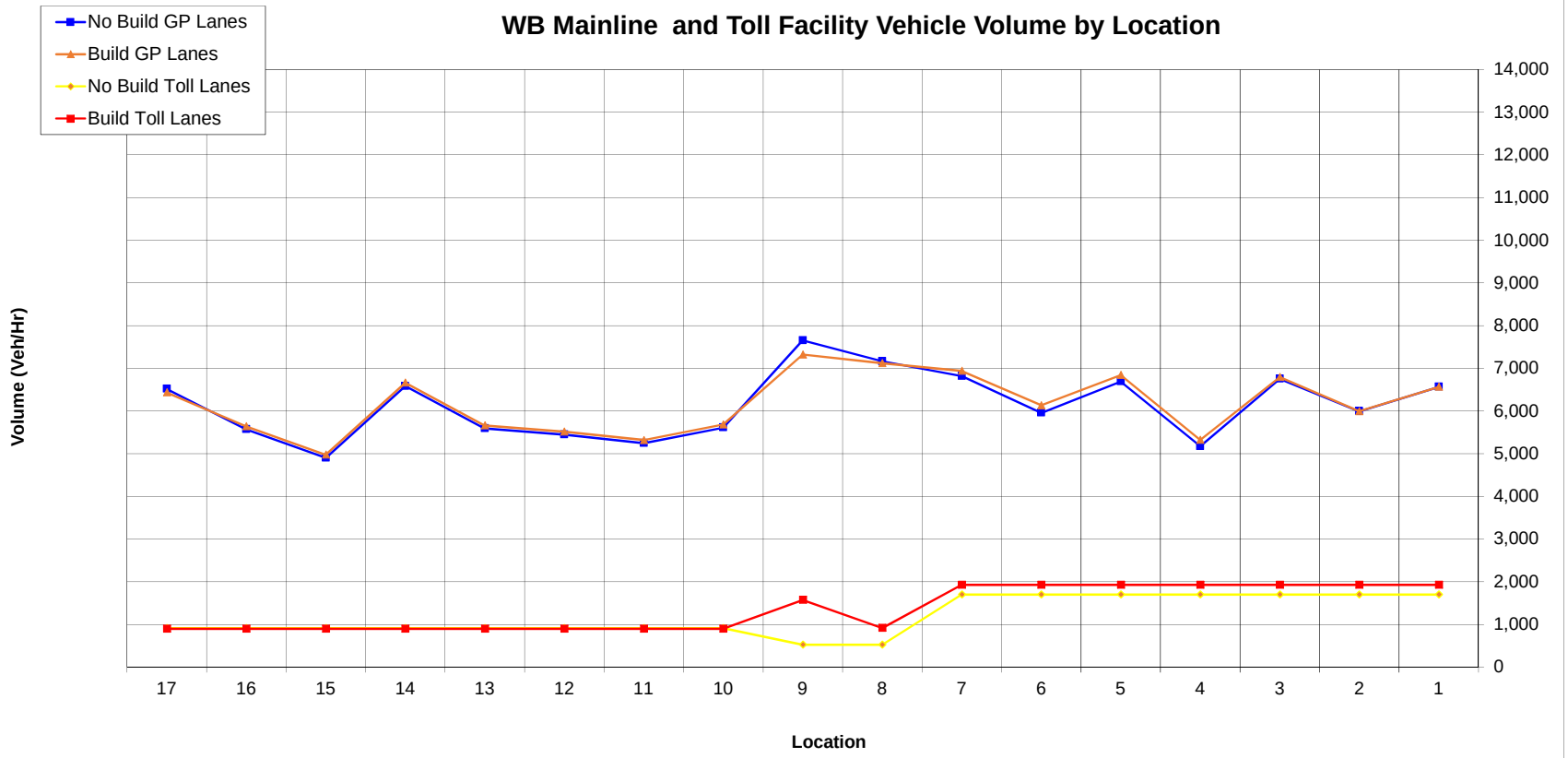


1	Begin Study Area to Off Ramp to Weir Canyon	7	On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13	Off Ramp to SR 71 CD to On Ramp from Green River
2	Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8	On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14	On Ramp from Green River to On Ramp from SR 71
3	On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9	On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15	On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4	On Ramp from NB Weir Canyon to Off Ramp to SR 241	10	On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16	Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5	Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11	Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17	Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6	Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12	Off Ramp to Green River to Off Ramp to SR 71 CD	18	On Ramp from Serfas/Autoclub to End of Study Area



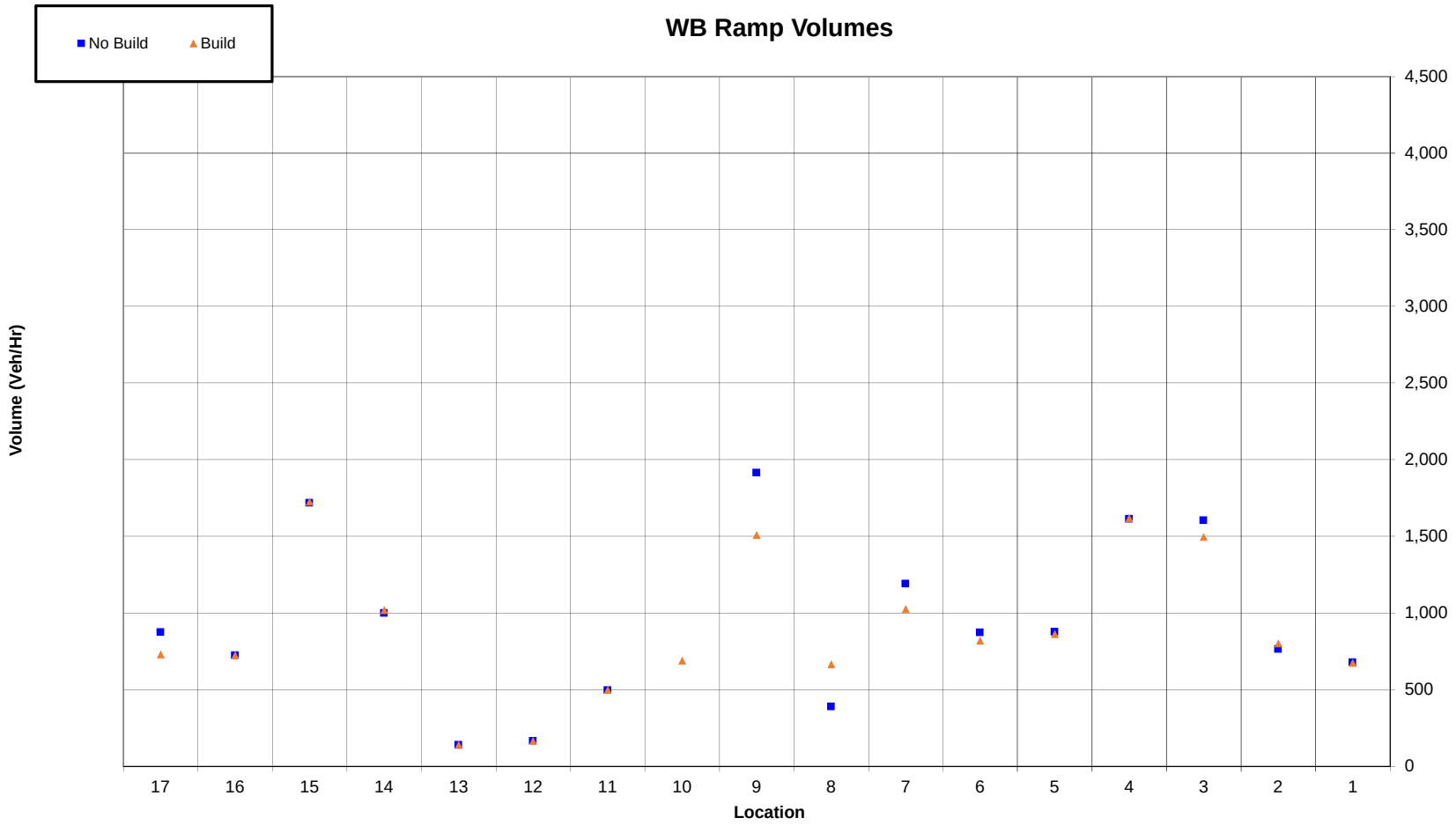
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

