APPENDIX E

TRAFFIC IMPACTS ANALYSIS

Draft Final Report
Traffic Impact Analysis

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1.0 INTRODUCTION

This report analyzes the potential traffic impacts that could result from the proposal by DesertXpress Enterprises, LLC, to construct and operate a high-speed passenger railroad between Victorville, California, and Las Vegas, Nevada. DesertXpress would finance and own the system and be responsible for the project's development, construction, operation, and maintenance. Approvals by several federal agencies, including the Federal Railroad Administration (FRA), Bureau of Land Management (BLM), Surface Transportation Board (STB), and Federal Highway Administration (FHWA) would be necessary to implement the project, including the granting of permission to use of public lands and/or highway rights-of-way.

1.1 Project Description

1.1.1 Overview

The project would construct nearly 200 miles of new, high quality exclusive double track railroad with no at-grade crossings. The route would either be immediately alongside or in the median of Interstate 15 (I-15) and/or within existing railroad corridors/rights-of-way. There would be two passenger stations; one at each end of the line, in Victorville, California, and Las Vegas, Nevada.

DesertXpress would provide trains departing both ends of the line at least hourly and as frequently as every 20 minutes on Fridays and Sundays. DesertXpress would travel at speeds up to 150 mph. The 200-mile trip would take between 1 hour and 45 minutes and 2 hours, and would operate every day of the year. The trains would be based on high speed trains used in Europe and customized for the high desert. Each car would be self-propelled to provide the high power-to-weight ratio needed o negotiate the alignment's relatively steep grades.

ALIGNMENT ALTERNATIVES

From Victorville, a completely separate, dedicated two-track passenger railway would be constructed, largely following the north side or median of I-15, making maximum use of excess freeway right-of-way. At Mountain Pass, there are two alignment options. One option would divert south of the I-15 corridor and traverse at grade a three mile portion of the Mojave National Preserve. East of the Preserve near Primm, this option would rejoin the I-15 corridor, continuing northeasterly toward metropolitan Las Vegas. The second option would divert north of the I-15 corridor at Mountain Pass and pass through the Clark Range in two tunnels, 1,300 feet and 5,000 feet in length respectively, to rejoin the I-15 corridor near Primm. Near Sloan Road, one alignment option continues in the I-15 corridor to reach Las Vegas, while another option would diverge from the I-15 corridor and generally follow or be located within the existing Union Pacific Railroad (UPRR) right-of-way to reach Las Vegas.

EQUIPMENT ALTERNATIVES

Two technology alternatives are under consideration: a diesel-electric multiple unit train (DMU) and an electric multiple unit train (EMU). The two technology options would have similar right-of-

way width requirements as well as the same construction footprint. However, the EMU option would also include overhead catenary wires and supports, three electrical substations, and approximately seventeen transformers, all of which would be located within the right-of-way and/or within construction easement areas.

STATION ALTERNATIVES

Two passenger stations would be constructed, one in Victorville located along the west side of I-15 near the Stoddard Wells Road interchanges, and the other in Las Vegas at one of four possible locations.

Two sites north of central Victorville are being considered for the Victorville station. Site 1 is located just north of the southern Stoddard Wells Road exit (Exit #154); Site 2 is located to the northwest of the northern Stoddard Wells Road exit (Exit #157). The two site options are located about 1.5 miles apart. The facilities directly associated with the either station site would occupy about 60 to 70 acres and would have a parking capacity for approximately 13,000 to 18,000 vehicles in self-parking lots, valet parking areas, and a proposed parking structure. The Victorville station would offer train ticketing, baggage handling, and hotel room check-in for Las Vegas resorts.

In Las Vegas, the terminal station would be designed to serve as a multi-modal facility with convenient access to rental cars, hotel shuttles, and taxis. The four options are being considered for the Las Vegas passenger station are:

- Southern Station, along Polaris Road, between West Russell Road and West Hacienda Drive, across I-15 from the Mandalay Bay Resort and Casino
- Central Station A, between West Flamingo Road and West Twain Avenue, adjacent to the Rio Suites Hotel property
- Central Station B, south of West Flamingo Road, in an area along the UPRR right of way that is currently occupied by industrial and light industrial uses
- Downtown Station, in the City of Las Vegas, along South Main Street between West Bonneville Avenue and Boulder Avenue

Note that the Southern Station option could not be utilized if the UPRR alignment option north of Sloan Road was selected.

1.1.2 Operations, Maintenance, and Storage Facility Alternatives

A 50-acre train maintenance and storage facility and operations center would be built in Victorville. The facility would include a train washing facility, repair shop, parts storage, trains storage tracks, operations control center, meeting rooms and administrative offices. OMSF site option 1 is located in the City of Victorville southwest of proposed Victorville station site 1. OMSF site option 2 is located north of Victorville station site option 2, west of I-15 and south of the Dale Evans Parkway interchange.

A light maintenance, storage, cleaning, and inspection facility would also be built near the northern terminus of the project. Three site options are under consideration for the Las Vegas area maintenance and storage facility:

- Sloan Road - located approximately 5 miles south of Sloan Road, on the east side of I-15, between the I-15 freeway and South Las Vegas Boulevard (Nevada State Route 604), near where Union Pacific Railroad (UPRR) crosses from east to west side of I-15.
- Wigwam Avenue – located west of the I-15 freeway about one half mile south of Blue Diamond Boulevard (Nevada State Route 160).
- Robindale Avenue – also located west of the I-15 freeway, about one half mile south of Blue Diamond Boulevard.

1.2 Relationship of Traffic Analysis Report to EIS

An EIS is being prepared by the FRA in cooperation with STB, BLM, FHWA, the California Department of Transportation (Caltrans) and the Nevada Department of Transportation (NDOT) to evaluate the impacts of the DesertXpress proposal. The FRA has authority to regulate the safety of railroads, under 49 U.S.C. 20101 et seq. The BLM has approval authority over the use of public lands under their control under 43 U.S.C. 1761, the Federal Land Policy and Management Act (FLPMA). The STB has jurisdiction, pursuant to 49 U.S.C. 10501(b), over the construction, acquisition, operation, and abandonment of rail lines, railroad rates and services, and rail carrier consolidations and mergers. The FHWA has jurisdiction over the use of and/or modification of Interstate highway right of way under 23 CFR 1.23. On June 25, 2007, the STB issued a declaratory order in finding that the proposed construction and operation of the interstate high-speed passenger rail system is not subject to state and local environmental review and land use and other permitting requirements because of the Federal preemption authority in 49 U.S.C. 10501(b).

This Traffic Analysis Report has been prepared by DMJM Harris for DesertXpress Enterprises. The research and analysis for preparing this report was conducted in coordination with the FRA's EIS consultant, CirclePoint. This report will be provided to CirclePoint for their use in preparing the transportation section of the EIS, as well as other sections.

1.3 Overview of Traffic Analysis Methodology

This report quantifies the potential impact of the DesertXpress project in terms of vehicular traffic on surrounding roadway facilities. The project represents the introduction of a new mode of travel in the Southern California to Las Vegas corridor. As such, the project will have the effect of shifting travelers from one mode to another. The size of these shifts have been forecast in a rail ridership report prepared for DesertXpress Enterprises and peer-reviewed by a firm hired by the FRA's EIS consultant. (see below). The first step of the rail ridership study was to forecast the annual number of trips by each existing mode between Southern California and Las Vegas through 2035. Existing modes included air, auto, and bus. The ridership study then applied rail diversion factors to each mode to develop rail ridership. These rail ridership

forecasts are the basis for the traffic analysis. Note that the rail ridership study only included trips that originate in Southern California.

The traffic analysis focused on three separate areas which were selected based on likely changes in traffic patterns. One focus area is the I-15 freeway mainline, which will experience a reduction in traffic due to introduction of DesertXpress. Trips that were formerly made by auto will be diverted to the train, thereby reducing the number of vehicles on I-15 between Victorville and Las Vegas.

South of Victorville, the rail project will have a negligible effect on mainline freeway traffic volumes. Since I-15 is essentially the only route to Las Vegas, all auto and bus trips must pass through Victorville. Rail trips that otherwise would have been made by the auto and bus modes will use I-15 to reach Victorville from Southern California. *These trips would be on I-15 south of Victorville whether or not the rail project is built.* With the rail project, these trips will leave the freeway at Victorville and switch to the rail mode. Trips diverted from the air mode to the rail mode most likely will access the Victorville station via the auto mode. The diverted air trips are not currently using I-15 south of Victorville. Instead, persons making a trip to Las Vegas by air travel to the most convenient airport. To use the rail mode, these travelers will now use I-15 south of Victorville to reach the rail station. However, the ridership study indicates that only 11% of the forecast rail trips would be diverted from the air mode. Applying this factor to the 2013 forecast rail ridership and converting from person-trips to vehicle trips, this works out to only 63 additional vehicles in the peak hour, peak direction on the segment of I-15 south of Victorville. This is less than 1% of the existing southbound PM peak hourly volume of 6490 vehicles in this section.

The other two focus areas are near the proposed station sites in Victorville and Las Vegas, respectively, and specifically the local roadway intersections. In these areas, the stations will act to concentrate trips that would otherwise remain on the freeway (in Victorville) or be dispersed on the local road network (Las Vegas). For the station areas, the DesertXpress project will increase the number of vehicles on the local roadways.

Two horizon years were selected for the traffic analysis: 2013 and 2030. DesertXpress is expected to begin operating in 2013. The out-year of 2030 was selected because it is about 20 years after the start of construction, and because it was the farthest year in the future for which regional travel forecasts were available for the metropolitan Las Vegas area. In the Victorville area, intersections were also analyzed for existing conditions. This was done due to uncertainty regarding the completion date of the South Stoddard Wells Road interchange relative to the opening date of the DesertXpress rail project.

The traffic analysis uses outputs from regional travel models as the baseline “without-project” traffic volumes. With-project traffic volumes were calculated by either subtracting (for the I-15 mainline) or adding (for the station areas) project-related vehicle trips to the baseline traffic volumes. For the I-15 mainline, baseline future volumes were obtained from the respective regional travel models in each state, as reviewed and agreed upon by the two state DOTs. In Victorville, baseline future traffic volumes were obtained from the Victor Valley travel demand model recently prepared for the City of Victorville. This model was based on the SCAG 2004 RTP model. Note that the Victorville model produces 2035 forecasts, which were factored back

by DMJM Harris to be compatible with the 2030 horizon year. In the Las Vegas area, future baseline volumes were obtained from the RTC travel demand model. The RTC model included future roadway improvement projects as identified in their Regional Transportation Plan 2009 – 2030.

2.0 TRANSPORTATION SETTING

Today, over one-third of the 38 million annual Las Vegas visitors come from Southern California. The transportation system serving these trips consists of:

- The freeway network of Southern California, feeding auto trips to I-15 at Victorville.
- Interstate 15, the only direct roadway available, is only two lanes in each direction for most of its length, and has not been modified since it was constructed about 50 years ago.
- Airlines and airports such as LAX, Burbank, Ontario, and John Wayne with flights to McCarran.
- Buses that use the freeway network.

Most travelers drive, leaving their point of origin and traveling by the most convenient route to Victorville. Though they used many different routes to reach Victorville, at the point where they cross the Mojave River, all of them are on I-15, where they will stay until they reach the I-215 beltway in Las Vegas. At this point, they will begin to exit the freeway and make their way to the final destination at a resort or hotel.

According to the project's ridership study (see below), the projected travel demand from Southern California to Las Vegas in the year 2012 will be 18.2 million trips. The study found that DesertXpress would potentially capture over 20 percent of the total trips between southern California and Las Vegas in the first full start up year. Most of these trips would be diverted from private automobiles that would otherwise use I-15 between Victorville and Las Vegas.

In the future, Interstate 15 will remain in its existing configuration for most the distance between Victorville and Las Vegas, except for capacity improvements in the urban areas. Caltrans is planning the following improvements to the I-15 freeway that would add capacity[1]:

- Widen bridge over Mojave River in Victorville; reconstruct D Street, E Street, and South Stoddard Wells Road interchanges.
- Widen approximately 1 mile of freeway to 6 lanes and reconstruct an interchange in Barstow.
- Add several truck lanes in sections with steep grades.

NDOT is planning the following improvements to I-15[2]:

- "NEON" project in the City of Las Vegas, includes reconstruction of Charleston interchange, local access improvements, and a HOV direct connector from US 95 to I-15.
- "I-15 South" project from Sloan Road to Tropicana Avenue, includes new interchanges at Bermuda Road, Starr Ave. and Cactus Road, plus reconstruction of Sloan Road interchange.

[1] Email communication from Caltrans District 8, February, 28, 2008

[2] NDOT Quarterly Report for Major Projects, March 31, 2008

In addition, NDOT has a planning study underway of potential upgrades to I-15 and parallel roadways between I-215 and US 95, called the Urban Resort Corridor Study.

Clark County is considering a new airport in the Ivanpah Valley to supplement McCarran airport. Though planning has not advanced far enough to provide specifics, the new airport project has triggered consideration of adding roadway capacity in the I-15 corridor, either through freeway widening and/or construction of a new arterial roadway.

In the Victorville area, planning is underway for the High Desert Corridor (HDC) roadway project. This facility would intersect with I-15 between the Stoddard Wells Road interchanges at a freeway-to-freeway interchange. This section of the HDC is part of a longer facility envisioned to run from I-5 near Lancaster and Palmdale to east of Victorville. The section between I-15 and US 395 would be one of the earlier phases constructed.

Also near Victorville, the city is preparing a specific plan for the North Mojave area, which stretches along I-15 from the Mojave River to the north of the Dale Evans Parkway interchange. The specific plan area overlaps the alternative DesertXpress station and operations facility sites. As will be discussed in the following sections, the preliminary specific plan land use concepts have been included in the Victor Valley area travel demand model, and the future no-project traffic volumes used in the present analysis include a substantial level of development in this area. However, planning work is not complete on the plan, and the roadway system to support the specific plan development has not been fully defined. As a result, the assumed roadway geometry should be considered as preliminary.

3.0 BASELINE TRAFFIC FORECASTS

In order to determine the project impact (to be discussed in subsequent sections) in the two horizon years, future background traffic volumes needed to be obtained. Project volumes are then added to these future volumes before comparison of level of service can be made between the 'with' and 'without' project scenarios. The comparison results would be the project impact.

3.1 I-15 Mainline

Traffic volumes on I-15 in 2030 were obtained from the area wide model of San Bernardino Association of Governments (SANBAG) and Regional Transportation Commission of Southern Nevada (RTC) for the sections in California and Nevada respectively. These volumes had been reviewed by Caltrans and NDOT. These numbers were then used to interpolate for traffic volume in 2013 based on existing traffic counts. Existing counts for the California section of I-15 were published 2006 peak hour volumes by Caltrans; RTC provided 2005 volumes for the Nevada section. Tables 3-1 and 3-2 show the forecast volumes on I-15.

Table 3-1
Future Forecast of California Section of I-15

Section	2006				2013				2030			
	AM		PM		AM		PM		AM		PM	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
No. Jct. Stoddard Wells to Jct. I-40	3,335	2,795	2,250	4,560	3,756	3,147	2,533	5,134	4,777	4,003	3,221	6,529
Jct. I-40 to Nevada State Line	2,465	2,065	1,659	3,361	2,842	2,382	1,915	3,881	3,760	3,150	2,537	5,143

Table 3-2
Future Forecast of Nevada Section of I-15

Section	2005				2013				2030			
	AM		PM		AM		PM		AM		PM	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Primm to Sloan	2,945	2,945	3,776	3,776	4,674	5,111	6,366	5,834	8,348	9,713	11,870	10,206
Sloan to I-215	3,772	2,824	3,786	4,662	7,520	6,904	7,285	9,242	15,483	15,573	14,720	18,974

3.2 Victorville Area

City of Victorville provided the 2035 3-hour peak volumes for local intersections around the proposed station locations. Growth factors for 2013 and 2030 were derived through straight line interpolation from the calibration year of 2005 and applied to existing turning movement counts collected for this project in 2006. These volumes were then adjusted to balance the 'in' and 'out' numbers. A peak hour factor of 0.28 was used whenever necessary according to the San Bernardino County CMP Guidelines 2005. A total of 13 intersections were analyzed for the two proposed station location alternatives.