Charts 6-7 PM

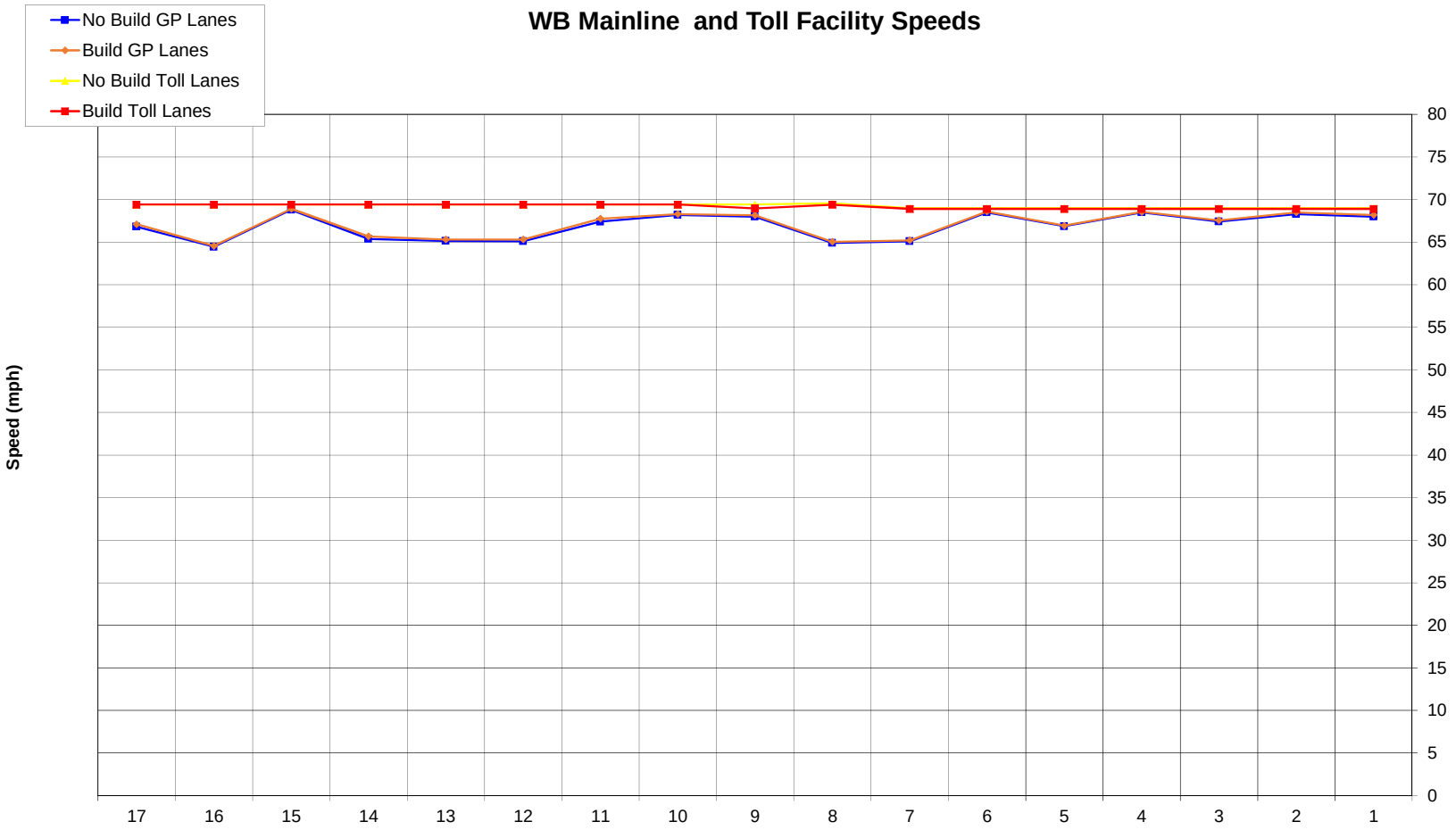


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

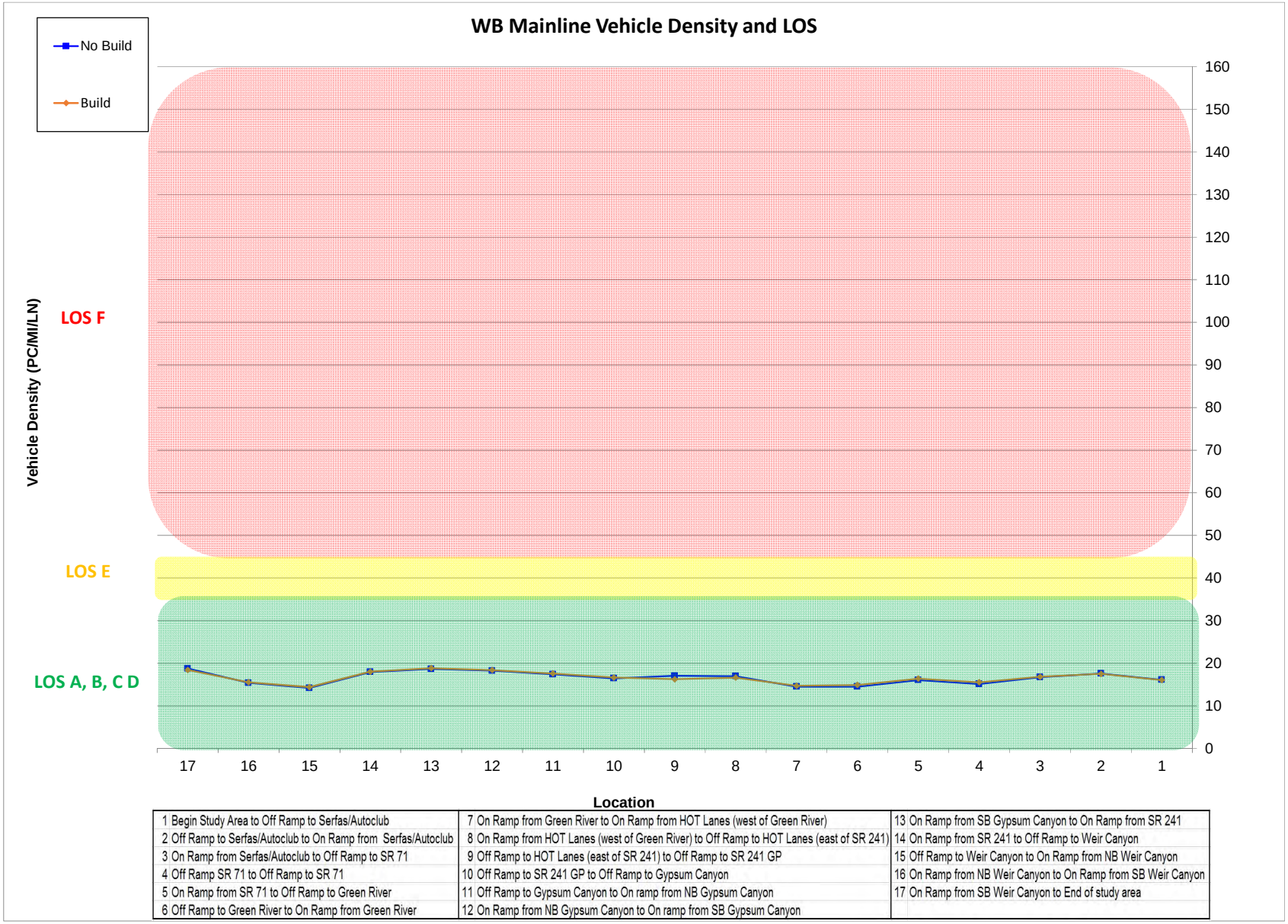
Charts 6-7 PM



1	Off Ramp to Serfas/Autoclub	7	On Ramp from HOV Exit (west of Green River Rd)	13	On Ramp from SB Gypsum Canyon Rd
2	On Ramp from Serfas/Autoclub	8	Off Ramp to HOV Entrance (east of SR 241)	14	On Ramp from SR 241
3	Off Ramp to SR 71	9	Off Ramp to SR 241 GP	15	Off Ramp to Weir Canyon Rd
4	On Ramp from SR 71	10	Off Ramp to SR 241 SB HOV	16	On Ramp from NB Weir Canyon Rd
5	Off Ramp to Green River Rd	11	Off Ramp to Gypsum Canyon Rd	17	On Ramp from SB Weir Canyon Rd
6	On Ramp from Green River Rd	12	On Ramp from NB Gypsum Canyon Rd		



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

Charts 6-7 PM

Appendix G
Project Layout Plan

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

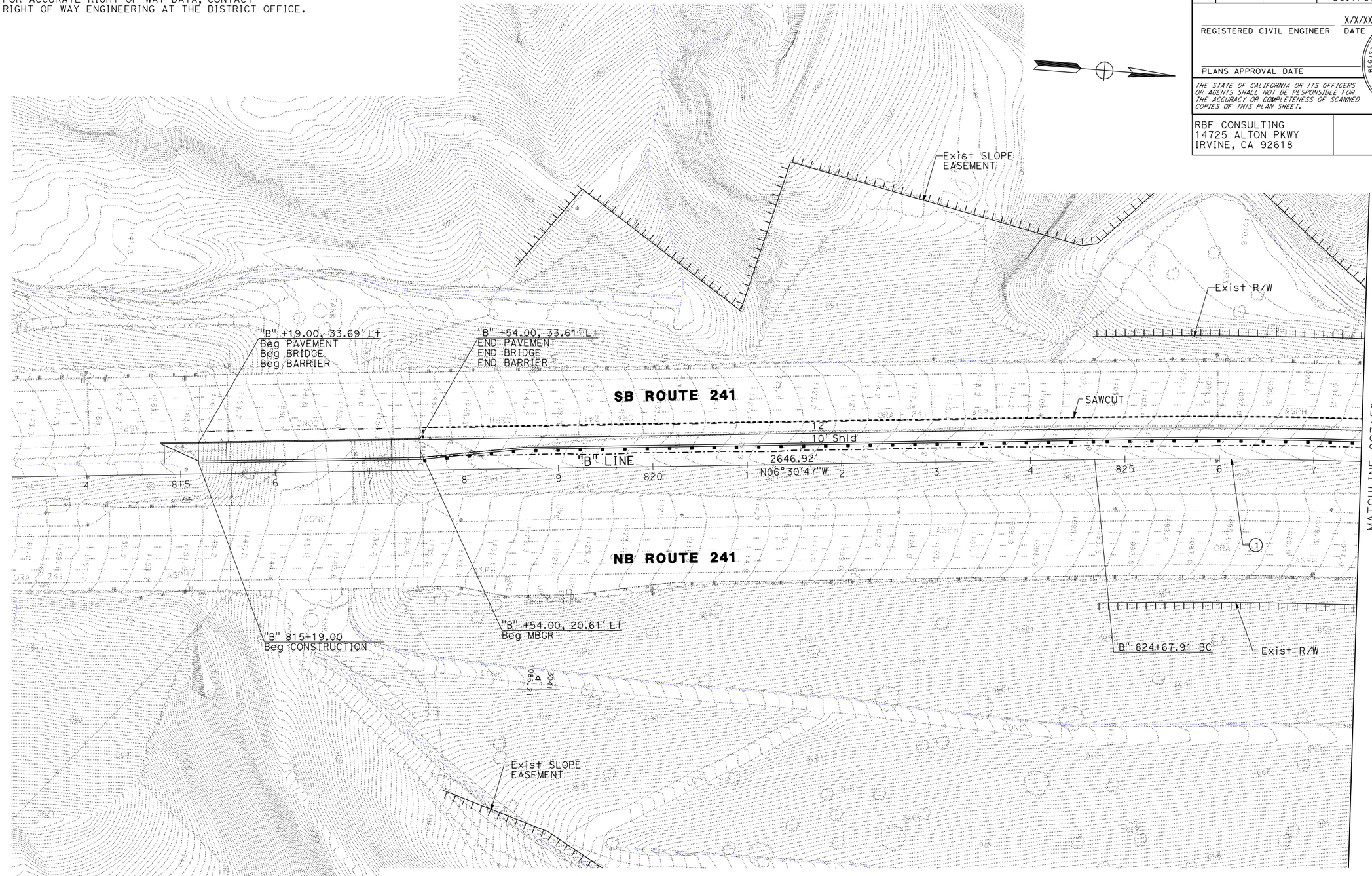
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



CURVE DATA

No.	R	Δ	T	L
(1)	6000.00	16°15'43"	857.23	1702.94

LAYOUT
SCALE: 1" = 50'

DRAFT

L-1

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY
CHECKED BY

SUPERVISOR: MIKE CHESNEY
CONSULTANT FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-001.dgn
mohamed.ghonim 05-JUN-2015 18:38

LAST REVISION: 00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-001.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

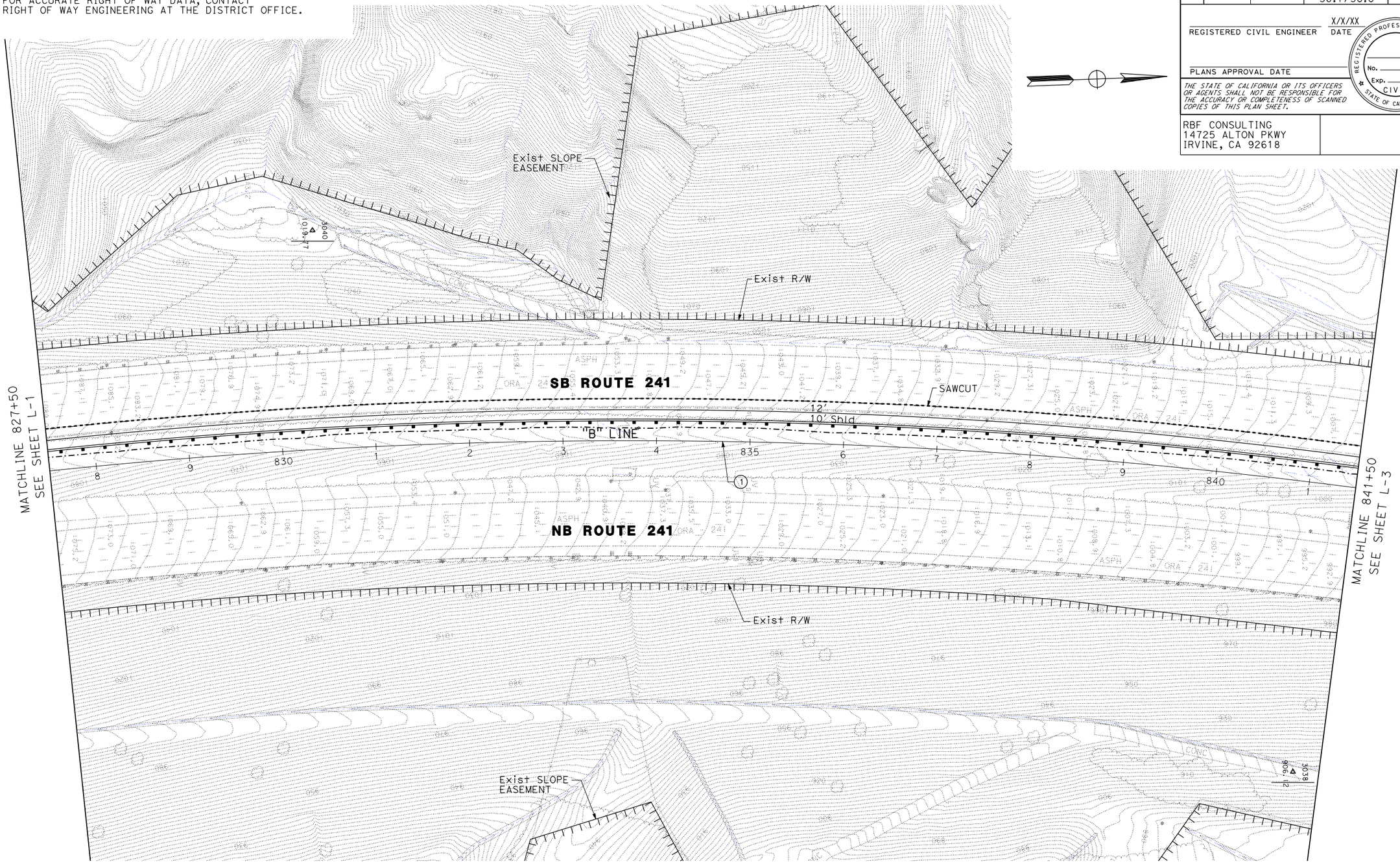
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



CURVE DATA

No.	R	Δ	T	L
(1)	6000.00	16°15'43"	857.23	1702.94

LAYOUT
SCALE: 1" = 50'

DRAFT

L-2

LAST REVISION	DATE PLOTTED => 05-JUN-2015
00-00-14	TIME PLOTTED => 18:38

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY
CHECKED BY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY

H:\pdata\10107774\CADD\TransPWDiv\Layout\7774-ST-002.dgn
mohamed.ghonim 05-JUN-2015 18:38

BORDER LAST REVISED 7/2/2010	USERNAME => mohamed.ghonim DGN FILE => 7774-ST-002.dgn	RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3	UNIT 0000	PROJECT NUMBER & PHASE 12000000000

NOTE:

1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

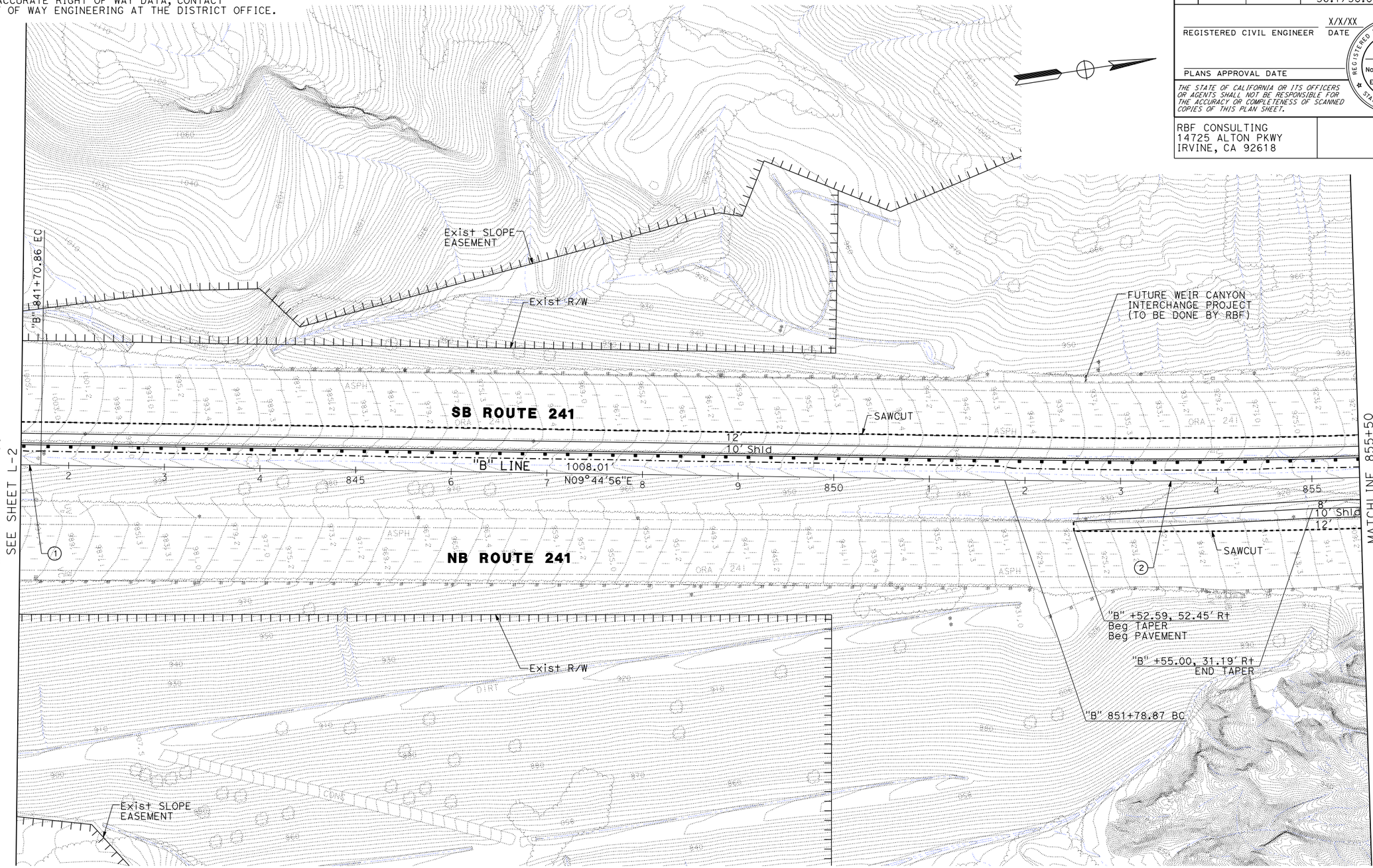
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



CURVE DATA

No.	R	Δ	T	L
(1)	6000.00	16°15'43"	857.23	1702.94
(2)	8000.00	09°18'59"	651.85	1300.83

DRAFT

LAYOUT

SCALE: 1" = 50'

L-3

LAST REVISION	DATE PLOTTED => 05-JUN-2015
00-00-14	TIME PLOTTED => 18:38

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY

CHECKED BY

SUPERVISOR

CONSULTANT FUNCTIONAL SUPERVISOR — MIKE CHESNEY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION — Caltrans

mohamed.ghonim 05-JUN-2015 18:38

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-003.dgn

BORDER LAST REVISED 7/2/2010

USERNAME => mohamed.ghonim
DGN FILE => 7774-ST-003.dgn

RELATIVE BORDER SCALE IS IN INCHES — 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

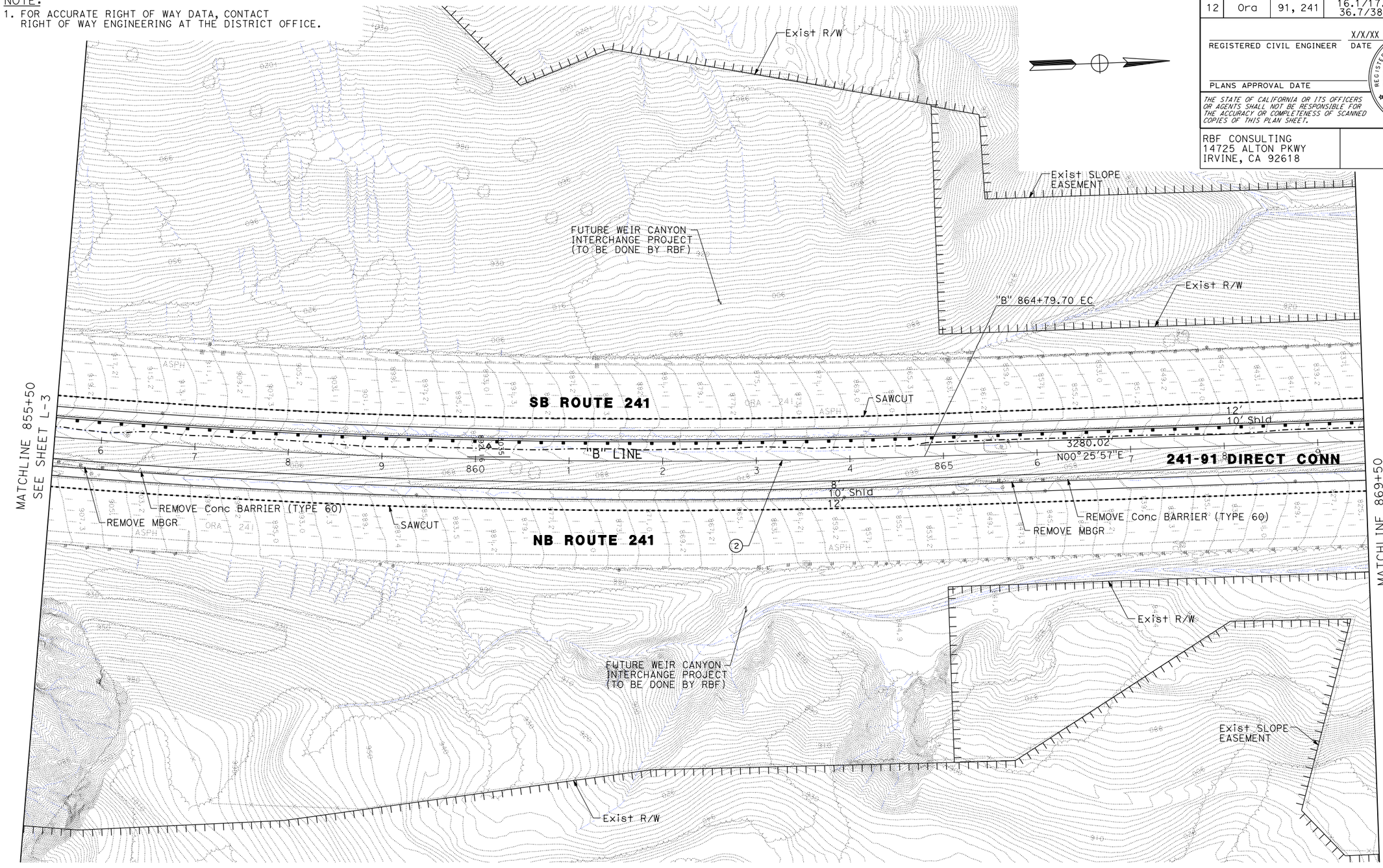
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