3.3 Las Vegas Area

Future 2030 average daily traffic volumes (ADT) of local intersection volumes around the proposed station locations in Las Vegas were provided by RTC. Straight line interpolation was used to obtain the 2013 growth factors. Turning movement counts at intersections under Clark County jurisdiction were collected for this project in 2008 while the City of Las Vegas provided turn volumes for intersections under its jurisdiction. There were four alternatives for the proposed station location, giving a total of 48 intersections being analyzed.

4.0 PROJECT TRAFFIC FORECASTS

4.1 Ridership Studies

Ridership projections for the project were developed through a comprehensive travel demand modeling process commissioned by DesertXpress Enterprises. This forecast was prepared by URS and independently peer-reviewed by Stear Davies and Gleave (SDG). The URS study incorporated a comprehensive travel demand model that divided the Southern California area into zones (by postal zip codes), computed travel times and costs from those zones for the automobile and air travel modes, and then compared those modes to the time and cost of DesertXpress. The study also utilized an internet-based stated preference survey of selected Southern California residents (carried out in July 2005) to estimate how many existing auto and air trips to Las Vegas could potentially be diverted to DesertXpress.

Subsequently, the FRA's EIS consultants hired Cambridge Systematics (CSI) to independently review the URS study and SDG peer review. The Cambridge Systematics study examined and evaluated the methodologies employed in the URS ridership study and confirmed that the URS work was done in a professional manner using widely accepted travel forecasting tools. CSI noted that numerous factors could alter the findings of the URS ridership study in both positive and negative directions. Following consideration of all of these factors and their relative potential to alter the findings, CSI concluded that the ridership forecast numbers prepared by URS should be adjusted downwards by a factor of about 10 percent overall for use in the EIS. CSI prepared a reduced forecast which is being used for all of the EIS studies that require a travel forecast, including noise, air quality, energy, and traffic. The CSI./URS report was also the source for average auto occupancy.

4.2 Rail Operating Plan

The preliminary operations plan used for the traffic analysis assumes that trains would operate between approximately 6 a.m. to 10 p.m., 365 days per year. There would be ten cars per train. Passenger capacities for DMU trains would be 478 passengers. EMU trains, which have slightly longer and wider cars, would have a capacity of 675 passengers.

Depending upon the direction of travel and the specific alignment and station locations, one-way travel times are in the range of 100 minutes for the EMU technology option to 116 minutes for the DMU technology option. DMU average speeds would be approximately 100 mph while EMU average speeds would be approximately 112 mph, enabling a shorter travel time for the EMU technology option (98 minutes for the EMU; 109 minutes for the DMU). Trains would depart from both ends of the line at 20 minute headways during peak hours and once per hour during off-peak periods.

Rail passengers would have the option of using a full-service valet parking and baggage service, where they would be greeted at the Victorville station as if they were arriving at their hotel in Las Vegas. Staff in Victorville would park their car, check them into their hotel and

forward their bags to their room. On arriving in Las Vegas, these passengers would take a hotel shuttle to their resort, where they would find their bags in their room.

4.3 Rail Ridership Forecasts

The URS and CSI rail ridership forecasts assumed that DesertXpress would begin operation in 2012. Since these forecasts were prepared, it has become apparent that 2013 would be a more likely opening date. Part of the URS forecast methodology assumed that there would be a "ramp-up" period for rail ridership covering the first two years of operation. This was implemented by discounting the total rail market to 60% in the first year and 80% in the second year of operation. As shown in Table 4-1, Wilbur Smith Associates, as part of their review of the rail operation plan for the EIS consultant, adjusted the CSI forecasts to a 2013 opening date. This table also shows the annual rail round trips that were used in the traffic analysis.

Table 4-1
Rail Ridership Ramp-Up Adjustments Annual Round Trips

Year	DMU			EMU		
	Total Rail Market	Ramp Share	Adjusted Rail Ridership	Total Rail Market	Ramp Share	Adjusted Rail Ridership
2012	3,245,797	0%	0	4,120,508	0%	0
2013	3,375,629	60%	2,025,377	4,285,329	60%	2,571,197
2014	3,510,654	80%	2,808,523	4,456,742	80%	3,565,394
2015	3,651,080	100%	3,651,080	4,635,012	100%	4,635,012
2016	3,797,123	100%	3,797,123	4,820,413	100%	4,820,413
2030	5,426,147	100%	5,426,147	6,888,443	100%	6,888,443

Source: WSA

4.4 Mainline Traffic Reduction

As discussed earlier, the proposed DesertXpress rail service is aimed to reduce traffic between southern California and Las Vegas. As such, it is envisaged that traffic along I-15 between the proposed Victorville station and Las Vegas would decrease when the service begins in 2013.

Two train types were considered for this project, each with a different capacity. As a result, the potential traffic reduction on I-15 would vary. Table 4-2 shows the expected volume reduction for the peak direction during peak hour. Following assumptions were made in arriving at the mainline traffic reduction.

Project Assumptions: Average daily trips were calculated from annual trips by dividing by 365.

Using data from the URS report, DH calculated the number of rail trips diverted from the auto, air and bus modes.

Table 4-2
Expected Number of Vehicle Reduction on I-15

Alternative	Year	Average Annual Daily Rail One-way Trips	Daily Trips Diverted From Auto	Daily Trips Diverted From Bus	Daily Diverted Auto Volume	Daily Diverted Bus Volume	Total Daily Diverted Volume	Total Volume Reduction in Peak Hour of Peak Direction
DEMU	2013	11,098	9,988	1,110	4,060	18	4,097	410
DEMU	2030	29,732	26,759	2,973	10,878	50	10,977	1,098
EMU	2013	14,089	12,680	1,409	5,154	23	5,201	520
EMU	2030	37,745	33,970	3,774	13,809	63	13,935	1,393

Trips diverted from the auto and bus modes to rail will reduce traffic on the section of I-15 between Victorville and Las Vegas.

Rail trips diverted from auto were converted to vehicle trips using an average vehicle occupancy rate of 2.46 persons per vehicle.

Rail trips diverted from bus were converted to vehicle trips using an average vehicle occupancy rate of 60 persons per bus.

Peak hour diverted vehicle volumes were derived from average daily diverted vehicle volumes by applying the highway peak hour factor of 10%.

It is assumed that 90% of the reduced trips would be auto trips and 10% would be bus trips. The occupancy for one car is 2.46 passengers and that for bus is 60 passengers. The peak hour volume in the peak direction is assumed to be 10% of the daily trips.

4.5 Station Mode Share and Trip Generation

The expected number of passengers using the project's stations will arrive or leave the station via 5 modes. Tables 4-3 and 4-4 present the mode share for Victorville and Las Vegas Station respectively, together with the assumed occupancy.

Table 4-3
Mode Share at Victorville Station

Mode	Occupancy (passenger/car)	Spilt %	PCE[1]
Self Drive	2.4	75%	
Kiss & Ride	1	5%	
Charter Bus	10	4%	1.5
Shuttle Bus	3	11%	
Taxi	1	5%	
Total		100%	

[1]Passenger Car Equivalent

Table 4-4
Mode Share at Las Vegas Station

Mode	Occupancy (passenger/car)	Spilt %	PCE
Rental/Car	1.5	21%	
Kiss & Ride	1	7%	
Charter Bus	15	5%	1.5
Shuttle Bus	2	35%	
Taxi	1	32%	
Total		100%	

The number of trips generated at the proposed stations depends on the type of train system selected for operation. EMU has a higher capacity of 675 passengers at full load whereas the capacity of DMU is 478. The train station would operate in the off-peak mode for both directions (outbound/inbound) on Monday to Thursday and on Saturday. For the Victorville Station, it would operate at peak mode during Friday for the outbound direction and the inbound direction would operate in off-peak mode. On Sunday, it would operate in peak mode for the inbound direction and off-peak mode for outbound. The Las Vegas Station on the other hand, would operate at peak mode for its inbound direction on Friday and off-peak mode for outbound. The outbound direction on Sunday would be peak and the inbound direction would operate at off-peak.

When both directions are operating as off-peak mode (Monday – Thursday and Saturday), it is assumed that the headway for each train would be 60 minutes, at full loading capacity. On days when one direction is operating at peak mode, the off-peak direction train would operate at 20-minute headway at only 69% capacity. The peak direction train would also operate at 20-minute headway but at 100% capacity. Table 4-5 and 4-6 show the number of peak hour trips (in terms of cars) generated at each station for each technology alternative.

Table 4-5
Peak Hour Trips Generated for Victorville Station

EMU				DMU			
	Trips In	Trips Out	Total Trips		Trips In	Trips Out	Total Trips
Mon-Thurs, Sat (arrive/depart)	342	342	685	Mon-Thurs, Sat (arrive/depart)	243	243	486
Friday (peak=depart, off-peak= arrive)	993	739	1732	Friday (peak=depart, off-peak= arrive)	704	524	1227
Sunday (peak=arrive, off-peak=depart)	739	993	1732	Sunday (peak=arrive, off-peak=depart)	524	704	1227

Table 4-6
Peak Hour Trips Generated for Las Vegas Station

EMU				DMU			
	Trips In	Trips Out	Total Trips		Trips In	Trips Out	Total Trips
Off Peak (arrive/depart)	528	528	1056	Off Peak (arrive/depart)	374	374	749
Friday (peak=arrive, off-peak=depart)	1136	1537	2673	Friday (peak=arrive, off-peak=depart)	803	1089	1892
Sunday (peak=depart, off-peak=arrive)	1537	1136	2673	Sunday (peak=depart, off-peak=arrive)	1089	803	1892

Station employees are included in the trip generation numbers, as are vehicles serving the station for deliveries, maintenance, etc. Note that some access modes such as kiss and ride generate both an in and out trip, while other modes such as self park generate only an inbound or outbound trip. This accounts for the relatively higher trip figures for the Las Vegas Station when compared to the Victorville Station.

4.6 Operation and Maintenance Service Facilities

Alternative locations have been proposed for the O & M facilities in Victorville and Las Vegas. Figures 4-1 and 4-2 show the proposed location options. A third alternative location in Las Vegas, near Sloan Road is not shown on the map.

Employees at these facilities would be divided into three shifts. Only the day and night shift employees would commute during the peak hour of the adjacent street. The day shift would work 7:00 am to 3:30 pm and the night shift starts at 11:00 pm and works to 7:30 am. It is assumed that 15% of the day shift would arrive after 7:00 am, constituting inbound trips. All the night shift employees would leave during the AM peak, making up the outbound station trips. No O & M generated trips would be added to the PM peak commute. Assuming each employee drives alone, Tables 4-7, 4-8 and 4-9 shows the number of trips generated at both facilities in 2013 and 2030. In 2030, the DMU fleet would be larger than the EMU fleet, leading to higher trip volumes for the DMU alternative.

Table 4-7
O & M Trip Generation in 2013

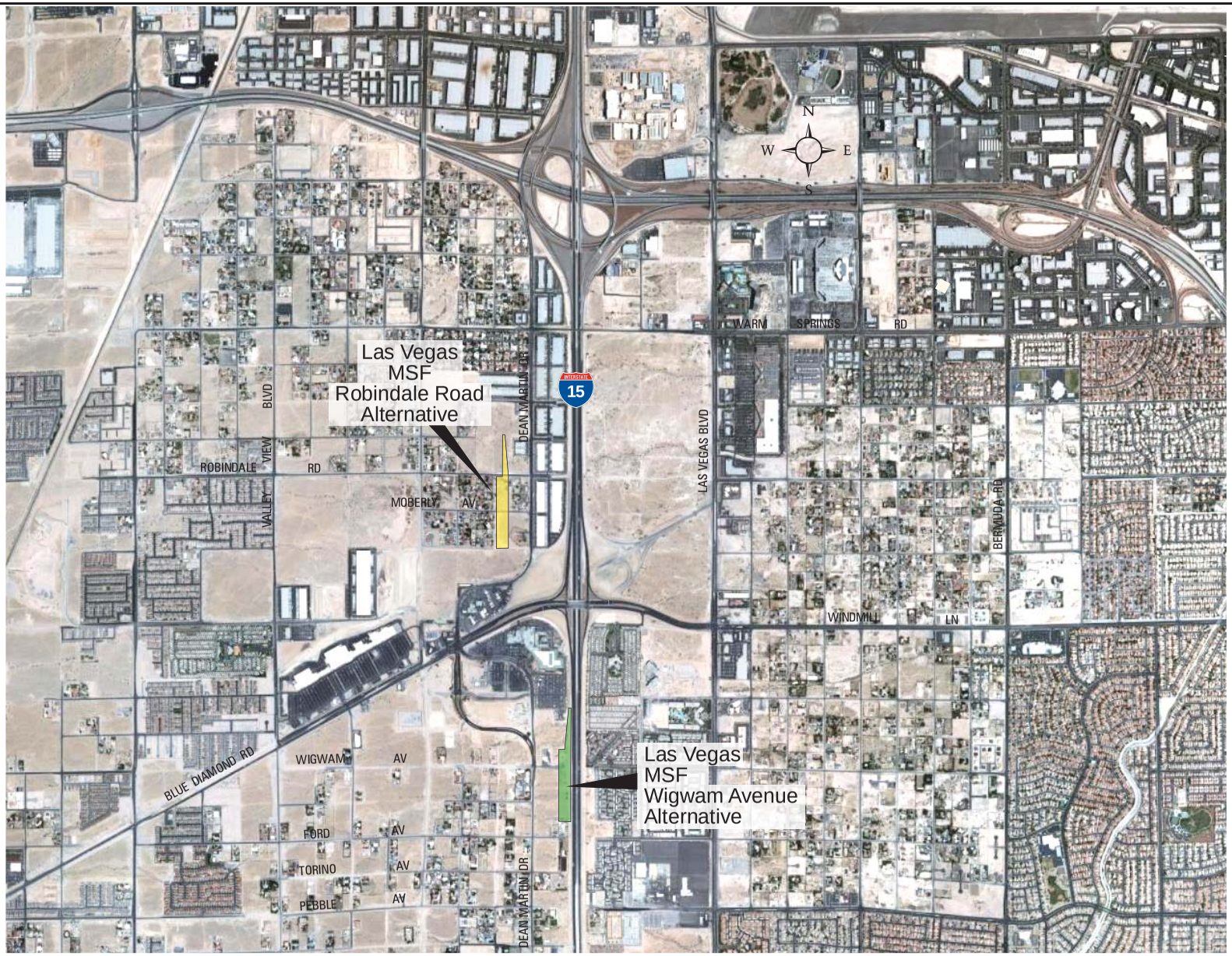
Station Location	Inbound Trips		Outbound Trips		Total
	Employees (Day Shift)	Trips @ 15%	Employees (Night Shift)	Trips @ 100%	
Victorville	60	9	40	40	49
Las Vegas	11	2	22	22	24

Maintenance facilities Victorville.ai

DESERT XPRESS PROPOSED VICTORVILLE STATION

Figure 4-1

PROPOSED MAINTENANCE FACILITY AT VICTORVILLE
(2 Alternatives)



Las Vegas Maintenance Sites rev1.ai

DESERT XPRESS LAS VEGAS

Figure 4-2

PROPOSED MAINTENANCE FACILITY AT LAS VEGAS

(2 Alternatives)

Table 4-8
O & M Trip Generation in 2030 for EMU

Station Location	Inbound Trips		Outbound Trips		Total
	Employees (Day Shift)	Trips @ 15%	Employees (Night Shift)	Trips @ 100%	
Victorville	79	12	53	53	64
Las Vegas	14	2	29	29	31

Table 4-9
O & M Trip Generation in 2030 for DMU

Station Location	Inbound Trips		Outbound Trips		Total
	Employees (Day Shift)	Trips @ 15%	Employees (Night Shift)	Trips @ 100%	
Victorville	109	16	72	72	89
Las Vegas	20	3	40	40	43

The number of trips generated by the proposed O&M facilities in 2013 would be less than 50 trips. Based on the San Bernardino County CMP and Caltrans guidelines, intersection analysis would not be necessary at the Victorville Station. Since the station location at Victorville Station would be served primarily by I-15, with less than 100 trips in 2030, intersection analysis on I-15 ramps would not be necessary as well. The proposed locations in Las Vegas are away from the high traffic area and the amount of trips generated is also less than 50 peak hour trips for both the horizon years. While RTC does not have guidelines on the minimum number of trips required for analysis, based on the California agencies' criteria, detailed evaluation of the local intersections would not be necessary as well.