CURVE DATA

No.	R	Δ	T	L
(2)	8000.00	09°18'59"	651.85	1300.83

LAYOUT
SCALE: 1" = 50'

DRAFT

L-4

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY
CHECKED BY

SUPERVISOR
CONSULTANT FUNCTIONAL SUPERVISOR — MIKE CHESNEY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

mohamed.ghonim 05-JUN-2015 18:38

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-004.dgn

LAST REVISION 00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010
USERNAME => mohamed.ghonim
DGN FILE => 7774-ST-004.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE 12000000000

NOTE:

1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

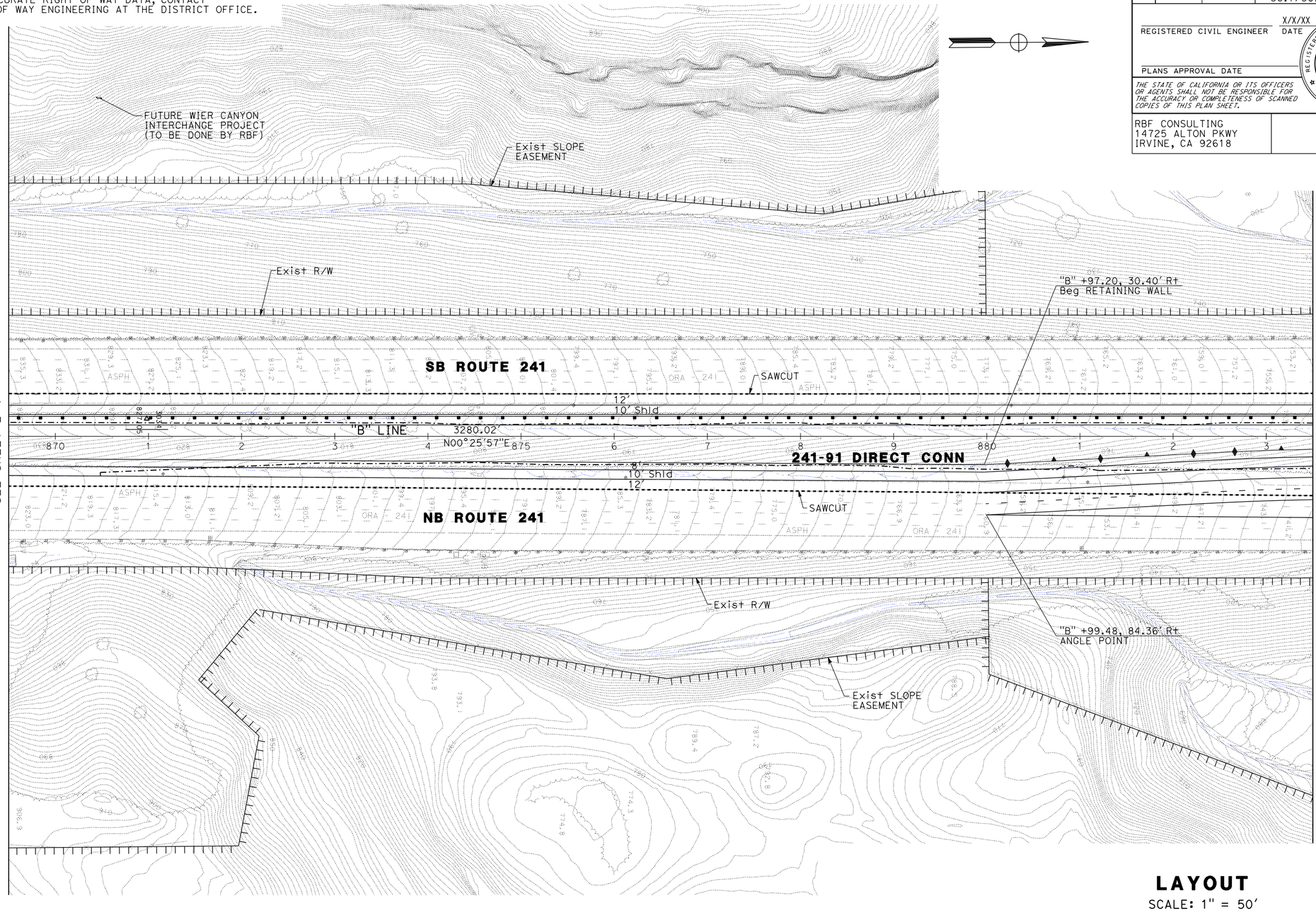
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



LAYOUT

SCALE: 1" = 50'

DRAFT

L-5

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY

CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-005.dgn

mohamed.ghonim 05-JUN-2015 18:38

LAST REVISION 00-00-14 — DATE PLOTTED => 05-JUN-2015 — TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-005.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

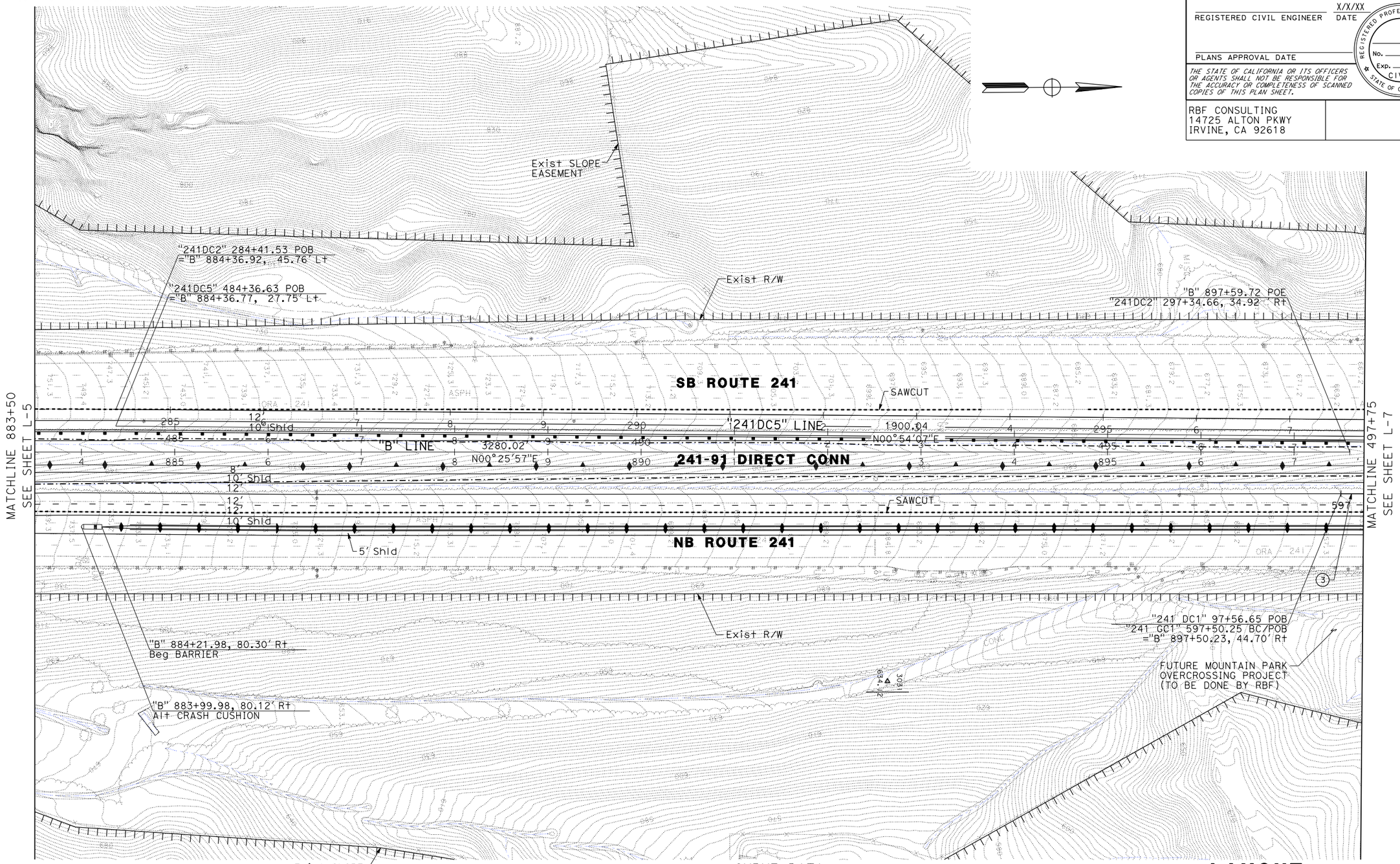
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. ____ Exp. ____ CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



CURVE DATA

No.	R	Δ	T	L
③	5116.00	06°05'50"	272.47	544.42

LAYOUT
SCALE: 1" = 50'

DRAFT

L-6

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-006.dgn × mohamed.ghonim 05-JUN-2015 18:38

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY | CALCULATED-DESIGNED BY | CHECKED BY | REVISED BY | DATE REVISED

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim, DGN FILE => 7774-ST-006.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

LAST REVISION 00-00-14 | DATE PLOTTED => 05-JUN-2015 | TIME PLOTTED => 18:38

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

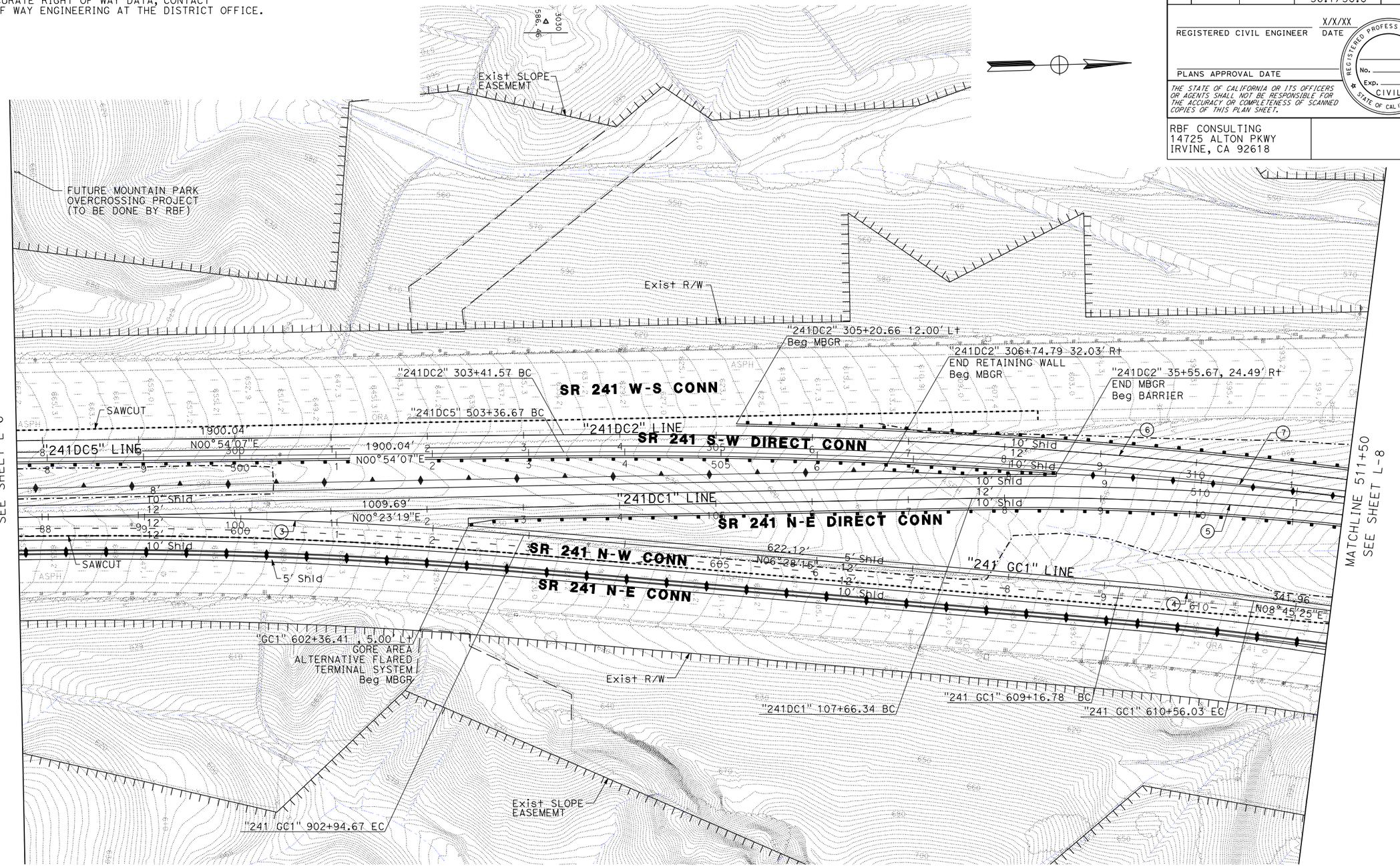
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



CURVE DATA

No.	R	Δ	T	L
③	5116.00	06°05'50"	272.47	544.42
④	3490.00	02°17'10"	69.63	139.24
⑤	3000.00	12°05'51"	317.90	633.43
⑥	6000.00	08°40'00"	454.65	907.57
⑦	5982.00	08°40'00"	453.29	904.85

LAYOUT
SCALE: 1" = 50'

L-7

DRAFT

REVISED BY	DATE REVISED

CALCULATED-
DESIGNED BY

CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-007.dgn
mohamed.ghonim 05-JUN-2015 18:38

LAST REVISION 00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-007.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

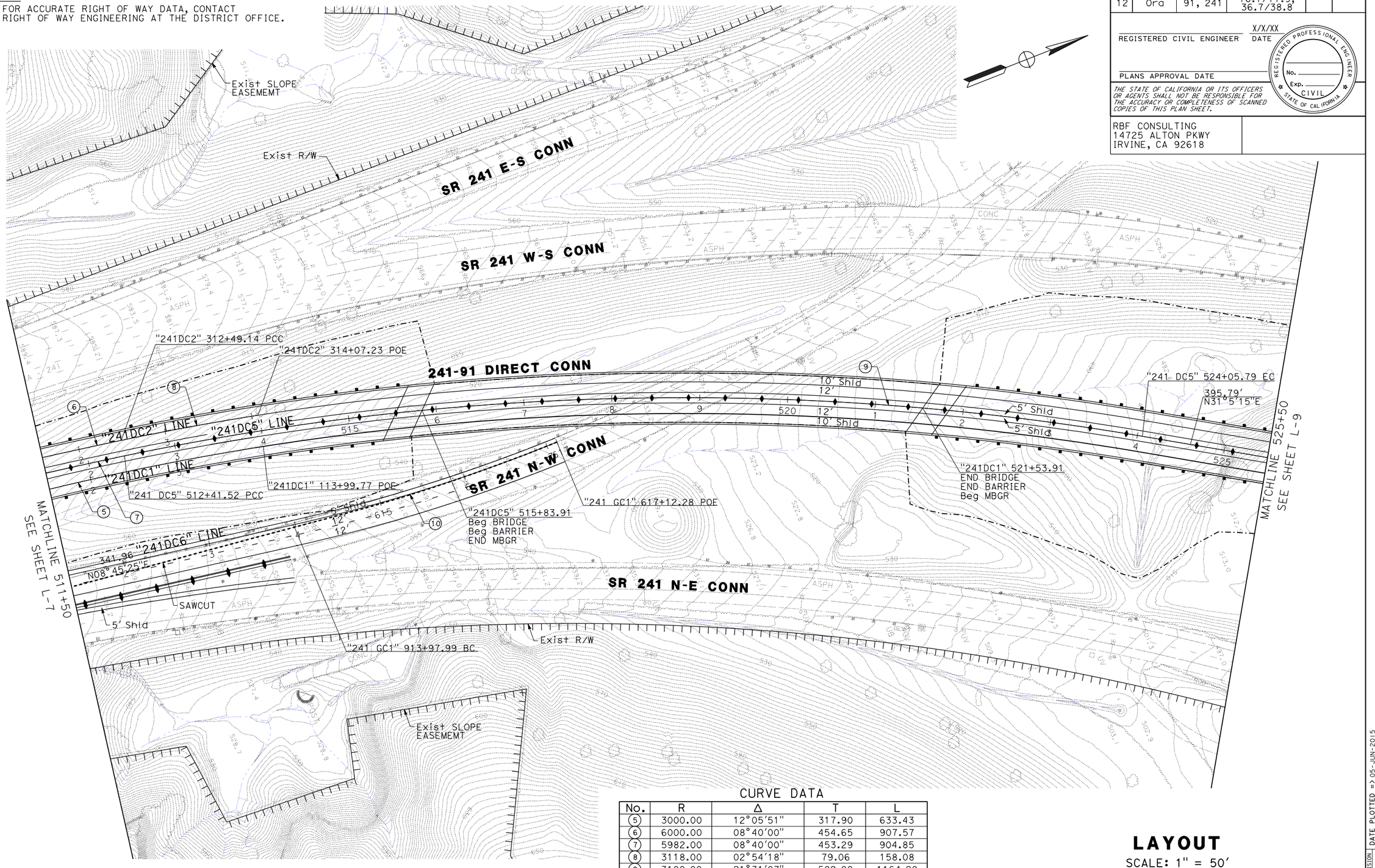
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



CURVE DATA

No.	R	Δ	T	L
(5)	3000.00	12°05'51"	317.90	633.43
(6)	6000.00	08°40'00"	454.65	907.57
(7)	5982.00	08°40'00"	453.29	904.85
(8)	3118.00	02°54'18"	79.06	158.08
(9)	3100.00	21°31'07"	589.08	1164.28
(10)	1900.00	09°28'39"	157.5	314.29

LAYOUT
SCALE: 1" = 50'

DRAFT

L-8

LAST REVISION	DATE PLOTTED => 05-JUN-2015
00-00-14	TIME PLOTTED => 18:38

mohamed.ghonim 05-JUN-2015 18:38
H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-008.dgn

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY	CHECKED BY

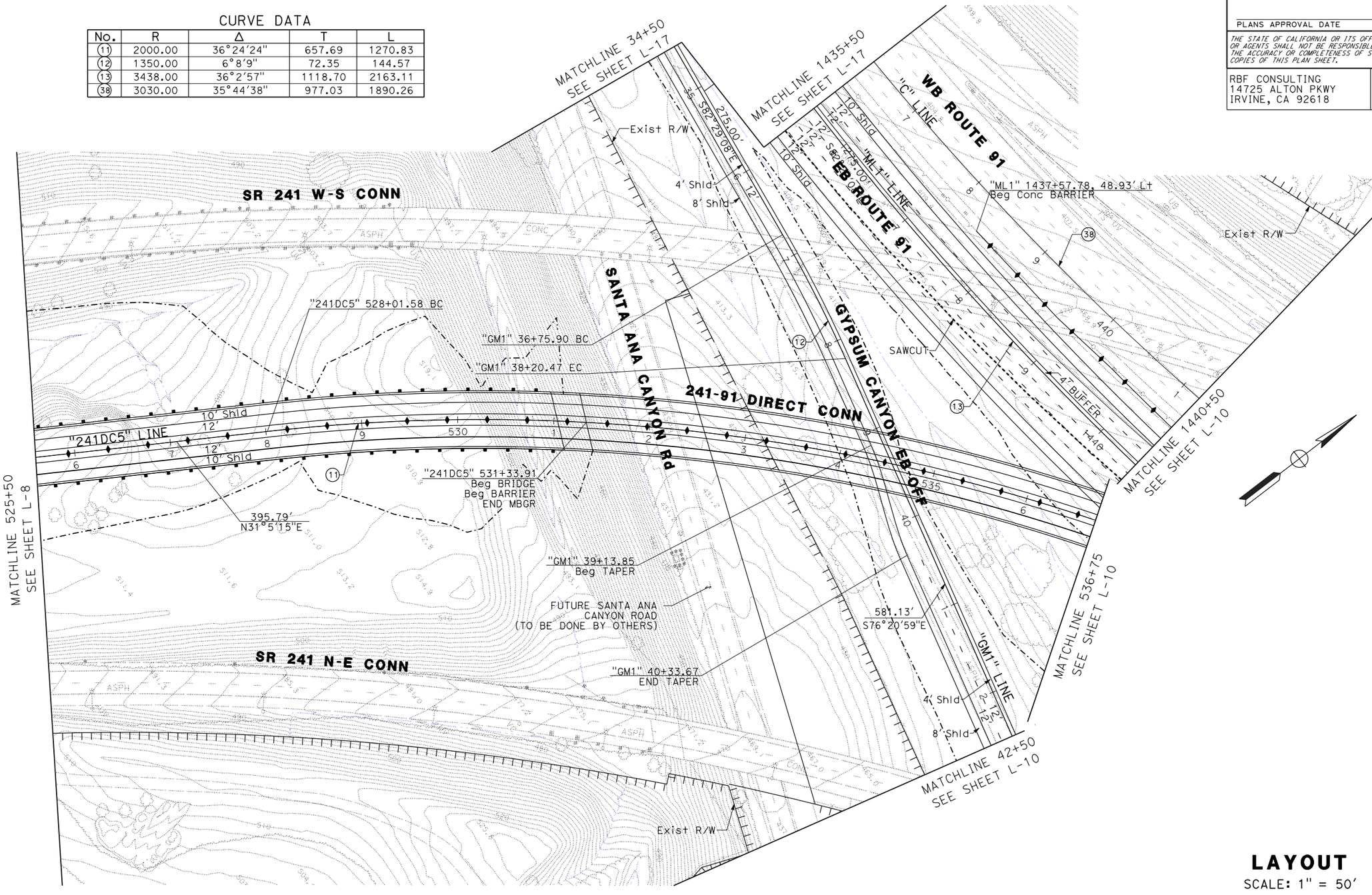
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
SUPERVISOR
MIKE CHESNEY
CONSULTANT FUNCTIONAL SUPERVISOR

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-008.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA

No.	R	Δ	T	L
(11)	2000.00	36°24'24"	657.69	1270.83
(12)	1350.00	6°8'9"	72.35	144.57
(13)	3438.00	36°2'57"	1118.70	2163.11
(38)	3030.00	35°44'38"	977.03	1890.26



LAYOUT
SCALE: 1" = 50'