5.0 I-15 MAINLINE AND RAMP ANALYSIS

5.1 Roadway Network

Regional Access. Currently I-15 is the only significant surface transportation route between Victorville and Las Vegas. The general number of traffic lanes on I-15 is described below:

- Victorville to Barstow - 3 lanes each way with a 4th southbound truck lane between Barstow and the summit,
- Barstow to I-40 - 3 lanes each way plus some auxiliary lanes,
- I-40 to Baker - 2 lanes each way,
- Baker to State Line - 2 lanes each way with a truck lane approaching Halloran Summit (~17 miles north of Baker) and at Mountain Pass (~15 miles south of the State Line),
- State Line to I-215 - 3 southbound lanes and 2 northbound lanes, with an additional northbound lane currently being constructed,
- I-215 to Flamingo Road in Las Vegas - 3 lanes each way plus auxiliary lanes, and
- North of Flamingo Road in Las Vegas - 4 lanes each way.

5.2 Freeway Section and Ramp Junction Analysis Methodology

The operating conditions for the freeway mainline were evaluated using the *Highway Capacity Manual (HCM)* methodology. For freeway mainlines, this methodology determines LOS based on the density of the freeway section, which is the number of vehicles within a given section of roadway for a period of time (presented in passenger cars per mile per lane, or pc/mi/ln).[1] Density values of LOS A through E assume stable non-breakdown operations, while LOS F signifies that a breakdown condition exists or is expected to occur. For the freeway-ramp junctions, the level of service is based on the amount of vehicles in the area of the freeway directly downstream of the analysis ramp, combining the mainline volume with the ramp volume. Density values of LOS A through E assume stable non-breakdown operations, while LOS F signifies that a breakdown condition exists or is expected to occur. In California and Nevada LOS E and F are considered unacceptable service conditions. Table 5-1 presents the definitions LOS threshold values for freeway sections and the ramp junctions.

[1] Density is not computed when free-flow speed is less than 55 mph. Under LOS F conditions, free-flow speed drops to below 55 mph.

Table 5-1
Freeway Mainline and Ramp Junction Level of Service Thresholds

Level of Service	Freeway Density Range (pc/mi/ln)	Ramp (Merge and Diverge area) Density Range (pc/mi/ln)
A	0 to 11	≤ 10
B	> 11 to 18	> 10 to 20
C	> 18 to 26	> 20 to 28
D	> 26 to 35	> 28 to 35
E	> 35 to 45	> 35
F	> 50	Demand exceeds capacity

SOURCE: *Highway Capacity Manual*, Transportation Research Board, 2000.

5.3 Existing Freeway Section Analysis

Interstate 15 (I-15) mainline conditions were evaluated for the following sections for weekday AM and PM peak hours:

1. North Stoddard Wells to Junction I-40 (California)
2. Junction I-40 to Nevada State Line (California)
3. Primm to Sloan (Nevada)
4. Sloan to I-215 (Nevada)

These sections are also indicated on Figure 5-1.

For the mainline analysis sections in California, volumes for existing (year 2007) conditions were obtained by interpolating between year 2006 and year 2030 volumes provided by the San Bernardino Association of Government's (SANBAG) travel demand model. Similarly for the mainline analysis sections in Nevada, volumes for existing (year 2007) conditions were obtained by interpolating between year 2005 and year 2030 volumes provided by Regional Transportation Commission (RTC) travel demand model. The mainline section AM and PM peak hour volumes are presented on Figure 5-2.

The following assumptions were made for the mainline HCM analysis (Table 5-2).

Table 5-2
HCM Analysis Assumptions – Existing Conditions

Description	California	Nevada
Peak Hour Factor	0.90	0.90
Terrain	Level	Level
Trucks and Buses (%)	20	10
Driver population adjustment	1.0	1.0
Measured Free Flow Speed	70.0	70.0
Number of Lanes		
North Stoddard Wells to Junction I-40 (NB, SB)	3 NB, 3 SB	
Junction I-40 to Nevada State line (NB, SB)	2 NB, 2 SB	
Primm to Sloan (NB, SB)		3 NB, 3 SB
Sloan to I-215 (NB, SB)		3 NB, 3 SB

SOURCE: DMJM Harris, 2008.

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Figure 5-1

I-15 MAINLINE ANALYSIS SECTIONS

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Figure 5-2

I-15 MAINLINE EXISTING VOLUMES

AM (PM) Peak Hour

Based on the assumptions listed in Table 5-2 and existing peak hour volumes shown on Figure 5-2, level of service analysis was performed on the freeway mainline sections. Table 5-3 presents the results of the analysis.

Table 5-3
Freeway Mainline Level of Service - Existing Conditions

No.	Section	Peak Hour	NB		SB	
			LOS	Density	LOS	Density
1	North Stoddard Wells to Junction I-40	AM	C	19.8	B	16.6
		PM	B	13.3	D	28.4
2	Junction I-40 to Nevada State line	AM	C	22.1	C	18.4
		PM	B	14.8	D	33.5
3	Primm to Sloan	AM	C	18.8	C	19.4
		PM	C	25.1	C	24.2
4	Sloan to I-215	AM	D	27.1	C	21.4
		PM	D	26.8	**E**	**38.7**

Bold indicates unacceptable conditions SOURCE: DMJM Harris, 2008.
Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density reported in pc/mi/ln

As indicated in Table 5-3, all the freeway sections operate at acceptable conditions in the AM and PM peak hours except Section 4 from Sloan to I-215 that operates at LOS E in the southbound direction during the PM peak hour.

The unacceptable condition indicates that the travel speeds along the freeway section are low, with delays to traffic and breakdown in flow.

5.4 Existing Ramp Junction Analysis

In accordance with Chapter 6 of this report, the ramp junction analysis is performed for the PM peak hour only as done for the intersection analysis. Ramp junctions were evaluated at both of the proposed station locations in Victorville. The following ramp-junctions were evaluated for the PM peak hour conditions. Ramp junctions 1 through 4 indicate merge and diverge areas at the station location alternative 1 and ramp junctions 5 through 8 are near the station location alternative 2.

1. I-15 NB Off-ramp to Stoddard Wells (Diverge analysis)
2. I-15 SB Off-ramp to Stoddard Wells (Diverge analysis)
3. I-15 NB On-ramp from Stoddard Wells (Merge analysis)
4. I-15 SB On-ramp from Stoddard Wells (Merge analysis)
5. I-15 NB Off-ramp to North Stoddard Wells (Diverge analysis)
6. I-15 SB Off-ramp to North Stoddard Wells (Diverge analysis)
7. I-15 NB On-ramp from North Stoddard Wells (Merge analysis)
8. I-15 SB On-ramp from North Stoddard Wells (Merge analysis)

For the above ramp junctions, volumes for existing (year 2007) conditions were obtained by interpolating between year 2006 and year 2035 volumes provided by the San Bernardino Association of Government's (SANBAG) travel demand model. The existing ramp junction volumes are presented in the Appendix. Table 5-4 presents the results of the ramp junction analysis. HCS calculation sheets are provided in the Appendix.

Table 5-4
Ramp Junction Level of Service – Existing Conditions

	Location	LOS	D_R
1	I-15 NB Off-ramp to Stoddard Wells	B	18.4
2	I-15 SB Off-ramp to Stoddard Wells	D	28.2
3	I-15 NB On-ramp from Stoddard Wells	B	18.5
4	I-15 SB On-ramp from Stoddard Wells	D	31.0
5	I-15 NB Off-ramp to North Stoddard Wells	B	17.5
6	I-15 SB Off-ramp to North Stoddard Wells	C	27.9
7	I-15 NB On-ramp from North Stoddard Wells	B	17.5
8	I-15 SB On-ramp from North Stoddard Wells	D	29.7

Bold indicates unacceptable conditions SOURCE: DMJM Harris, 2008.
Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density of ramp (D_R) reported in pc/mi/ln

As indicated in Table 5-4, all the ramp junctions would operate at acceptable conditions.

5.5 Impact Analysis

This section presents the assessment of transportation impacts due to the proposed project on the freeway mainline. The impacts were assessed for the following scenarios:

- 2013 Opening Year Conditions;
- 2013 Opening Year plus Project Conditions;
- 2030 Cumulative Baseline Conditions; and,
- 2030 Cumulative Baseline plus Project Conditions

5.6 2013 Opening Year Conditions

5.6.1 Freeway Analysis

1. 2013 Baseline Conditions

For the mainline analysis sections in California, volumes for opening (year 2013) conditions were obtained by interpolating between year 2006 and year 2030 volumes provided by the San Bernardino Association of Government's (SANBAG) travel demand model. Similarly for the

mainline analysis sections in Nevada, volumes for opening (year 2013) conditions were obtained by interpolating between year 2005 and year 2030 volumes provided by Regional Transportation Commission (RTC) travel demand model. I-15 mainline volumes for analysis sections are presented in the Appendix.

Table 5-5 presents the results of 2013 Baseline conditions for the freeway mainline.

Table 5-5
Freeway Mainline Level of Service – 2013 Baseline Conditions

No.	Section	Peak Hour	NB		SB	
			LOS	Density	LOS	Density
1	North Stoddard Wells to Junction I-40	AM	C	21.9	C	18.3
		PM	B	14.7	D	33.3
2	Junction I-40 to Nevada State line	AM	C	25.4	C	20.8
		PM	B	16.7	**E**	**43.6**
3	Primm to Sloan	AM	D	26.9	D	30.5
		PM	**F**	**>45.0**	**E**	**39.1**
4	Sloan to I-215	AM	**F**	**>45.0**	**F**	**>45.0**
		PM	**F**	**>45.0**	**F**	**>45.0**

Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density reported in pc/mi/ln
Bold indicates unacceptable conditions

SOURCE: DMJM Harris, 2008.

As indicated in Table 5-5, the following freeway sections would operate at unacceptable conditions:

AM Peak Hour:

- #4. Sloan to I-215 in the northbound and southbound directions (LOS F)

PM Peak Hour:

- #2. Junction I-40 to Nevada State Line in southbound direction (LOS E)
- #3. Primm to Sloan in the northbound and southbound directions (LOS F and E respectively)
- #4. Sloan to I-215 in the northbound and southbound directions (LOS F)

The unacceptable conditions indicate that the travel speeds along the freeway are low, with delays to traffic and breakdown in flow.

2. *2013 Baseline plus DMU Alternative Conditions*

Based on the mainline traffic reduction for the DMU alternative presented in Section 4.2, the project trips associated with the alternative were reduced from the 2013 Baseline volumes to generate 2013 Baseline plus DMU alternative volumes, presented in Figure 5-3.

For analysis purposes, existing mainline geometry was assumed for year 2013. Based on the assumptions presented in Table 5-2 and mainline volumes presented in Figure 5-3, HCS analysis has been performed. Table 5-6 presents the results of 2013 Baseline plus DMU alternative conditions for the freeway mainline sections.

Table 5-6
Freeway Mainline Level of Service – 2013 Baseline plus DMU Conditions

No.	Section	Peak Hour	2013 Baseline Conditions				2013 Baseline plus DMU Conditions			
			NB		SB		NB		SB	
			LOS	Density	LOS	Density	LOS	Density	LOS	Density
1	North Stoddard Wells to Junction I-40	AM	C	21.9	C	18.3	C	19.5	B	15.9
		PM	B	14.7	D	33.3	B	12.4	D	29.1
2	Junction I-40 to Nevada State line	AM	C	25.4	C	20.8	C	21.3	B	17.2
		PM	B	16.7	**E**	**43.6**	B	13.1	D	34.1
3	Primm to Sloan	AM	D	26.9	D	30.5	C	24.0	D	27.1
		PM	**F**	**>45.0**	**E**	**39.1**	**E**	**41.0**	D	33.7
4	Sloan to I-215	AM	**F**	**>45.0**	**F**	**>45.0**	**F**	**> 45.0**	**F**	**> 45.0**
		PM	**F**	**>45.0**	**F**	**>45.0**	**F**	**> 45.0**	**F**	**> 45.0**

Note:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density reported in pc/mi/ln
Bold indicates unacceptable conditions

SOURCE: DMJM Harris, 2008.

Comparing the HCS analysis results from 2013 Baseline conditions to 2013 Baseline plus DMU conditions, it can be seen from Table 5-6 the following freeway section operating conditions improve from unacceptable to acceptable conditions with the reduction in volume with the DMU project alternative:

PM Peak Hour:

- #2. Section from Junction I-40 to Nevada State Line improves from LOS E to LOS D in the southbound direction.
- #3. Section from Primm to Sloan improves from LOS E to LOS D in the southbound direction.

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Figure 5-3

I-15 MAINLINE 2013 PLUS DMU ALTERNATIVE VOLUMES

AM (PM) Peak Hour

However, the following sections continue to operate at unacceptable level of service under 2013 Baseline plus DMU conditions:

AM Peak Hour:

- #4. Sloan to I-215 in the northbound and southbound directions (LOS F)

PM Peak Hour:

- #3. Primm to Sloan in the northbound direction (LOS F to LOS E)
- #4. Sloan to I-215 in the northbound and southbound directions (LOS F)

3. 2013 Baseline plus EMU Alternative Conditions

Based on the mainline traffic reduction for the EMU alternative presented in Section 4.2, the project trips associated with the alternative were reduced from the 2013 Baseline volumes to generate 2013 Baseline plus EMU alternative volumes, presented in Figure 5-4.

For analysis purposes, existing mainline geometry was assumed for year 2013. Based on the assumptions presented in Table 5-2 and mainline volumes presented in Figure 5-4, HCS analysis has been performed. Table 5-7 presents the results of 2013 Baseline plus the EMU alternative conditions for the freeway mainline sections.

Table 5-7
Freeway Mainline Level of Service – 2013 Baseline plus EMU Conditions

No.	Section	Peak Hour	2013 Baseline Conditions				2013 Baseline plus EMU Conditions			
			NB		SB		NB		SB	
			LOS	Density	LOS	Density	LOS	Density	LOS	Density
1	North Stoddard Wells to Junction I-40	AM	C	21.9	C	18.3	C	18.8	B	15.3
		PM	B	14.7	D	33.3	B	11.7	D	28.1
2	Junction I-40 to Nevada State line	AM	C	25.4	C	20.8	C	20.3	B	16.3
		PM	B	16.7	**E**	**43.6**	B	12.2	D	32.2
3	Primm to Sloan	AM	D	26.9	D	30.5	C	23.3	D	26.2
		PM	**F**	**>45.0**	**E**	**39.1**	**E**	**39.3**	D	32.6
4	Sloan to I-215	AM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**
		PM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**

Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density reported in pc/mi/ln
Bold indicates unacceptable conditions

SOURCE: DMJM Harris, 2008.

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Figure 5-4

I-15 MAINLINE 2013 PLUS EMU ALTERNATIVE VOLUMES

AM (PM) Peak Hour

Comparing the HCS analysis results from 2013 Baseline conditions to 2013 Baseline plus EMU conditions, it can be seen from Table 5-7 the following freeway section operating conditions improve from unacceptable to acceptable conditions with the reduction in volume with the EMU project alternative:

PM Peak Hour:

- #2. Section from Junction I-40 to Nevada State Line improves from LOS E to LOS D in the southbound direction.
- #3. Section from Primm to Sloan improves from LOS E to LOS D in the southbound direction.