DRAFT

L-9

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY
CHECKED BY

CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY

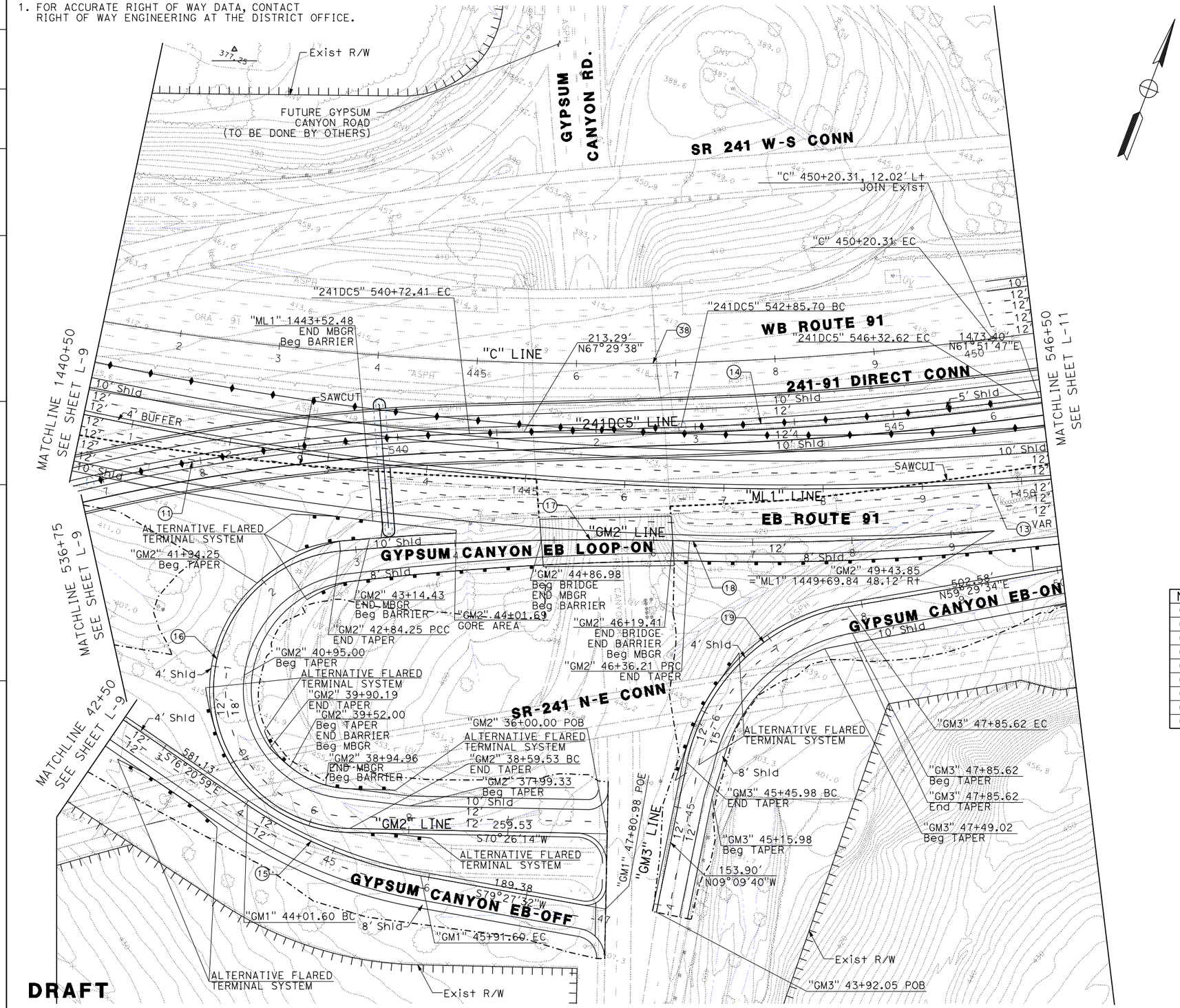
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

LAST REVISION 00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-009.dgn
mohamed.ghonim 05-JUN-2015 18:38

BORDER LAST REVISED 7/2/2010
USERNAME => mohamed.ghonim
DGN FILE => 7774-ST-009.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



DRAFT

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618

CURVE DATA

No.	R	Δ	T	L
(11)	2000.00	36°24'24"	657.69	1270.83
(13)	3438.00	36°2'57"	1118.70	2163.11
(14)	3530.00	5°37'51"	173.60	346.92
(15)	450.00	24°11'30"	96.44	190.00
(15)	140.00	173°49'1"	2592.11	424.71
(17)	3000.00	6°43'20"	176.19	351.97
(18)	2420.00	7°17'1"	154.03	307.64
(19)	200.00	68°39'14"	136.57	239.65
(38)	3030.00	35°44'38"	977.03	1890.26

LAYOUT
SCALE: 1" = 50'

L-10

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY: mohamed.ghonim 05-JUN-2015 18:38
CHECKED BY:
CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-010.dgn

LAST REVISION: 00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-010.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA

No.	R	Δ	T	L
(13)	3438.00	36°2'57"	1118.70	2163.11
(20)	1900.00	2°17'16"	37.94	75.87
(21)	3000.00	3°11'29"	83.57	167.10
(22)	3000.00	3°0'12"	78.65	157.25

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

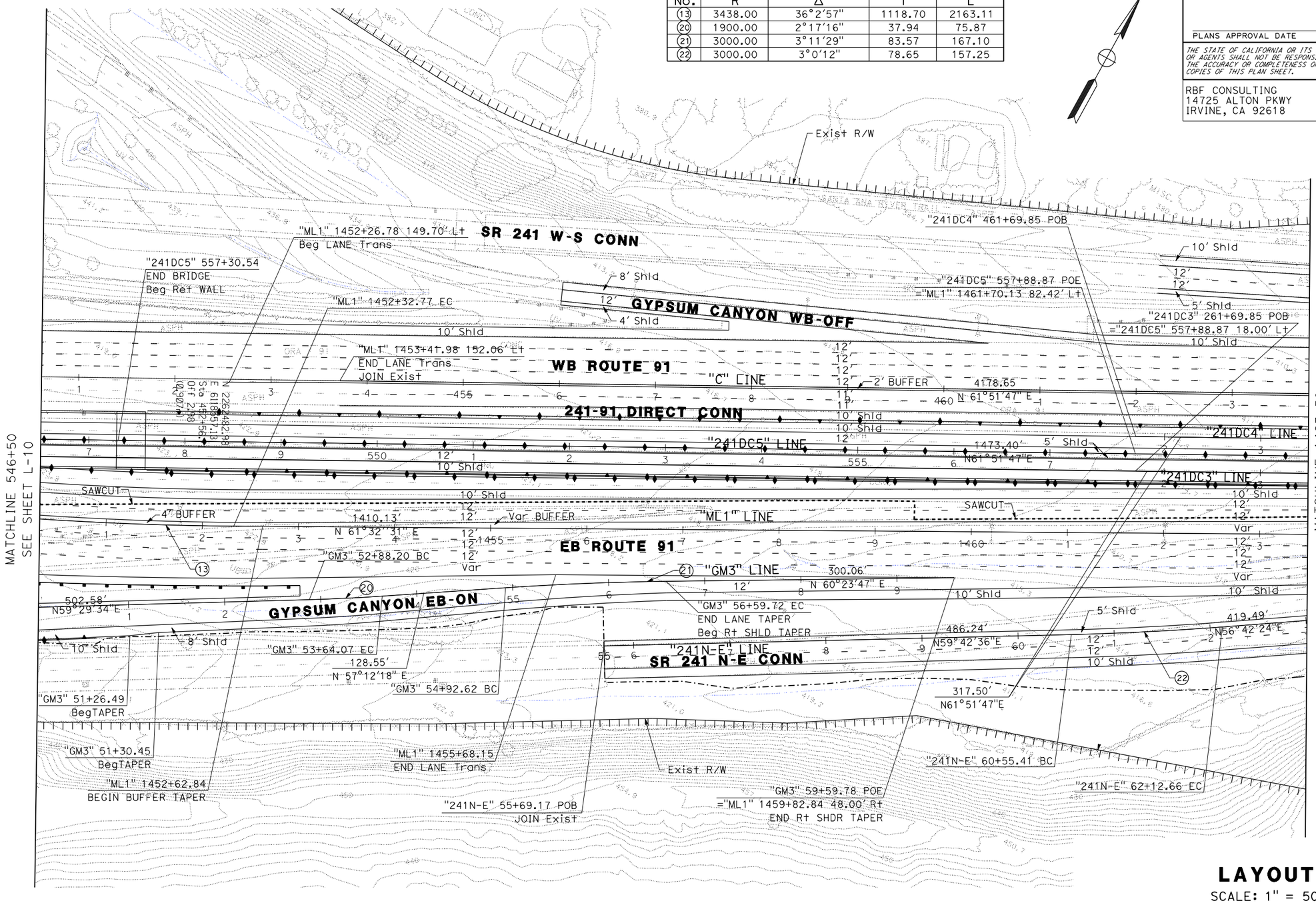
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



LAYOUT
SCALE: 1" = 50'

DRAFT

L-11

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY
CHECKED BY
CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-011.dgn
mohamed.ghonim 05-JUN-2015 18:38

LAST REVISION 00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-011.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

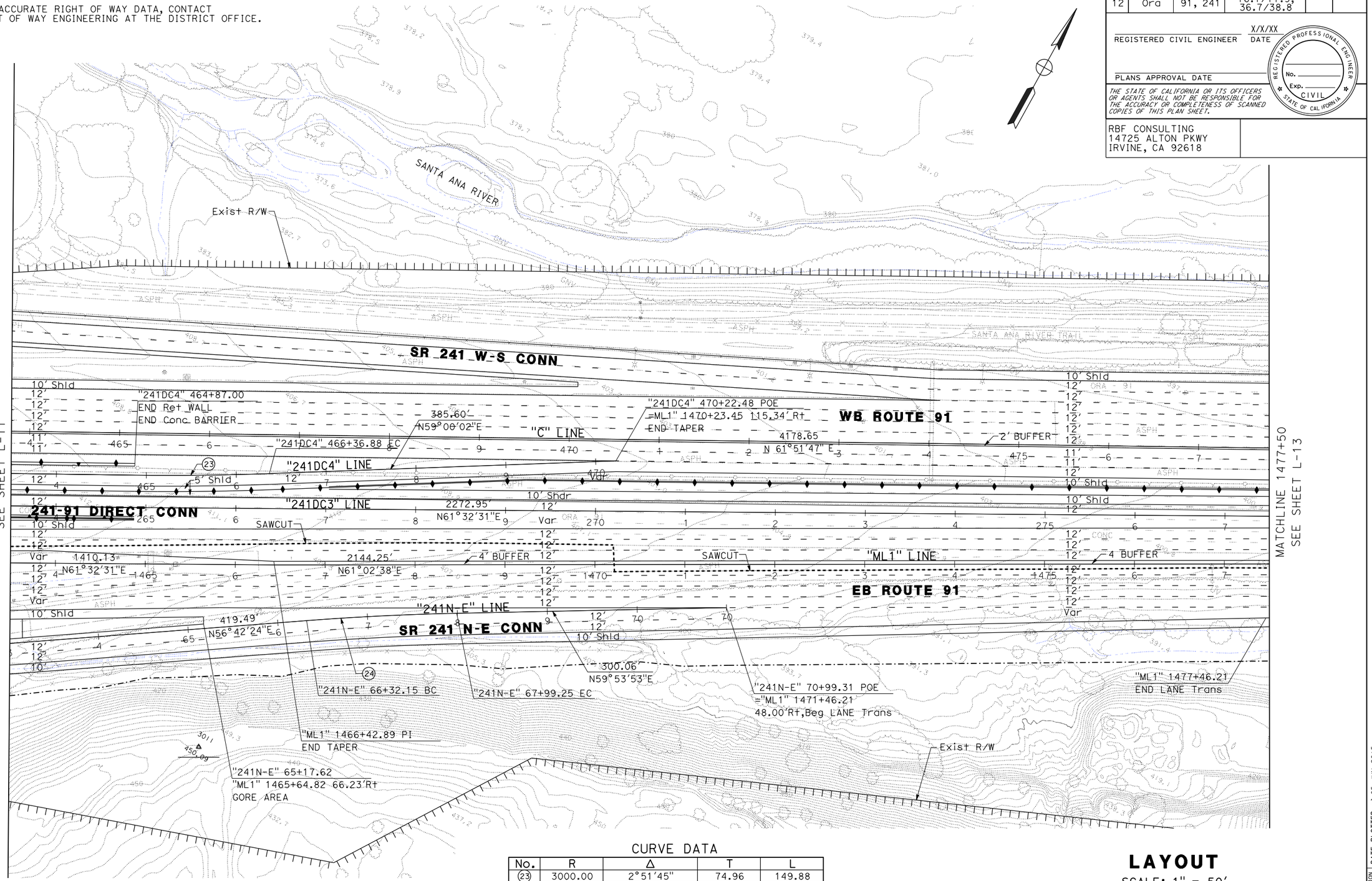
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