However, the following sections continue to operate at unacceptable level of service under 2013 Baseline plus EMU conditions:

AM Peak Hour:

- #4. Sloan to I-215 in the northbound and southbound directions (LOS F)

PM Peak Hour:

- #3. Primm to Sloan in the northbound direction (LOS F to LOS E)
- #4. Sloan to I-215 in the northbound and southbound directions (LOS F)

5.6.2 Ramp Junction Analysis

1. 2013 Baseline Conditions

The future year 2013 baseline volumes were obtained by interpolating between the existing year and future year 2035 travel demand volumes. The 2013 baseline condition volumes are presented in the Appendix. For analysis purposes, existing geometry was assumed for the future year 2013 conditions. Table 5-8 presents the results of the ramp junction analysis for 2013 baseline conditions. HCS calculation sheets are provided in the Appendix.

Table 5-8
Ramp Junction Level of Service – 2013 Baseline Conditions

Location		LOS	D_R
1	I-15 NB Off-ramp to Stoddard Wells	F	41.5
2	I-15 SB Off-ramp to Stoddard Wells	F	47.5
3	I-15 NB On-ramp from Stoddard Wells	F	48.3
4	I-15 SB On-ramp from Stoddard Wells	F	69.7
5	I-15 NB Off-ramp to North Stoddard Wells	F	38.8
6	I-15 SB Off-ramp to North Stoddard Wells	F	47.0
7	I-15 NB On-ramp from North Stoddard Wells	F	44.1

	Location	LOS	D_R
8	I-15 SB On-ramp from North Stoddard Wells	F	65.3

Bold indicates unacceptable conditions
SOURCE: DMJM Harris, 2008.
Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density of ramp (D_R) reported in pc/mi/ln

As indicated in Table 5-8, all the ramp junctions operate at unacceptable level of service conditions under this scenario. This indicates that the existing ramp configuration would not be able to handle the future volume growth in the area.

2. 2013 Baseline plus DMU Alternative Conditions

The DMU project alternative volumes were added to the 2013 baseline volumes to obtain the 2013 baseline plus DMU alternative condition volumes. These volumes are presented in the Appendix. Table 5-9 presents the results of the ramp junction analysis for 2013 baseline plus DMU conditions. HCS calculation sheets are provided in the Appendix.

Table 5-9
Ramp Junction Level of Service – 2013 Baseline plus DMU Alternative Conditions

	Location	LOS	D_R
1	I-15 NB Off-ramp to Stoddard Wells	F	42.3
2	I-15 SB Off-ramp to Stoddard Wells	F	47.5
3	I-15 NB On-ramp from Stoddard Wells	F	48.5
4	I-15 SB On-ramp from Stoddard Wells	F	73.4
5	I-15 NB Off-ramp to North Stoddard Wells	F	39.8
6	I-15 SB Off-ramp to North Stoddard Wells	F	47.0
7	I-15 NB On-ramp from North Stoddard Wells	F	44.2
8	I-15 SB On-ramp from North Stoddard Wells	F	68.4

Bold indicates unacceptable conditions
SOURCE: DMJM Harris, 2008.
Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density of ramp (D_R) reported in pc/mi/ln

Comparing results from tables 5-8 and 5-9, it can be noted that all the ramp junctions continue to operate at unacceptable conditions under this scenario. The densities at the ramp influence area only increase with the addition of the DMU project volumes.

3. 2013 Baseline plus EMU Alternative Conditions

The EMU project alternative volumes were added to the 2013 baseline volumes to obtain the 2013 baseline plus EMU alternative condition volumes. These volumes are presented in the

Appendix. Table 5-10 presents the results of the ramp junction analysis for 2013 baseline plus EMU conditions. HCS calculation sheets are provided in the Appendix.

Table 5-10
Ramp Junction Level of Service – 2013 Baseline plus EMU Alternative Conditions

	Location	LOS	D_R
1	I-15 NB Off-ramp to Stoddard Wells	F	42.7
2	I-15 SB Off-ramp to Stoddard Wells	F	47.5
3	I-15 NB On-ramp from Stoddard Wells	F	48.6
4	I-15 SB On-ramp from Stoddard Wells	F	74.9
5	I-15 NB Off-ramp to North Stoddard Wells	F	40.3
6	I-15 SB Off-ramp to North Stoddard Wells	F	47.0
7	I-15 NB On-ramp from North Stoddard Wells	F	44.3
8	I-15 SB On-ramp from North Stoddard Wells	F	69.7

Bold indicates unacceptable conditions SOURCE: DMJM Harris, 2008.
Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density of ramp (D_R) reported in pc/mi/ln

Comparing results from tables 5-8 and 5-10, it can be noted that all the ramp junctions continue to operate at unacceptable conditions under this scenario. The densities at the ramp influence area only increase with the addition of the EMU project volumes.

5.7 2030 Cumulative Conditions

This section presents the analysis of 2030 Cumulative conditions without and with project (both DMU and EMU options).

5.7.1 Freeway Analysis

1. 2030 Baseline Conditions

For the mainline analysis sections in California, cumulative conditions volumes for the future year 2030 were obtained from the San Bernardino Association of Government's (SANBAG) travel demand model. Similarly for the mainline analysis sections in Nevada, cumulative conditions volumes for the future year 2030 were obtained from the Regional Transportation Commission (RTC) travel demand model.

Future year 2030 lane configuration for all the analysis sections is presented in Figure 5-5. The mainline section AM and PM peak hour volumes are presented on Figure 5-6.

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Figure 5-5

I-15 MAINLINE FUTURE YEAR 2030 GEOMETRY

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Figure 5-6

I-15 MAINLINE 2030 NO BUILD VOLUMES

AM (PM) Peak Hour

Table 5-11
HCS Assumptions – 2030 Conditions

Description	California	Nevada
Peak Hour Factor	0.95	0.95
Number of Lanes		
North Stoddard Wells to Junction I-40 (NB, SB)	3 NB, 3 SB	
Junction I-40 to Nevada State line (NB, SB)	2 NB, 2 SB	
Primm to Sloan (NB, SB)		4 NB, 4 SB
Sloan to I-215 (NB, SB)		5 NB, 5 SB

SOURCE: DMJM Harris, 2008.

Based on the assumptions presented in Table 5-11 and mainline volumes presented in Figure 5-6, HCS analysis has been performed. Table 5-12 presents the results of 2030 Baseline condition analysis for the freeway mainline sections.

Table 5-12
Freeway Mainline Level of Service – 2030 Baseline Conditions

No.	Section	Peak Hour	NB		SB	
			LOS	Density	LOS	Density
1	North Stoddard Wells to Junction I-40	AM	D	27.4	C	22.2
		PM	B	17.8	**F**	**>45.0**
2	Junction I-40 to Nevada State line	AM	**E**	**35.8**	D	27.0
		PM	C	21.0	**F**	**>45.0**
3	Primm to Sloan	AM	**E**	**40.6**	**F**	**>45.0**
		PM	**F**	**>45.0**	**F**	**>45.0**
4	Sloan to I-215	AM	**F**	**>45.0**	**F**	**>45.0**
		PM	**F**	**>45.0**	**F**	**>45.0**

Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density reported in pc/mi/ln
Bold indicates unacceptable conditions

SOURCE: DMJM Harris, 2008.

As indicated in Table 5-12, all the freeway sections operate at unacceptable conditions (LOS E or F), except section 1 in the northbound direction in the AM and PM peak hours, in the southbound direction in the AM peak hour and section 2 in southbound direction during the AM peak hour as well as in the northbound direction during the PM peak hour.

2. 2030 Baseline plus DMU Alternative Conditions

Based on the mainline traffic reduction for DMU alternative presented in Section 4.2, the project trips associated with the alternative were reduced from the 2030 Baseline volumes to generate 2030 Baseline plus DMU alternative volumes, presented in Figure 5-7.

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Figure 5-7

I-15 MAINLINE 2030 PLUS DMU ALTERNATIVE VOLUMES

AM (PM) Peak Hour

Based on the assumptions presented in Table 5-11 and mainline volumes presented in Figure 5-7, HCS analysis has been performed. Table 5-13 presents the results of 2030 Baseline plus DMU alternative conditions for the freeway mainline sections.

Table 5-13
Freeway Mainline Level of Service – 2030 Baseline plus DMU Conditions

No.	Section	Peak Hour	2030 Baseline Conditions				2030 Baseline plus DMU Conditions			
			NB		SB		NB		SB	
			LOS	Density	LOS	Density	LOS	Density	LOS	Density
1	North Stoddard Wells to Junction I-40	AM	D	27.4	C	22.2	C	20.3	B	16.0
		PM	B	17.8	**F**	**>45.0**	B	11.7	D	33.4
2	Junction I-40 to Nevada State line	AM	**E**	**35.8**	D	27.0	C	22.1	B	17.0
		PM	C	21.0	**F**	**>45.0**	B	11.9	**E**	**42.2**
3	Primm to Sloan	AM	**E**	**40.6**	**F**	**>45.0**	D	30.9	**E**	**44.0**
		PM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**
4	Sloan to I-215	AM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**
		PM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**

Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density reported in pc/mi/ln
Bold indicates unacceptable conditions

SOURCE: DMJM Harris, 2008.

Comparing the HCS analysis results from 2030 Baseline conditions to 2030 Baseline plus DMU conditions, it can be seen from Table 5-13 that following freeway section operating conditions improve from unacceptable to acceptable conditions with the reduction in volume with the DMU project alternative:

AM Peak Hour:

- #2. Section from Junction I-40 to Nevada State Line improves from LOS E to LOS C in the northbound direction.
- #3. Section from Primm to Sloan improves from LOS E to LOS D in the northbound direction.

It can also be noted from Table 5-13 that sections 2 and 3 improve operating conditions from LOS F to LOS E in the southbound direction.

PM Peak Hour:

- #1. Section from North Stoddard Wells to Junction I-40 improves from LOS F to LOS D in the southbound direction.

All the other freeway sections operating at unacceptable conditions under the 2030 Baseline conditions continue to operate at unacceptable conditions under the 2030 DMU project conditions.

3. 2030 Baseline plus EMU Alternative Conditions

Based on the mainline traffic reduction for EMU alternative presented in Section 4.2, the project trips associated with the alternative were reduced from the 2030 Baseline volumes to generate 2030 Baseline plus EMU alternative volumes, presented in Figure 5-8.

Based on the assumptions presented in Table 5-11 and mainline volumes presented in Figure 5-8, HCS analysis has been performed. Table 5-14 presents the results of 2030 Baseline plus EMU alternative conditions for the freeway mainline sections.

Table 5-14
Freeway Mainline Level of Service – 2030 Baseline plus EMU Conditions

No.	Section	Peak Hour	2030 Baseline Conditions				2030 Baseline plus EMU Conditions			
			NB		SB		NB		SB	
			LOS	Density	LOS	Density	LOS	Density	LOS	Density
1	North Stoddard Wells to Junction I-40	AM	D	27.4	C	22.2	C	18.7	B	14.4
		PM	B	17.8	**F**	**>45.0**	A	10.1	D	30.4
2	Junction I-40 to Nevada State line	AM	**E**	**35.8**	D	27.0	C	19.6	B	14.5
		PM	C	21.0	**F**	**>45.0**	A	9.5	**E**	**35.6**
3	Primm to Sloan	AM	**E**	**40.6**	**F**	**>45.0**	D	29.0	**E**	**40.3**
		PM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**
4	Sloan to I-215	AM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**
		PM	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**	**F**	**>45.0**

Notes: SOURCE: DMJM Harris, 2008.
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density reported in pc/mi/ln
Bold indicates unacceptable conditions

Comparing the HCS analysis results from 2030 Baseline conditions to 2030 Baseline plus EMU conditions, it can be seen from Table 5-14 that following freeway section operating conditions improve from unacceptable to acceptable conditions with the reduction in volume with the EMU project alternative:

AM Peak Hour:

- #2. Section from Junction I-40 to Nevada State Line improves from LOS E to LOS C in the northbound direction..

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Figure 5-8

I-15 MAINLINE 2030 PLUS EMU ALTERNATIVE VOLUMES

AM (PM) Peak Hour

- #3. Section from Primm to Sloan improves from LOS E to LOS D in the northbound direction.

It can also be noted from Table 5-14 that section 3 improves operating conditions from LOS F to LOS E in the southbound direction.

PM Peak Hour:

- #1. Section from North Stoddard Wells to Junction I-40 improves from LOS F to LOS D in the southbound direction.

It can also be noted from Table 5-10 that section 2 improves operating conditions from LOS F to LOS E in the southbound direction.

All the other freeway sections operating at unacceptable conditions under the 2030 Baseline conditions continue to operate at unacceptable conditions under the 2030 EMU project conditions. Although it can be noted from Table 5-14 that freeway section 2 improves from LOS F to LOS E.

5.7.2 Ramp Junction Analysis

1. 2030 Baseline Conditions

The future year 2030 baseline volumes were obtained by interpolating between the existing year and future year 2035 travel demand volumes. The 2030 baseline condition volumes are presented in the Appendix. For analysis purposes, existing geometry was assumed for the mainline and two lanes were considered for the on- and off-ramps. Table 5-15 presents the results of the ramp junction analysis for 2013 baseline conditions. HCS calculation sheets are provided in the Appendix.

Table 5-15
Ramp Junction Level of Service – 2030 Baseline Conditions

	Location	LOS	D_R
1	I-15 NB Off-ramp to Stoddard Wells	F	96.8
2	I-15 SB Off-ramp to Stoddard Wells	F	115.5
3	I-15 NB On-ramp from Stoddard Wells	F	118.4
4	I-15 SB On-ramp from Stoddard Wells	F	163.1
5	I-15 NB Off-ramp to North Stoddard Wells	F	84.3
6	I-15 SB Off-ramp to North Stoddard Wells	F	116.7
7	I-15 NB On-ramp from North Stoddard Wells	F	106.1
8	I-15 SB On-ramp from North Stoddard Wells	F	156.7

Bold indicates unacceptable conditions SOURCE: DMJM Harris, 2008.
Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density of ramp (D_R) reported in pc/mi/ln

As indicated in Table 5-15, all the ramp junctions operate at unacceptable conditions under this scenario. This indicates that the future ramp configuration would not be able to handle the future volume growth in the area

2. 2030 Baseline plus DMU Alternative Conditions

The DMU project alternative volumes were added to the 2030 baseline volumes to obtain the 2030 baseline plus DMU alternative condition volumes. These volumes are presented in the Appendix. Table 5-16 presents the results of the ramp junction analysis for 2030 baseline plus DMU conditions. HCS calculation sheets are provided in the Appendix.

Table 5-16
Ramp Junction Level of Service – 2030 Baseline plus DMU Alternative Conditions

Location		LOS	D_R
1	I-15 NB Off-ramp to Stoddard Wells	F	99.9
2	I-15 SB Off-ramp to Stoddard Wells	F	115.7
3	I-15 NB On-ramp from Stoddard Wells	F	118.6
4	I-15 SB On-ramp from Stoddard Wells	F	166.8
5	I-15 NB Off-ramp to North Stoddard Wells	F	87.9
6	I-15 SB Off-ramp to North Stoddard Wells	F	116.9
7	I-15 NB On-ramp from North Stoddard Wells	F	106.3
8	I-15 SB On-ramp from North Stoddard Wells	F	159.8

Bold indicates unacceptable conditions SOURCE: DMJM Harris, 2008.
Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density of ramp (D_R) reported in pc/mi/ln

Comparing results from tables 5-15 and 5-16, it can be noted that all the ramp junctions continue to operate at unacceptable conditions under this scenario. The densities at the ramp influence area only increase with the addition of the DMU project volumes.

3. 2030 Baseline plus EMU Alternative Conditions

The EMU project alternative volumes were added to the 2030 baseline volumes to obtain the 2030 baseline plus EMU alternative condition volumes. These volumes are presented in the Appendix. Table 5-17 presents the results of the ramp junction analysis for 2030 baseline plus EMU conditions. HCS calculation sheets are provided in the Appendix.

Table 5-17
Ramp Junction Level of Service – 2030 Baseline plus EMU Alternative Conditions

Location		LOS	D_R
1	I-15 NB Off-ramp to Stoddard Wells	F	101.2
2	I-15 SB Off-ramp to Stoddard Wells	F	115.8
3	I-15 NB On-ramp from Stoddard Wells	F	118.7
4	I-15 SB On-ramp from Stoddard Wells	F	168.3
5	I-15 NB Off-ramp to North Stoddard Wells	F	89.3
6	I-15 SB Off-ramp to North Stoddard Wells	F	117.0
7	I-15 NB On-ramp from North Stoddard Wells	F	106.3
8	I-15 SB On-ramp from North Stoddard Wells	F	161.0

Bold indicates unacceptable conditions SOURCE: DMJM Harris, 2008.
Notes:
a) NB = Northbound; SB = Southbound
b) LOS = Level of Service
c) Density of ramp (D_R) reported in pc/mi/ln

Comparing results from tables 5-15 and 5-17, it can be noted that all the ramp junctions continue to operate at unacceptable conditions under this scenario. The densities at the ramp influence area only increase with the addition of the EMU project volumes.

6.0 VICTORVILLE STATION LOCATION

6.1 Victorville Station Location Option 1

The proposed station in Victorville would be located along the west side of I-15 between the two existing Stoddard Wells Road interchanges. Access to this station would be via the two existing Stoddard Wells Road interchanges.

6.1.1 Existing Conditions

EXISTING ROADWAY NETWORK

The two Stoddard Wells Road interchanges with I-15 will provide the most direct regional access to the proposed Victorville train station. Currently, Stoddard Wells Road has a single travel lane in each direction and because of the relatively low traffic volumes intersections in the area are stop controlled. The existing lane geometry at the Victorville study intersections is shown in Figure 6-1.

EXISTING TRANSIT CONDITIONS

The Victor Valley Transit Authority (VVTA) provides local transit service throughout the Victor Valley, including Victorville and San Bernardino County communities. The only bus line operating in the vicinity of the proposed station location is Route 22.

Route 22- Helendale is a local service running between Silver Lakes Market and Lorene Transfer with approximately 120 minute headways from 6:00 AM to 8:00PM, Monday to Saturday.

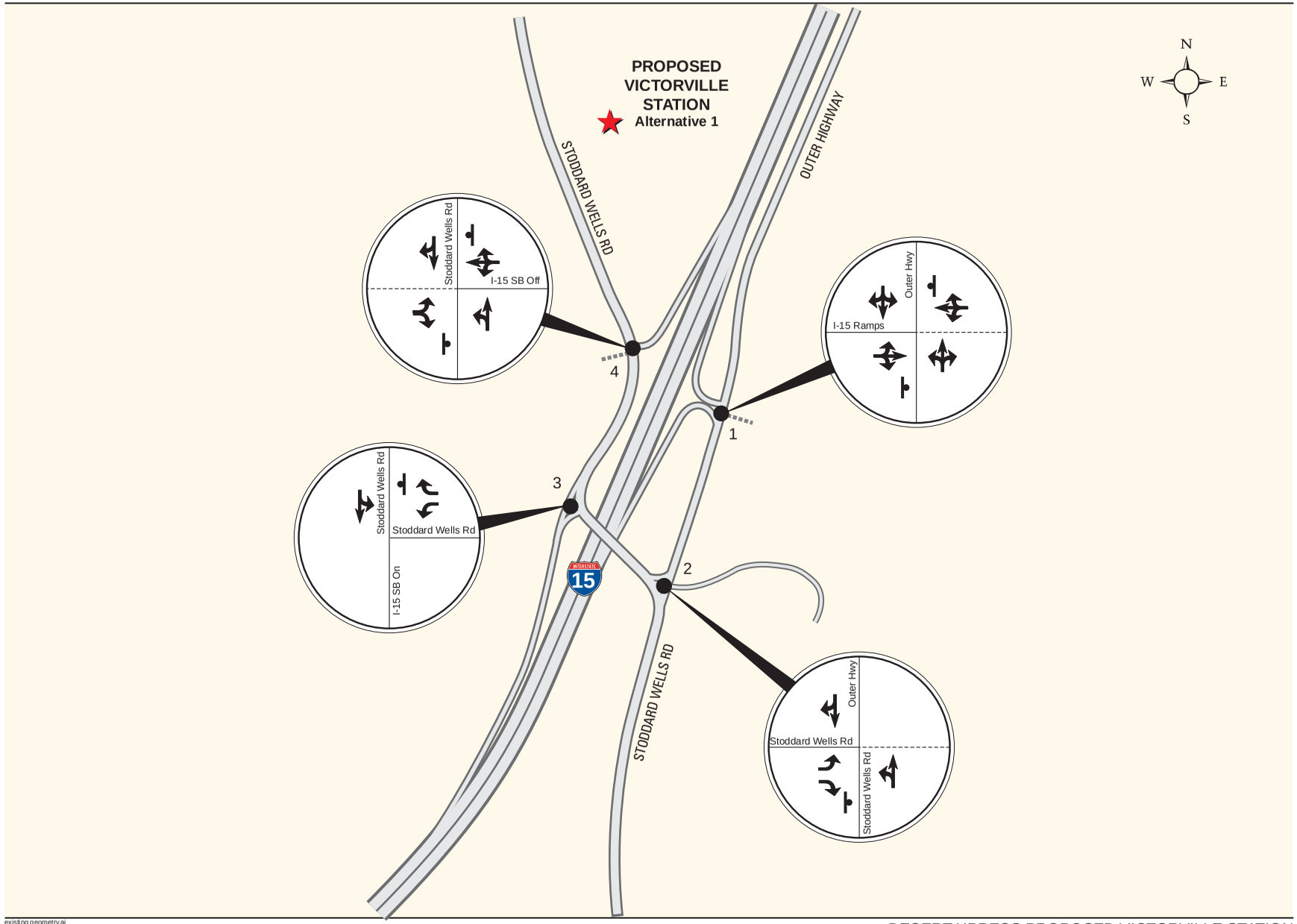
EXISTING INTERSECTION OPERATIONS

The intersection analysis was performed using the Highway Capacity Manual (HCM) methodologies, a requirement of the San Bernardino Congestion Management Program (CMP), which was implemented using SYNCHRO Version 7 software. Level of Service designation and corresponding delay thresholds are provided in Table 6-1.

Table 6-1
Intersection Level of Service Description

Level of Service	Signalized Intersections Delay Thresholds	Unsignalized Intersections Delay Thresholds
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Notes: Delay reported in seconds per vehicle SOURCE: Highway Capacity Manual, 2000.



existing geometry.ai

DESERT XPRESS PROPOSED VICTORVILLE STATION

Figure 6-1

EXISTING INTERSECTION LANE GEOMETRY

Victorville Station Alternative 1

In Victorville, level of service values A through D are considered satisfactory service levels, and LOS E and F conditions are considered unsatisfactory service levels. Unsignalized intersections are considered to operate at unsatisfactory conditions if one approach operates at LOS E or F and Caltrans peak hour volume signal warrants are met.

Based on the station location, the following intersections were identified for analysis purposes as shown on Figure 6-1:

- Outer Highway & I-15 NB Ramps
- Outer Highway & Stoddard Wells Rd
- Stoddard Wells Rd & I-15 SB Off-Ramp
- Stoddard Wells Rd & I-15 SB On-Ramp

Afternoon peak hour turning movement counts were obtained at the study intersections and are shown in Figure 6-2. Intersection Level of Service (LOS) conditions were analyzed for weekday PM peak period (4:00 PM to 6:00 PM) at the study intersections. The results of the analysis are presented in Table 6-2. SYNCHRO analysis worksheets are provided in the Appendix.

Table 6-2
Victorville Option 1 - Intersection Level of Service - Existing Conditions

	Intersection	Traffic Control	Existing Conditions	
			LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Unsignalized[2]	C (WB)[3]	16.3
2	Outer Highway & Stoddard Wells Rd	Unsignalized[2]	B (EB)[3]	12.7
3	Stoddard Wells Rd & I-15 SB On-Ramp	Unsignalized[2]	B (WB)[3]	10.4
4	Stoddard Wells Rd & I-15 SB Off-Ramp	Unsignalized[2]	B (WB)[3]	11.9

SOURCE: DMJM Harris, 2008.

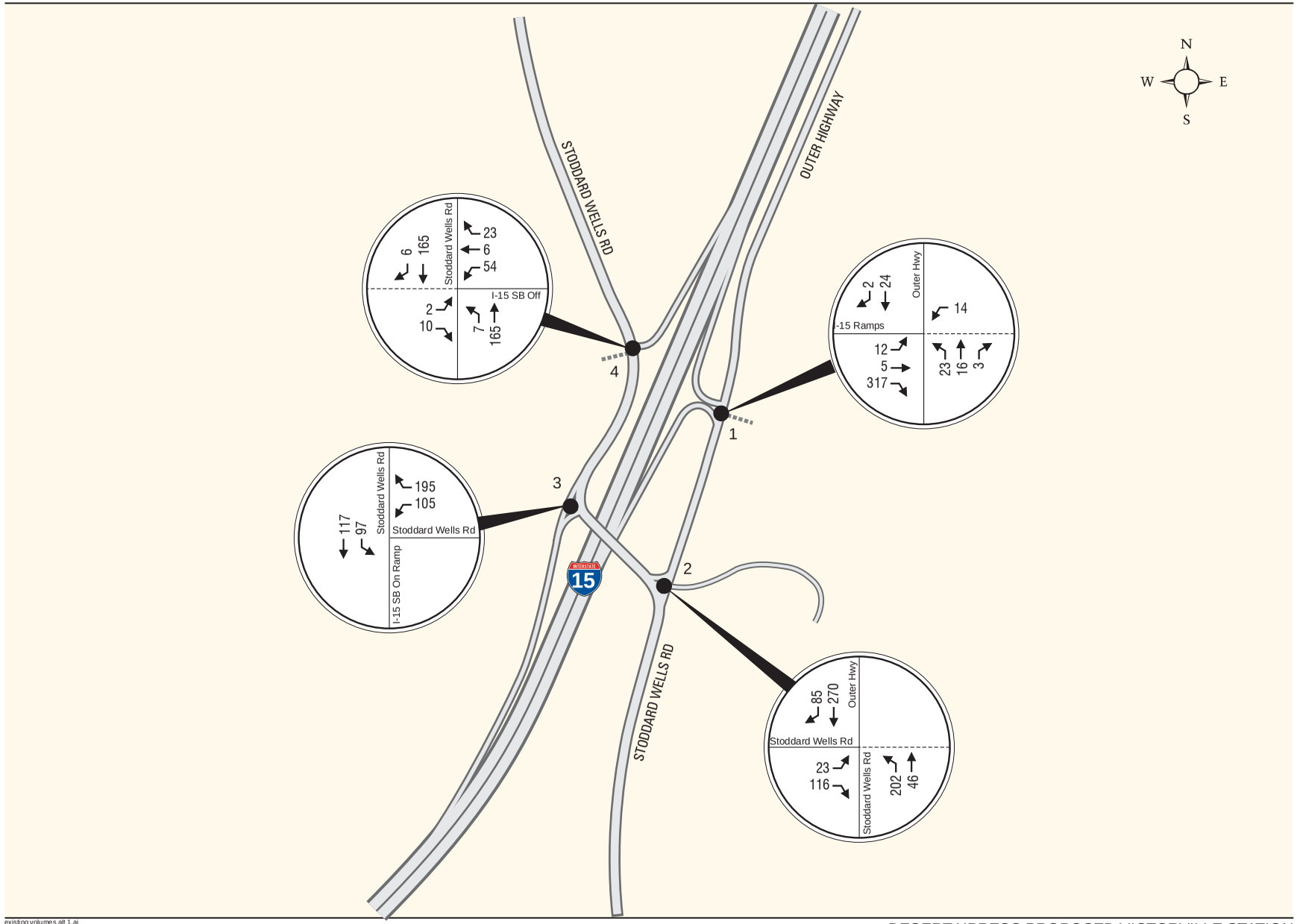
Notes:
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, WB=Westbound

As indicated in Table 6-2, all the analysis intersections have acceptable conditions (LOS D or better) under existing conditions.

6.1.2 Impact Analysis

This section presents the assessment of transportation impacts due to the proposed project. The transportation conditions were assessed for the following scenarios:

- Existing plus Project Conditions;
- 2013 Opening Year Conditions;
- 2013 Opening Year plus Project (DMU and EMU alternatives) Conditions;
- 2030 Cumulative Baseline Conditions; and,
- 2030 Cumulative Baseline plus Project (DMU and EMU alternatives) Conditions



existing volumes alt 1.ai

DESERT XPRESS PROPOSED VICTORVILLE STATION

Figure 6-2

EXISTING INTERSECTION TRAFFIC VOLUMES

Victorville Station Alternative 1

SIGNIFICANCE CRITERIA

The following are the significance criteria used by the City of Victorville and San Bernardino County CMP guidelines for the determination of impacts associated with a proposed project:

- If the proposed site adds 5% or more to the peak hour traffic of an intersection.
- Level of service C will be the design objective for capacity and under no circumstances will less than level of service D be accepted.

PROJECT TRAVEL DEMAND

The Victor Valley Area Transportation Study (VVATS) travel demand forecasting model was used to develop the base "no-project" travel forecasts for future year 2013 and 2030 traffic analysis. The City of Victorville provided future year 2035 travel forecasts from the model to DMJM Harris. DMJM Harris has applied a straight line methodology to interpolate the intermediate year growth factors for each network link in the model. The calculated growth factors were applied to the existing volumes to generate analysis year volumes. The growth factor calculations are presented in the Appendix. The project-related trips were then added to the future year base volumes to determine the "with project conditions".

TRIP DISTRIBUTION

The overall trip distribution for the station is shown in Figure 6-3. This station is served primarily by I-15 and Stoddard Wells Road. Due to its proximity to the southern I-15 / Stoddard Wells Road interchange, it is assumed that all vehicle trips generated by the proposed station would use this interchange. Hence, no project traffic is assigned to the northern I-15 / Stoddard Wells Road interchange.