CURVE DATA

No.	R	Δ	T	L
(23)	3000.00	2°51'45"	74.96	149.88
(24)	3000.00	3°11'29"	83.57	167.10

LAYOUT
SCALE: 1" = 50'

DRAFT

L-12

LAST REVISION 00-00-14 | DATE PLOTTED => 05-JUN-2015 | TIME PLOTTED => 18:38

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY | CALCULATED-DESIGNED BY | CHECKED BY | REVISED BY | DATE REVISED

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-012.dgn | mohamed.ghonim 05-JUN-2015 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-012.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA

No.	R	Δ	T	L
(25)	3232.00	03°05'12"	87.08	174.12
(26)	3276.00	03°05'33"	88.43	176.81
(27)	25.00	65°27'12"	16.07	28.56
(28)	26.00	157°22'06"	129.99	71.42
(29)	25.00	94°29'19"	27.04	41.23
(30)	25.00	96°34'33"	28.05	42.14
(31)	100.00	08°30'10"	7.43	14.84
(32)	50.00	24°19'44"	10.78	21.23
(33)	120.00	40°02'14"	43.72	83.85
(34)	450.00	16°44'18"	66.20	131.46

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

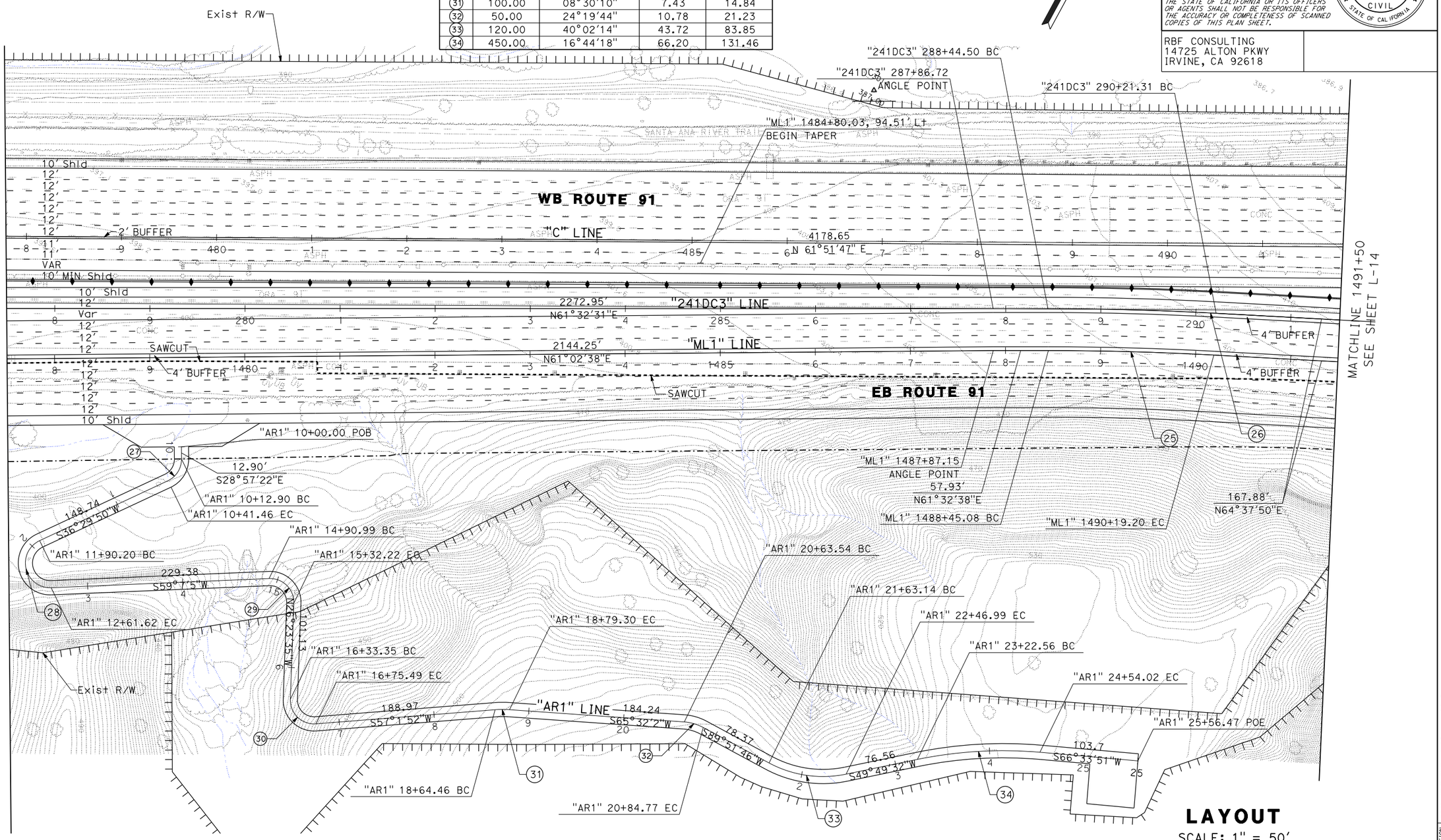
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



LAYOUT
SCALE: 1" = 50'

DRAFT

L-13

LAST REVISION	DATE PLOTTED => 05-JUN-2015
00-00-14	TIME PLOTTED => 18:38

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY: mohamed.ghonim 05-JUN-2015 18:38
CHECKED BY:
CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-013.dgn

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim, DGN FILE => 7774-ST-013.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA

No.	R	Δ	T	L
(35)	3000.00	51°52'00"	1458.88	2715.74
(36)	3044.00	32°20'29"	882.67	1718.22
(39)	3000.00	57°24'04"	1642.49	3005.52

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

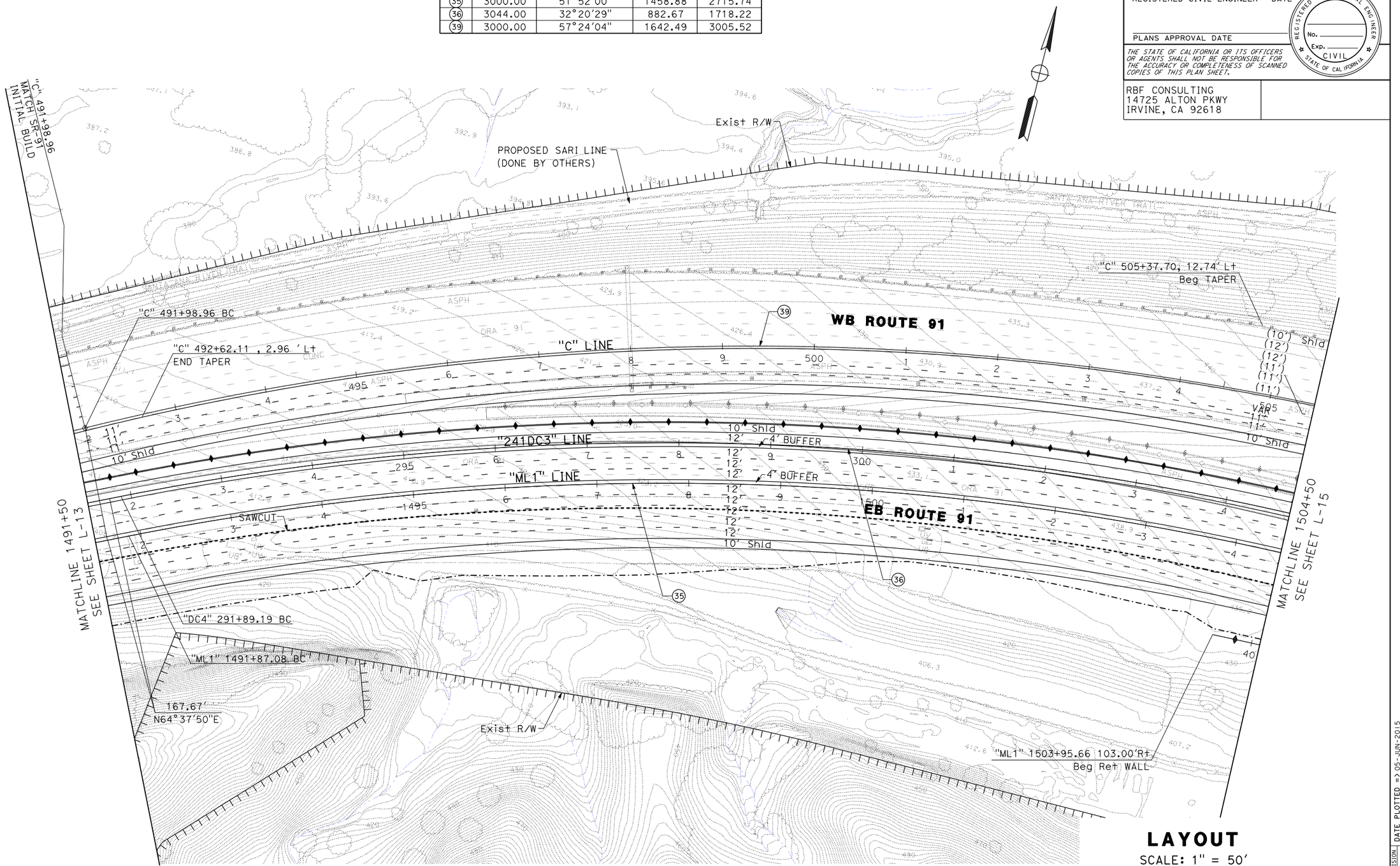
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



LAYOUT
SCALE: 1" = 50'

DRAFT

L-14

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-014.dgn 05-JUN-2015 18:38 mohamed.ghonim

REVISED BY	DATE REVISED
CALCULATED-DESIGNED BY	
CHECKED BY	
CONSULTANT FUNCTIONAL SUPERVISOR	MIKE CHESNEY
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	Caltrans