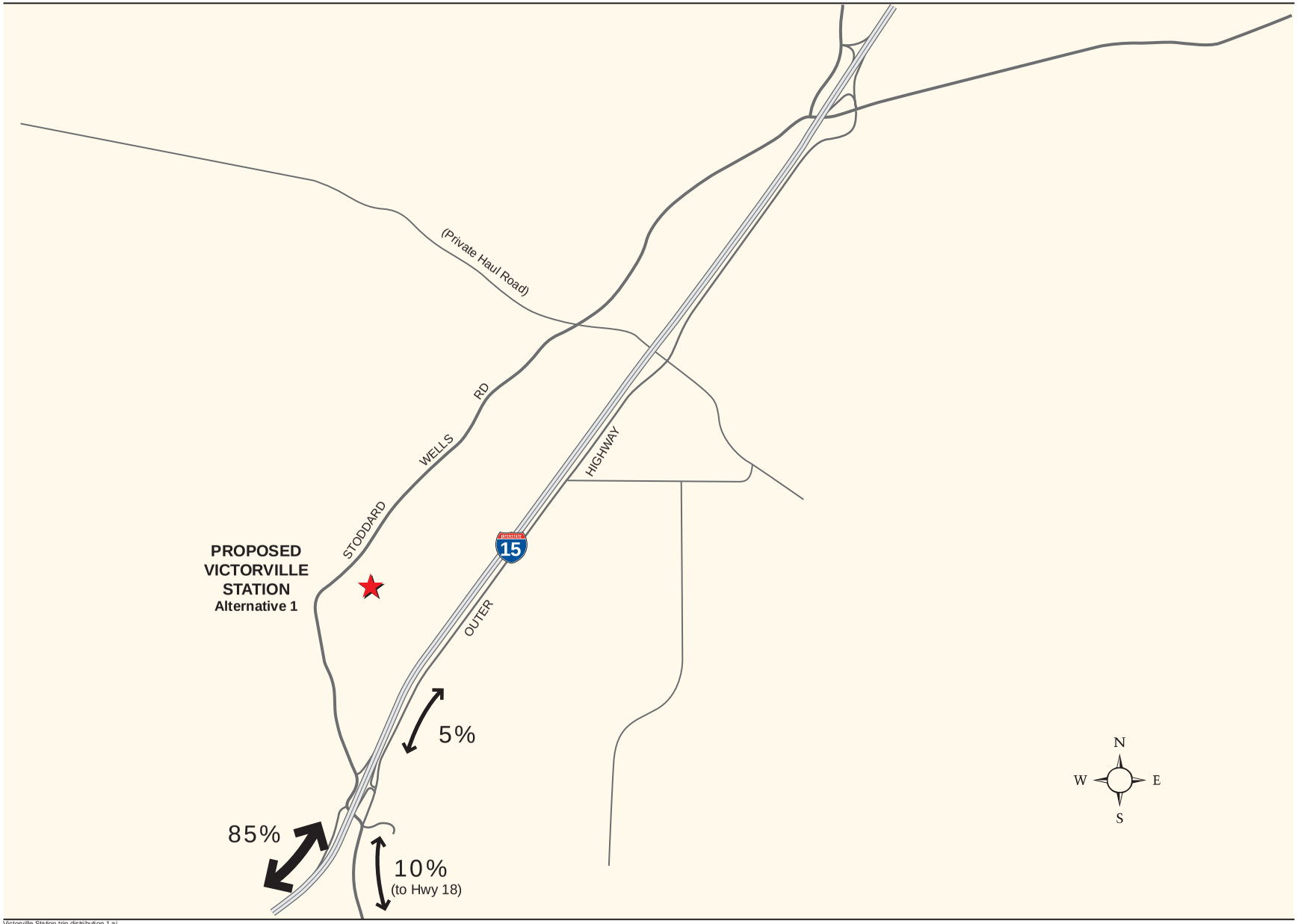
6.1.3 Existing plus Project Conditions

EXISTING PLUS DIESEL ELECTRIC MULTIPLE UNIT (DMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 6-3, project trips accessing the station were assigned to the analysis intersections. The project trips for DMU alternative conditions for existing conditions are presented in the Appendix. These project trips were added to the existing volumes to generate the Existing plus DMU volumes.

Based on the Existing plus DMU volumes and the existing geometry, intersection level of service analysis was performed. Table 6-3 presents the results of the analysis. SYNCHRO analysis worksheets are provided in the Appendix.

As indicated in Table 6-3, the intersections of Outer highway and I-15 northbound ramps and Stoddard Wells Road and I-15 southbound off-ramp operate at unacceptable conditions, while all other intersections operate at acceptable conditions.



Victorville Station trip distribution 1.ai

DESERT XPRESS PROPOSED VICTORVILLE STATION

Figure 6-3

VICTORVILLE STATION TRIP DISTRIBUTION

Alternative 1

Table 6-3
Victorville Option 1 - Existing plus DMU Conditions LOS

Intersection		Traffic Control	Existing Conditions		Existing plus DMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Unsignalized[2]	C (WB)[3]	16.3	F (WB)[3]	-
2	Outer Highway & Stoddard Wells Road	Unsignalized[2]	B (EB)[3]	12.7	D (EB)[3]	32.5
3	Stoddard Wells Road & I-15 SB On-Ramp	Unsignalized[2]	B (WB)[3]	10.4	D (WB)[3]	25.1
4	Stoddard Wells Road & I-15 SB Off-Ramp	Unsignalized[2]	B (WB)[3]	11.9	F (WB)[3]	179.5
5	Stoddard Wells Road & Station Access #1[4]	Signalized	-	-	B	15.7
6	Stoddard Wells Road & Station Access #2[4]	Unsignalized[2]	-	-	A	0

Notes:
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, WB=Westbound
4. See Figure 6-4 for locations

SOURCE: DMJM Harris, 2008.

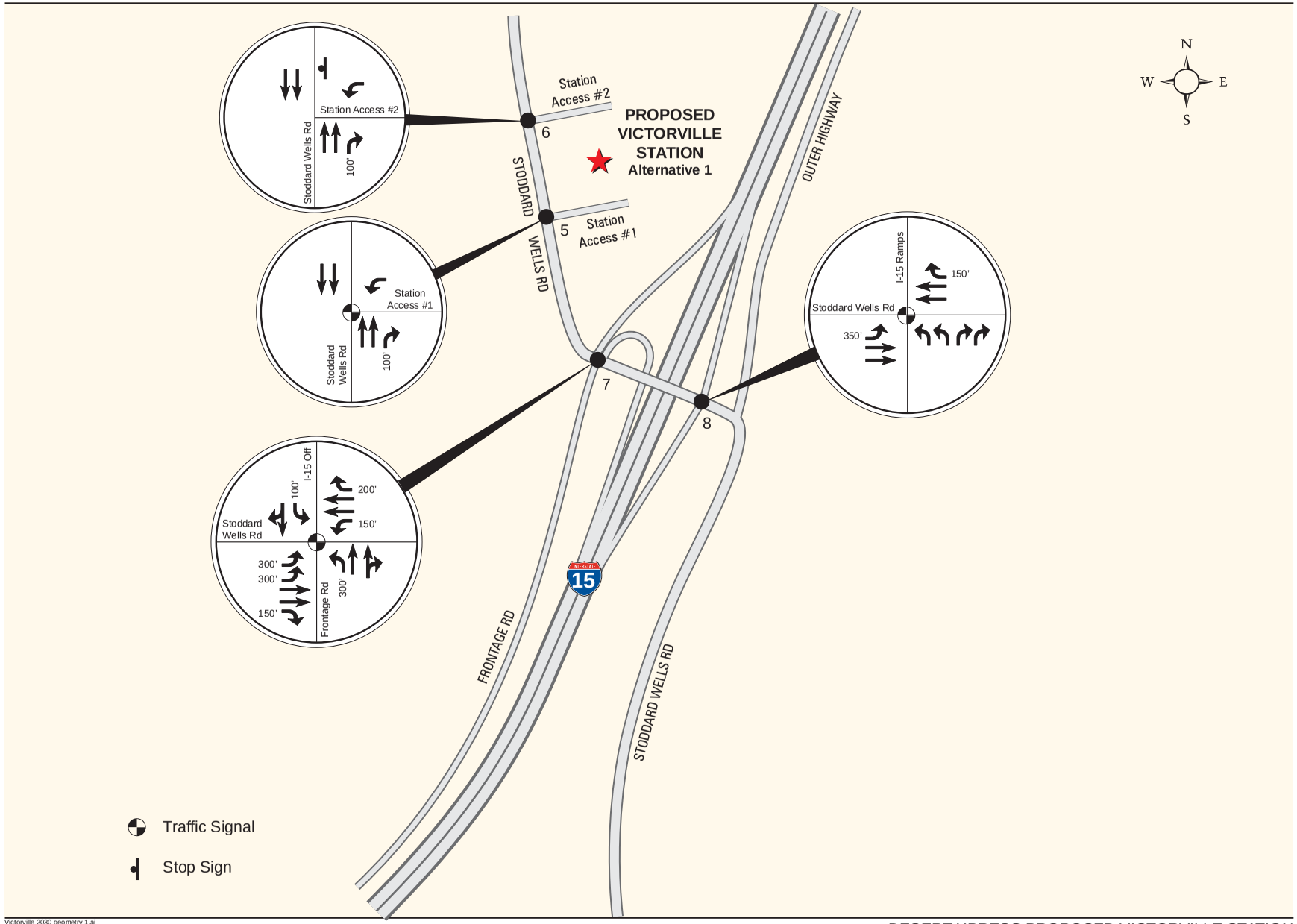
Comparing the results of the Existing plus DMU conditions to the Existing conditions level of service, it can be noted that due to the addition of project volumes, the intersections of Outer highway and I-15 northbound ramps and Stoddard Wells Road at I-15 southbound off-ramp deteriorate from acceptable (LOS C or better) to unacceptable (LOS F) conditions. As the project trips add more than 5% of the existing volume to these intersections, project impacts at these intersections are considered to be significant.

EXISTING PLUS ELECTRIC MULTIPLE UNIT (EMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 6-3, project trips for EMU alternative conditions were calculated. These project trips were added to the existing volumes to generate the Existing plus EMU volumes. Based on the Existing plus EMU volumes and the existing geometry, intersection level of service analysis was performed. Table 6-4 presents the results of the analysis. SYNCHRO analysis worksheets are provided in the Appendix.

As indicated in Table 6-4, all the intersections, except those at the station access roads, operate at unacceptable conditions (LOS F).

Comparing the results of the Existing plus EMU conditions to the Existing conditions level of service, it can be noted that due to the addition of project volumes, all the existing intersections deteriorate from acceptable (LOS C or better) to unacceptable (LOS F) conditions. As the project trips add more than 5% of the existing volume to these intersections, project impacts at these intersections are considered to be significant.



Victorville 2030 geometry 1.ai

DESERT XPRESS PROPOSED VICTORVILLE STATION

Figure 6-4

FUTURE YEAR 2030 INTERSECTION LANE GEOMETRY

Victorville Station Alternative 1

Table 6-4
Victorville Option 1 - Existing plus EMU Conditions LOS

Intersection		Traffic Control	Existing Conditions		Existing plus EMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Unsignalized[2]	C (WB)[3]	16.3	F (WB)[3]	-
2	Outer Highway & Stoddard Wells Road	Unsignalized[2]	B (EB)[3]	12.7	F (EB)[3]	335.8
3	Stoddard Wells Road & I-15 SB On-Ramp	Unsignalized[2]	B (WB)[3]	10.4	F (WB)[3]	204.6
4	Stoddard Wells Road & I-15 SB Off-Ramp	Unsignalized[2]	B (WB)[3]	11.9	F (WB)[3]	839.2
5	Stoddard Wells Road & Station Access #1[4]	Signalized	-	-	C	22.5
6	Stoddard Wells Road & Station Access #2[4]	Unsignalized[2]	-	-	A	0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, WB=Westbound
4. See Figure 6-4 for location

6.1.4 2013 Baseline Conditions (Opening Year Analysis)

2013 BASELINE CONDITIONS

Future year 2013 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix. For analysis purposes, existing intersection geometry was assumed for future year 2013 conditions.

Based on the 2013 base volumes and the existing geometry, intersection level service analysis was performed. Table 6-5 presents the results of the analysis. SYNCHRO analysis worksheets are provided in the Appendix.

As indicated in Table 6-5, all the intersections except Stoddard Wells Road and I-15 SB Off-ramp operate at unacceptable conditions (LOS F) during the analysis period.

2013 BASELINE PLUS DIESEL-ELECTRIC MULTIPLE UNIT (DMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 6-2, project trips accessing the station were assigned to the analysis intersections. The project trips for DMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base volumes to generate the 2013 base plus DMU volumes.

Based on the 2013 Baseline plus DMU volumes and the existing geometry, intersection level service analysis was performed. Table 6-6 presents the results of the analysis. SYNCHRO analysis worksheets are provided in the Appendix.

Table 6-5
Victorville Option 1 - 2013 Baseline Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions	
			LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Unsignalized[2]	F (WB)[3]	324.0
2	Outer Highway & Stoddard Wells Road	Unsignalized[2]	F (EB)[3]	154.9
3	Stoddard Wells Rd. & I-15 SB On-Ramp	Unsignalized[2]	F (WB)[3]	113.4
4	Stoddard Wells Rd. & I-15 SB Off-Ramp	Unsignalized[2]	C (WB)[3]	20.5

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, WB=Westbound

Table 6-6
Victorville Option 1 – 2013 Baseline plus DMU Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions		2013 Baseline plus DMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Unsignalized[2]	F (WB)[3]	324.0	F (WB)[3]	-
2	Outer Highway & Stoddard Wells Road	Unsignalized[2]	F (EB)[3]	154.9	F (EB)[3]	-
3	Stoddard Wells Road & I-15 SB On-Ramp	Unsignalized[2]	F (WB)[3]	113.4	F (WB)[3]	-
4	Stoddard Wells Road & I-15 SB Off-Ramp	Unsignalized[2]	C (WB)[3]	20.5	F (WB)[3]	-
5	Stoddard Wells Road & Station Access #1[4]	Signalized	-	-	B	14.9
6	Stoddard Wells Road & Station Access #2[4]	Unsignalized[2]	-	-	A	0.0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, WB=Westbound
4. See Figure 6-4 for location

As indicated in Table 6-6, all the intersections except station access roads operate at unacceptable conditions during the analysis period.

Comparing the results of 2013 Baseline plus DMU conditions to the 2013 Baseline conditions level of service, it can be noted that due to the addition of project volumes, intersections already operating at LOS F would worsen with higher delays. As the project trips account for more than 5% of the volume at these intersections, project impacts at these intersections are considered to be significant.

2013 BASELINE PLUS ELECTRIC MULTIPLE UNIT (EMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 6-2, project trips accessing the station were assigned at the analysis intersections. The project trips for EMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base conditions volumes to generate the 20103 baseline plus EMU volumes.

Based on the 2013 Baseline plus EMU volumes and the existing geometry, intersection level service analysis was performed. Table 6-7 presents the results of the analysis. SYNCHRO analysis worksheets are provided in the Appendix.

Table 6-7
Victorville Option 1 – 2013 Baseline plus EMU Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions		2013 Baseline plus EMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Unsignalized[2]	F (WB)[3]	324.0	F (WB)[3]	-
2	Outer Highway & Stoddard Wells Rd	Unsignalized[2]	F (EB)[3]	154.9	F (EB)[3]	-
3	Stoddard Wells Rd & I-15 SB On-Ramp	Unsignalized[2]	F (WB)[3]	113.4	F (WB)[3]	-
4	Stoddard Wells Rd & I-15 SB Off-Ramp	Unsignalized[2]	C (WB)[3]	20.5	F (WB)[3]	-
5	Stoddard Wells Rd & Station Access #1[4]	Signalized	-	-	D	38.6
6	Stoddard Wells Rd & Station Access #2[4]	Unsignalized[2]	-	-	A	0.2

SOURCE: DMJM Harris, 2008.

Notes:
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, WB=Westbound
4. See Figure 6-4 for location

As indicated in Table 6-7, all the intersections except station access roads operate at unacceptable conditions during the analysis period.

Comparing the results of 2013 Baseline plus EMU conditions to the 2013 Baseline conditions level of service, it can be noted that due to the addition of project volumes, intersections already operating at LOS F would worsen with higher delays. As the project trips account for more than 5% of the volume at these intersections, project impacts at these intersections are considered to be significant.

6.1.5 2030 Cumulative Conditions

Under this scenario, the proposed improvements include a new Stoddard Wells Road interchange at existing southerly Stoddard Wells ramps as shown in Figure 6-4. Improvements

also include signalized intersections at the ramp interchange locations. Based on the arterial lane geometry information provided by the City of Victorville travel demand model, intersection geometry presented in Figure 6-4 was assumed for future year 2030.

2030 BASELINE CONDITIONS

Future year 2030 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix.

Based on the future base volumes and geometry presented in Figure 6-4, intersection level service analysis was performed. Table 6-8 presents the results of intersection operating conditions for future year 2030 baseline conditions. SYNCHRO analysis worksheets are presented in the Appendix.

Table 6-8
Victorville Option 1 - 2030 Baseline Conditions LOS

Intersection		Traffic Control	2030 Baseline Conditions	
			LOS	Delay[1]
7	Stoddard Wells Road and I-15 SB Ramps	Signalized	F	102.9
8	Stoddard Wells Road and I-15 NB Ramps	Signalized	F	216.4

Notes: Delay reported in seconds per vehicle SOURCE: DMJM Harris, 2008.

As indicated in Table 6-8, all the intersections operate at unacceptable conditions during the analysis period.

2030 BASELINE PLUS DMU CONDITIONS

Based on the trip distribution presented in Figure 6-3, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus DMU volumes.

Based on the 2030 Baseline plus DMU volumes geometry presented in Figure 6-4, intersection level service analysis was performed. Table 6-9 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 6-9, all the intersections except Stoddard Wells Road at Station Access #2 operate at unacceptable conditions during the analysis period.

Comparing the results of 2030 Baseline plus DMU conditions to the 2030 Baseline conditions level of service, it can be noted that due to the addition of project volumes, intersections already operating at LOS F would continue to operate at LOS F.

Table 6-9
Victorville Option 1 – 2030 Baseline plus DMU Conditions LOS

Intersection		Traffic Control	2030 Baseline Conditions		2030 Baseline DMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
5	Stoddard Wells Road & Station Access #1	Signalized	-	-	E	58.6
6	Stoddard Wells Road & Station Access #2	Unsignalized	-	-	A	0.0
7	Stoddard Wells Road & I-15 SB Ramps	Signalized	F	102.9	F	192.8
8	Stoddard Wells Road & I-15 NB Ramps	Signalized	F	216.4	F	162.1

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

2030 BASELINE PLUS EMU CONDITIONS

Based on the trip distribution presented in Figure 6-3, project trips accessing the station were assigned at the analysis intersections. The project trips for EMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus EMU volumes.

Based on the 2030 Baseline plus EMU volumes geometry presented in Figure 6-4, intersection level service analysis was performed. Table 6-10 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 6-10
Victorville Option 1 – 2030 Baseline plus EMU Conditions LOS

Intersection		Traffic Control	2030 Baseline Conditions		2030 Baseline EMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
5	Stoddard Wells Road & Station Access #1	Signalized	-	-	F	95.6
6	Stoddard Wells Road & Station Access #2	Unsignalized	-	-	A	0.0
7	Stoddard Wells Road & I-15 SB Ramps	Signalized	F	102.9	F	261.4
8	Stoddard Wells Road & I-15 NB Ramps	Signalized	F	216.4	F	214.3

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 6-10, all the intersections except Stoddard Wells Road at Station Access #2 operate at unacceptable conditions during the analysis period.

Comparing the results of 2030 Baseline plus EMU conditions to the 2030 Baseline conditions level of service, it can be noted that due to the addition of project volumes, intersections already operating at LOS F would continue to operate at LOS F.

6.1.6 Mitigation Measures

EXISTING PLUS DMU CONDITIONS

As indicated in Table 6-3, intersections at Outer Highway and I-15 northbound ramps and Stoddard Wells Road and I-15 southbound on-ramp are significantly impacted by the proposed project. To mitigate these intersections, the following mitigation measures are proposed:

- #1: Signalize intersection of Outer Highway at I-15 northbound ramps.
- #4: Signalize intersection of Stoddard Wells Road at I-15 southbound off-ramp.

After applying the above mitigation measures to the existing roadway network, the intersection level of service was calculated. Table 6-11 presents the results of the Existing plus DMU mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix. The signal warrant analysis at both these intersections indicates that the warrant for peak hour (Warrants 3A and 3B) are met. The signal warrant analysis worksheets are provided in the Appendix. As indicated in Table 6-11, signalization at both the impacted intersections improves the operating conditions to acceptable levels (LOS C).

Table 6-11
Victorville Option 1 - Existing plus DMU Mitigation Conditions LOS

Intersection		Traffic Control	Existing plus DMU Mitigation Conditions	
			LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Signalized	C	20.9
4	Stoddard Wells Rd & I-15 SB Off-Ramp	Signalized	C	20.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

EXISTING PLUS EMU CONDITIONS

As indicated in Table 6-4, all the existing intersections except project access roads are significantly impacted by the proposed project. To mitigate these intersections, following mitigation measures are proposed:

- #1: Signalize intersection of Outer Highway at I-15 northbound ramps.
- #2: Signalize intersection of Outer Highway at Stoddard Wells Road and add a northbound left turn lane and a southbound right turn lane.

- #3: Signalize the intersection of Stoddard Wells Road at I-15 southbound on-ramp.
- #4: Signalize the intersection of Stoddard Wells Road at I-15 southbound off-ramp.

After applying the above mitigation measures to the existing roadway network, intersection level of service was calculated. Table 6-12 presents the results of the Existing plus EMU mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix. The signal warrant analysis indicates that the warrant for peak hour (Warrants 3A and 3B) are met for intersections 1, 2 and 4 and only Warrant 3B is satisfied for intersection 3. The signal warrant analysis worksheets are provided in the Appendix.

Table 6-12
Victorville Option 1 - Existing plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	Existing plus EMU Conditions	
			LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Signalized	B	16.4
2	Outer Highway & Stoddard Wells Rd	Signalized	C	25.3
3	Stoddard Wells Rd & I-15 SB On-Ramp	Signalized	D	41.7
4	Stoddard Wells Rd & I-15 SB Off-Ramp	Signalized	A	7.3

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 6-12, installing traffic signals at both the impacted intersections improves the operating conditions to acceptable levels (LOS D or better).

2013 BASELINE CONDITIONS

As indicated in Table 6-5, three study intersections operate at unacceptable conditions in the 2013 baseline conditions. To improve operating conditions at these intersections and accommodate the future volume growth, following mitigation measures are proposed:

- #1: Signalize the intersection of Outer Highway at I-15 northbound ramps and add an eastbound right turn lane.
- #2: Signalize the intersection of Outer Highway at Stoddard Wells Road and add a northbound left turn lane and southbound right turn lane.
- # 3: Signalize the intersection of Stoddard Wells Road at I-15 southbound on-ramp and add a southbound left turn lane.

After applying above mitigation measures to the existing roadway network, intersection level of service was calculated. Table 6-13 presents the results of 2013 baseline mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix. The signal warrant analysis indicates that the warrant for peak hour (Warrants 3A and 3B) are met for intersections 1 and 2 and only Warrant 3B is satisfied for intersection 3. The signal warrant analysis worksheets are provided in the Appendix.

As indicated in Table 6-13, applying the proposed mitigation measures at the impacted intersections improves the operating conditions to acceptable levels (LOS C or better).

Table 6-13
Victorville Option 1 – 2013 Baseline Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline Mitigation Conditions	
			LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Signalized	A	8.9
2	Outer Highway & Stoddard Wells Rd	Signalized	C	22.5
3	Stoddard Wells Rd & I-15 SB On-Ramp	Signalized	A	7.2

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

2013 BASELINE PLUS DMU CONDITIONS

As indicated in Table 6-6, four study intersections operate at unacceptable conditions in the 2013 baseline plus DMU conditions. To improve the operating conditions at these intersections, along with the mitigation measures identified in the 2013 Baseline conditions, the following mitigation measures are proposed:

- # 1: Add a second eastbound right turn lane at Outer highway and I-15 northbound ramps intersection.
- # 4: Signalize intersection of Stoddard Wells Road at I-15 southbound off-ramp

After applying the mitigation measures from 2013 baseline conditions and the mitigation measures suggested above to the existing roadway network, intersection level of service was calculated. Table 6-14 presents the results of 2013 baseline plus DMU mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix. The signal warrant analysis at intersection 4 indicates that the warrant for peak hour (Warrants 3A and 3B) is met. The signal warrant analysis worksheet is provided in the Appendix.

As indicated in Table 6-14, the impacted intersections operating conditions improve to acceptable levels (LOS B or better).

Table 6-14
Victorville Option 1 - 2013 Baseline plus DMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus DMU Mitigation Conditions	
			LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Signalized	A	8.3
2	Outer Highway & Stoddard Wells Rd	Signalized	B	11.4
3	Stoddard Wells Rd & I-15 SB On-Ramp	Signalized	B	15.2
4	Stoddard Wells Rd & I-15 SB Off-Ramp	Signalized	A	7.8

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

2013 BASELINE PLUS EMU CONDITIONS

As indicated in Table 6-7, four study intersections operate at unacceptable conditions in the 2013 baseline plus EMU conditions. To improve the operating conditions at these intersections, along with the mitigation measures identified in the 2013 Baseline conditions, following mitigation measure are proposed:

- #1: Add a second eastbound right turn lane at Outer Highway and I-15 northbound ramps intersection.
- #2: Add a second northbound left turn lane and second southbound right turn lane at Stoddard Wells Road and Outer Highway intersection.
- #3: Add a southbound left turn lane at Stoddard Wells Road and I-15 southbound on-ramp intersection.
- #4: Signalize the intersection of Stoddard Wells Road at I-15 southbound off-ramp

After applying mitigation measures from 2013 baseline conditions and the mitigation measrues suggested above to the existing roadway network, intersection level of service was calculated. Table 6-15 presents the results of 2013 baseline plus EMU mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix. The signal warrant analysis at intersection 4 indicates that the warrant for peak hour (Warrants 3A and 3B) is met. The signal warrant analysis worksheet is provided in the Appendix.

Table 6-15
Victorville Option 1 - 2013 Baseline plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus EMU Mitigation Conditions	
			LOS	Delay[1]
1	Outer Highway & I-15 NB Ramps	Signalized	B	19.5
2	Outer Highway & Stoddard Wells Road	Signalized	B	16.4
3	Stoddard Wells Road & I-15 SB On-Ramp	Signalized	C	28.8
4	Stoddard Wells Road & I-15 SB Off-Ramp	Signalized	B	27.5

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 6-15, the impacted intersections operating conditions improve to acceptable levels (LOS C or better).

2030 BASELINE CONDITIONS

As indicated in Table 6-8, both the study intersections operate at unacceptable conditions in the 2030 baseline conditions. To mitigate these intersections and accommodate the future volume growth, following mitigation measures are proposed:

- #7: Add an eastbound left turn lane and an eastbound through lane to the intersection of Stoddard Wells Road at I-15 southbound ramps.

- #8: Add an eastbound left turn lane and a northbound right turn late at the intersection of Stoddard Wells Road at I-15 northbound ramps.

After applying above mitigations to the existing roadway network, the intersection level of service was calculated. Table 6-16 presents the results of 2030 baseline mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 6-16
Victorville Option 1 – 2030 Baseline Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline Mitigation Conditions	
			LOS	Delay[1]
7	Stoddard Wells Rd and I-15 SB Ramps	Signalized	E	61.5
8	Stoddard Wells Rd and I-15 NB Ramps	Signalized	F	83.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 6-16, both the study intersections continue to operate at unacceptable conditions even when mitigated.

The addition of project volumes at these intersections operating at unacceptable conditions would only worsen the operating conditions. Hence mitigation analysis for 2030 Baseline plus DMU and 2030 Baseline plus EMU conditions was not performed. However, the intersection of Stoddard Wells Road at Station Access #1 can be mitigated under the DMU and EMU conditions with the addition of third southbound lane. With this mitigation, the intersection operating condition improves to LOS C with 25.3 seconds of delay under DMU conditions and to LOS D with 49.6 seconds of delay under EMU conditions.

6.1.7 Queuing Analysis

Queuing analysis was performed to identify the required length of turn pockets under the future year 2030 cumulative conditions at the ramp locations. Table 6-17 presents the results of queuing analysis for 2030 baseline and project conditions with and without mitigations. Queuing analysis worksheets are included in the Appendix.

It can be noted from table 6-17 that the queue lengths under the mitigated conditions are considerably lower than the baseline conditions. However, some of the turn pockets experience higher queues under the mitigated conditions than the baseline conditions. This occurs because of the signal timing, which provides more green time to the heavier traffic volumes movements to bring the operating conditions at the intersection to acceptable levels. For example, under the 2030 baseline conditions, the westbound left-turn and right-turn queue lengths are shorter than the 2030 mitigated conditions.

Table 6-17
Victorville Option 1 – Queuing Analysis

Intersection		Movement	95th % queue length (ft)		
			2030	2030 + DMU	2030 + EMU
Baseline Conditions					
7	Stoddard Wells Rd & I-15 SB Ramps	EBL	947	1050	1048
		EBR	33	63	7
		WBL	82	83	76
		WBR	54	156	265
		NBL	200	336	348
		SBL	141	211	223
8	Stoddard Wells Rd & I-15 NB Ramps	EBL	412	430	464
		WBR	21	23	25
		NBL	289	829	1011
		NBR	1861	1768	1882
With Mitigations					
7	Stoddard Wells Rd & I-15 SB Ramps	EBL	608	718	846
		EBR	22	m29	43
		WBL	115	102	130
		WBR	323	228	346
		NBL	197	290	312
		SBL	139	180	173
8	Stoddard Wells Rd & I-15 NB Ramps	EBL	187	175	218
		WBR	21	21	26
		NBL	269	347	414
		NBR	1207	997	1155

SOURCE: DMJM Harris, 2008.

6.2 Victorville Station Location Option 2

The proposed station in Victorville would be located along the west side of I-15 between the two existing Stoddard Wells Road interchanges. Access to this station would be via the existing northerly Stoddard Wells Road interchange.

6.2.1 Existing Conditions

EXISTING ROADWAY NETWORK

The two Stoddard Wells Road interchanges with I-15 will provide the most direct regional access to the proposed Victorville train station. Currently the Stoddard Wells Road in this area has a single travel lane in each direction and because of the relatively low traffic volumes, intersections in the area are stop controlled. The existing lane geometry at the Victorville study intersections is shown in Figure 6-5.

EXISTING INTERSECTION OPERATIONS

Based on the station location options, following intersections in the vicinity of the station location were identified for analysis purposes:

- Stoddard Wells Road and I-15 NB Ramps
- Stoddard Wells Road and Quarry Road
- I-15 SB Ramps and Quarry Road

The afternoon peak hour turning movement counts were obtained at the study intersections and are presented in Figure 6-6.

Intersection Level of Service (LOS) conditions were analyzed for weekday PM peak period (4:00 PM to 6:00 PM) at the study intersections. The results of the analysis are presented in Table 6-18**.** SYNCHRO analysis worksheets are provided in the Appendix.

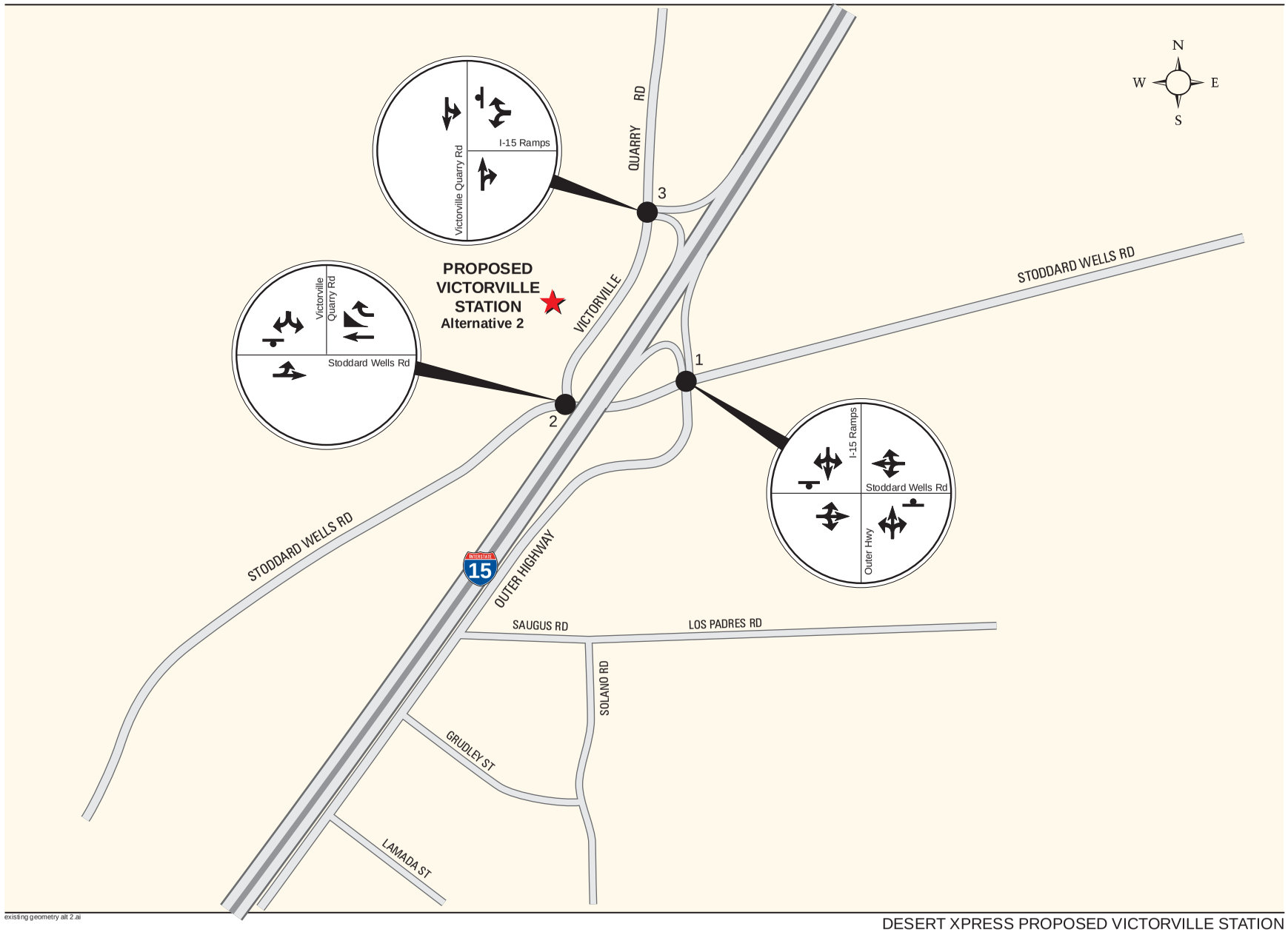
Table 6-18
Victorville Option 2 - Existing Conditions LOS

Intersection		Traffic Control	Existing Conditions	
			LOS	Delay[1]
1	Stoddard Wells Rd and I-15 NB Ramps	Unsignalized[2]	A (SB)	10.0
2	Stoddard Wells Rd and Quarry Road	Unsignalized[2]	A (SB)	8.6
3	I-15 SB Ramps and Quarry Road	Unsignalized[2]	A (WB)	8.8

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. SB=Southbound, WB=Westbound

As indicated in Table 6-18, all the study intersections operate at acceptable conditions under existing conditions.