LAST REVISION	DATE PLOTTED => 05-JUN-2015
00-00-14	TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim, DGN FILE => 7774-ST-014.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

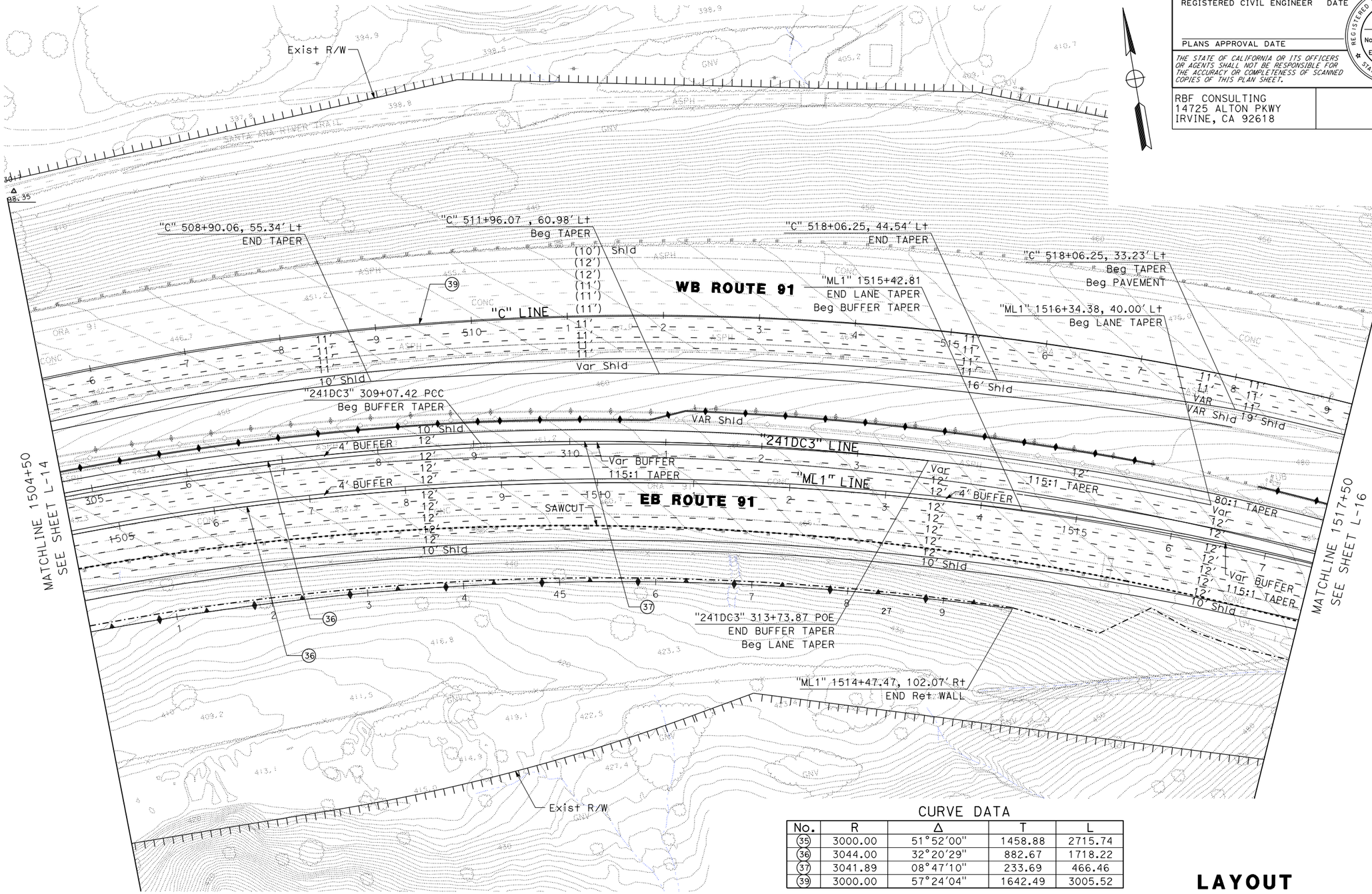
REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618



CURVE DATA

No.	R	Δ	T	L
(35)	3000.00	51°52'00"	1458.88	2715.74
(36)	3044.00	32°20'29"	882.67	1718.22
(37)	3041.89	08°47'10"	233.69	466.46
(39)	3000.00	57°24'04"	1642.49	3005.52

LAYOUT
SCALE: 1" = 50'

DRAFT

L-15

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY: mohamed.ghonim 05-JUN-2015 18:38
CHECKED BY:

CONSULTANT FUNCTIONAL SUPERVISOR: MIKE CHESNEY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-015.dgn

LAST REVISION 00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-015.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA

No.	R	Δ	T	L
(35)	3000.00	51°52'00"	1458.88	2715.74
(39)	3000.00	57°24'04"	1642.49	3005.52

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618

Exist R/W

"C" 522+04.48 EC

"C" 521+99.53, 0.26' Rt
JOIN Exist 91CIP

"C" 524+39.53, 10.57' Rt
JOIN Exist 91CIP

FUTURE 91CIP PROJECT
(TO BE DONE BY OTHERS)

COAL CANYON RD.

WB ROUTE 91

"C" LINE

2243.45'
S60°44'09"E

"ML1" LINE

691.57'
N63°30'10"E

2591.23'
N63°30'10"E

"A" LINE

80:1 TAPER

Var BUFFER
115:1 TAPER

SAWCUT

"ML1" 1519+02.81 EC
END BUFFER TAPER
Beg LANE TAPER

"ML1" 1519+02.81
END BUFFER TAPER
Beg LANE TAPER

"ML1" 1525+94.38 POE
="A" 526+00.00, 12.00' Lt
JOIN Exist 91CIP
END LANES TAPER
END PAVEMENT
END Conc BARRIER

EB ROUTE 91

FUTURE 91CIP PROJECT
(TO BE DONE BY OTHERS)

Exist R/W

MATCHLINE 1517+50
SEE SHEET L-15

(10') Shdr
(11') Var
(11') Var 12' TO 11'
(11') Var 12' TO 11'
(11') Var 12' TO 11'
(11') Var 12' TO 11'
(12') Var 12' TO 11'
(12') 12'
(10') 12'
(10') Shdr

DRAFT

LAYOUT
SCALE: 1" = 50'

L-16

REVISED BY	DATE REVISED
CALCULATED-DESIGNED BY	CHECKED BY
CONSULTANT FUNCTIONAL SUPERVISOR	MIKE CHESNEY
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	Caltrans

mohamed.ghonim 05-JUN-2015 18:38
H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-016.dgn

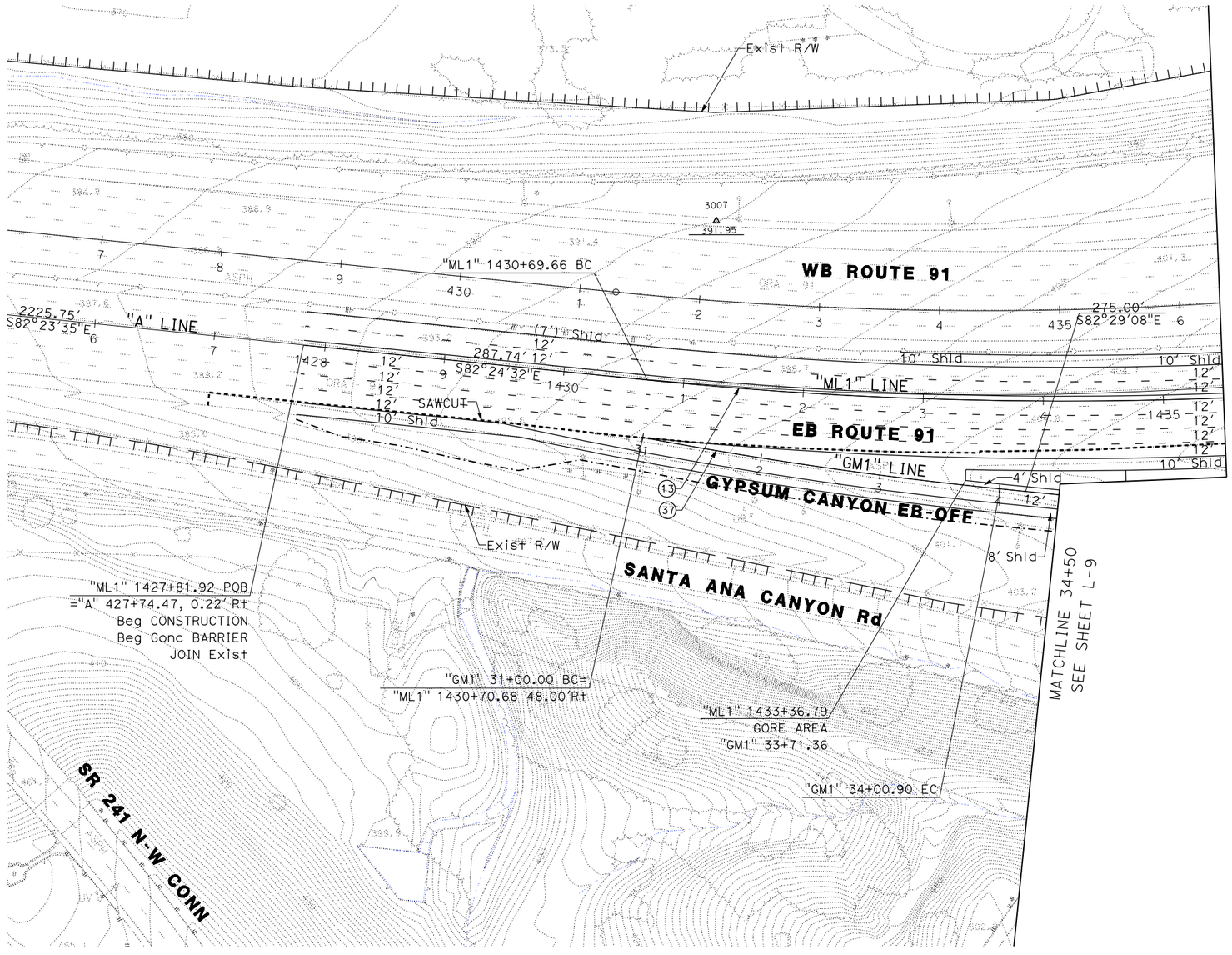
LAST REVISION 00-00-14 | DATE PLOTTED => 05-JUN-2015 | TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-016.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA

No.	R	Δ	T	L
(13)	3438.00	36°02'57"	1118.70	2163.11
(37)	3486.00	4°56'44"	150.54	300.90



LAYOUT
SCALE: 1" = 50'

DRAFT

L-17

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

REGISTERED CIVIL ENGINEER — X/X/XX DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

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.

RBF CONSULTING
14725 ALTON PKWY
IRVINE, CA 92618

REVISED BY	DATE REVISED

CALCULATED-DESIGNED BY
CHECKED BY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR
MIKE CHESNEY

H:\pdata\10107774\CADD\TransPW\Div\Layout\7774-ST-017.dgn
mohamed.ghonim 05-JUN-2015 18:38

LAST REVISION 00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

BORDER LAST REVISED 7/2/2010 | USERNAME => mohamed.ghonim | DGN FILE => 7774-ST-017.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0000 | PROJECT NUMBER & PHASE 12000000000