In Victorville, LOS A through D is considered satisfactory levels, and LOS E and F conditions are considered unsatisfactory service levels. Unsignalized intersections are considered to operate at unsatisfactory conditions if one approach operates at LOS E or F and Caltrans peak hour volume signal warrants are met.



existing geometry alt 2.ai

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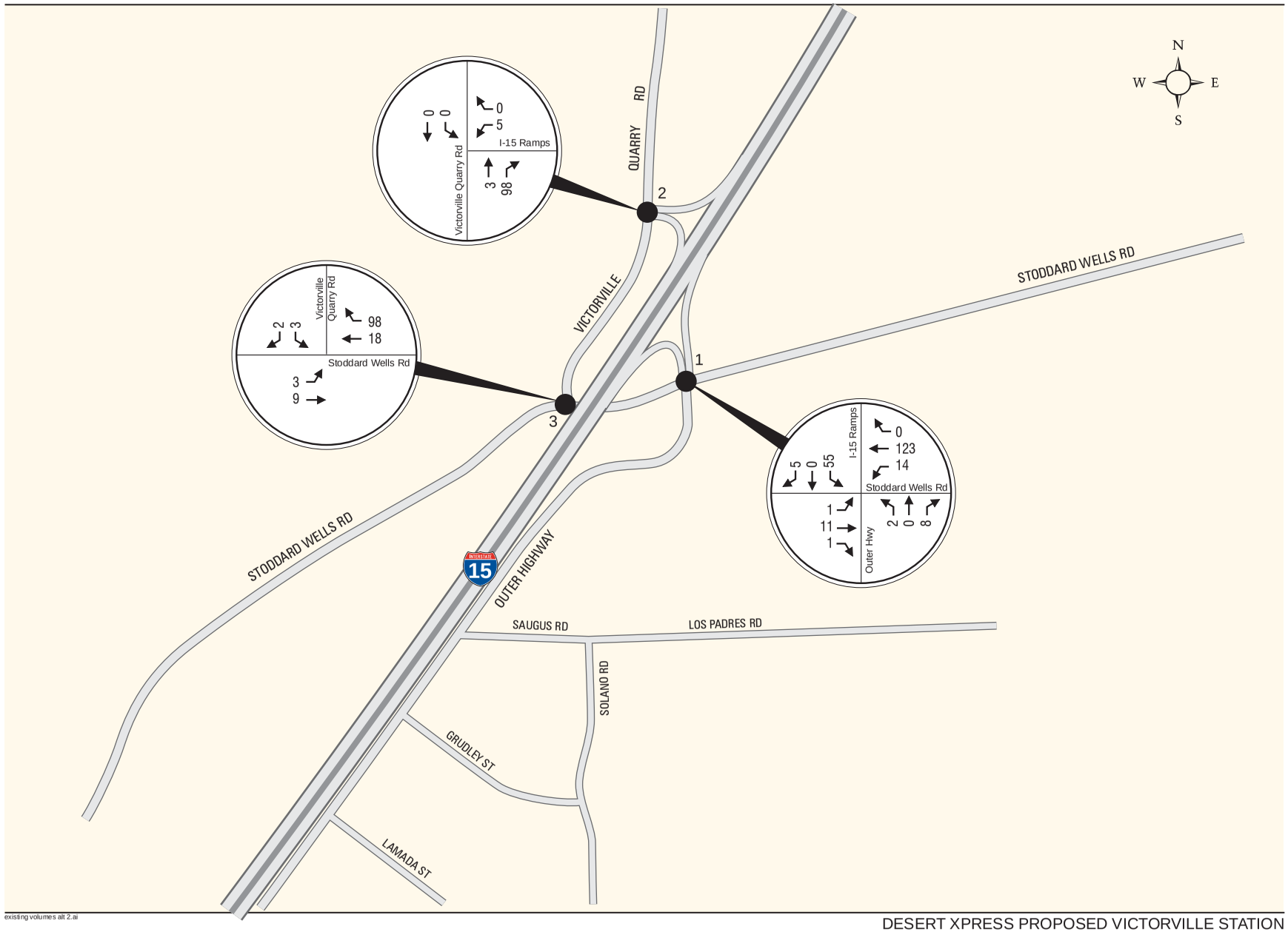
Figure 6-5

EXISTING INTERSECTION LANE GEOMETRY

Victorville Station Alternative 2



existing volumes alt 2.ai

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Figure 6-6

EXISTING INTERSECTION TRAFFIC VOLUMES

Victorville Station Alternative 2

6.2.2 Impact Analysis

This section presents the assessment of transportation impacts due to the proposed project. The transportation conditions were assessed for the following scenarios:

- Existing plus Project Conditions;
- 2013 Opening Year Conditions;
- 2013 Opening Year plus Project Conditions;
- 2030 Cumulative Baseline Conditions; and,
- 2030 Cumulative Baseline plus Project Conditions.

SIGNIFICANCE CRITERIA

The following are the significance criteria used by the City of Victorville and San Bernardino County CMP guidelines for the determination of impacts associated with a proposed project:

- If the proposed site adds 5% or more to the peak hour traffic of an intersection.
- Level of service C will be the design objective for capacity and under no circumstances will less than level of service D be accepted.

PROJECT TRAVEL DEMAND

The Victor Valley Area Transportation Study (VVATS) travel demand forecasting model was used to develop the base "no-project" travel forecasts for future year 2013 and 2030 traffic analysis. The City of Victorville provided future year 2035 travel forecasts from the model to DMJM Harris. DMJM Harris has applied a straight line method to interpolate the intermediate year growth factors for each network link in the model. The calculated growth factors were applied to the existing volumes to generate analysis year volumes. The growth factor calculations are presented in the Appendix. The project-related trips were then added to the future year base volumes to determine the "with project conditions".

TRIP DISTRIBUTION

The overall trip distribution for the station is shown in Figure 6-7. This station is served primarily by I-15 and Stoddard Wells Road. Due to its proximity to the northern I-15 / Stoddard Wells Road interchange, it is assumed that all vehicles generated by the proposed station would use this interchange. Hence, no project traffic is assigned to the southern I-15 / Stoddard Wells Road interchange.

EXISTING PLUS PROJECT CONDITIONS

a) Existing plus Diesel Electric Multiple Unit (DMU) Alternative Conditions

Based on the trip distribution presented in Figure 6-7, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for existing conditions are presented in the Appendix. These project trips were added to the existing volumes to generate the Existing plus DMU volumes.

Based on the Existing plus DMU volumes and the existing geometry, intersection level of service analysis was performed. Table 6-19 presents the results of the analysis. SYNCHRO analysis worksheets are provided in the Appendix.

As indicated in Table 6-19, all the study intersections operate at acceptable conditions under existing plus DMU project conditions.

Table 6-19
Victorville Option 2 – Existing plus DMU Conditions LOS

Intersection		Traffic Control	Existing Conditions		Existing plus DMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Stoddard Wells Road & I-15 NB Ramps	Unsignalized[2]	A (SB)	10.0	D (SB)	28.8
2	Stoddard Wells Road & Quarry Road	Unsignalized[2]	A (SB)	8.6	C (SB)	25.0
3	I-15 SB Ramps & Quarry Road	Unsignalized[2]	A (WB)	8.8	B (WB)	10.8
4	Quarry Road & Station Access #1	Unsignalized[2]	-	-	A (NB)	9.3
5	Stoddard Wells Road & Station Access #2	Unsignalized[2]	-	-	B (SB)	13.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB=Northbound, SB=Southbound, WB=Westbound

b) Existing plus Electric Multiple Unit (EMU) Alternative Conditions

Based on the trip distribution presented in Figure 6-7, project trips accessing the station were assigned to the analysis intersections. The project trips for EMU alternative conditions for existing conditions are presented in the Appendix. These project trips were added to the existing volumes to generate the Existing plus EMU volumes.

Based on the Existing plus EMU volumes and the existing geometry, intersection level of service analysis was performed. Table 6-20 presents the results of the analysis. SYNCHRO analysis worksheets are provided in the Appendix.

As indicated in Table 6-20, all the study intersections operate at acceptable conditions except Stoddard Wells Road and I-15 northbound ramps and Stoddard Wells Road and Quarry Road intersections.

DMJM HARRIS | AECOM

Victorville Station trip distribution 2.ai

DESERT XPRESS PROPOSED VICTORVILLE STATION

Figure 6-7

VICTORVILLE STATION TRIP DISTRIBUTION

Alternative 2

Table 6-20
Victorville Option 2 – Existing plus EMU Conditions LOS

Intersection		Traffic Control	Existing Conditions		Existing plus EMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Stoddard Wells Road & I-15 NB Ramps	Unsignalized[2]	A (SB)	10.0	F (NB)	-
2	Stoddard Wells Road & Quarry Road	Unsignalized[2]	A (SB)	8.6	F (SB)	63.2
3	I-15 SB Ramps & Quarry Road	Unsignalized[2]	A (WB)	8.8	B (WB)	12.0
4	Quarry Road & Station Access #1	Unsignalized[2]	-	-	A (NB)	9.9
5	Stoddard Wells Road & Station Access #2	Unsignalized[2]	-	-	C (SB)	19.9

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB=Northbound, SB=Southbound, WB=Westbound

Comparing the results of the Existing plus EMU conditions to the Existing conditions level of service, it can be noted that due to the addition of project volumes, intersections approaches at Stoddard Wells Road at I-15 northbound ramps and Stoddard Wells Road at Quarry Road deteriorate from acceptable (LOS A) to unacceptable (LOS F) conditions. As the project trips add more than 5% of the existing volumes at these intersections, project impacts at these intersections are considered to be significant.

6.2.3 2013 Opening Year Conditions

2013 BASELINE CONDITIONS

Future year 2013 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix. For analysis purposes, the existing intersection geometry was assumed for future year 2013 conditions. Based on the future base volumes and the existing geometry, intersection level of service analysis was performed.

Table 6-21 presents the results of intersection operating conditions for future year 2013 baseline conditions. SYNCHRO analysis worksheets are presented in the Appendix.

Table 6-21
Victorville Option 2 – 2013 Baseline Conditions LOS

	Intersection	Traffic Control	2013 Baseline Conditions	
			LOS	Delay[1]
1	Stoddard Wells Rd and I-15 NB Ramps	Unsignalized[2]	C (SB)	17.3
2	Stoddard Wells Rd and Quarry Road	Unsignalized[2]	A (SB)	9.4
3	I-15 SB Ramps and Quarry Road	Unsignalized[2]	A (WB)	9.6

Notes:
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. SB=Southbound, WB=Westbound

SOURCE: DMJM Harris, 2008.

As indicated in Table 6-21, all the study intersections continue to operate at acceptable conditions under 2013 Baseline conditions.

2013 BASELINE PLUS DMU CONDITIONS

Based on the trip distribution presented in Figure 6-7, project trips accessing the station were assigned to the analysis intersections. The project trips for DMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base conditions volumes to generate the 2013 baseline plus DMU volumes. For analysis purposes, the existing intersection geometry was assumed for future year 2013 conditions.

Based on the 2013 Baseline plus DMU volumes and the existing geometry, intersection level of service analysis was performed. Table 6-22 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 6-22, intersection of Stoddard Wells Road at I-15 northbound ramps operates at unacceptable conditions (LOS F) while all others operate at acceptable conditions (LOS D or better).

Table 6-22
Victorville Option 2 – 2013 Baseline plus DMU Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions		2013 Baseline DMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Stoddard Wells Rd and I-15 NB Ramps	Unsignalized[2]	C (SB)[3]	17.3	F (NB[3])	-
2	Stoddard Wells Rd and Quarry Road	Unsignalized[2]	A (SB)[3]	9.4	D (SB)[3]	34.2
3	I-15 SB Ramps and Quarry Road	Unsignalized[2]	A (WB)[3]	9.6	C (WB)[3]	16.0
4	Quarry Road and Station Access #1	Unsignalized[2]	-	-	A (NB)[3]	9.3
5	Stoddard Wells Road and Station Access #2	Unsignalized[2]	-	-	C (SB)[3]	15.9

Notes:
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB= Northbound, SB=Southbound, WB=Westbound

SOURCE: DMJM Harris, 2008.

Comparing the results of 2013 Baseline plus DMU conditions to the 2013 Baseline conditions level of service, it can be noted that due to the addition of project volumes, intersections approaches at Stoddard Wells Road and I-15 northbound ramps deteriorates from acceptable (LOS C) to unacceptable (LOS F) conditions. As the project trips add more than 5% of the existing volume at these intersections, the project impacts at these intersections are considered to be significant.

2013 BASELINE PLUS EMU CONDITIONS

Based on the trip distribution presented in Figure 6-7, project trips accessing the station were assigned to the analysis intersections. The project trips for EMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base conditions volumes to generate the 2013 baseline plus EMU volumes.

Based on the 2013 Baseline plus EMU volumes and the existing geometry, intersection level of service analysis was performed. Table 6-23 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 6-23, intersections of Stoddard Wells Road at northbound ramps intersection and Stoddard Wells Road at Quarry Road intersection operate at unacceptable conditions while all others operate at acceptable conditions.

Comparing the results of 2013 Baseline plus EMU conditions to the 2013 Baseline conditions level of service, it can be noted that due to the addition of project volumes, intersections of Stoddard Wells Road and I-15 northbound ramps and Stoddard Wells Road at Quarry Road deteriorate from acceptable (LOS C or better) to unacceptable (LOS F) conditions. As the project trips add more than 5% of existing volume at these intersections, project impacts at these intersections are considered to be significant.

Table 6-23
Victorville Option 2 – 2013 Baseline plus EMU Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions		2013 Baseline EMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Stoddard Wells Rd and I-15 NB Ramps	Unsignalized[2]	C (SB)[3]	17.3	F (NB)[3]	-
2	Stoddard Wells Rd and Quarry Road	Unsignalized[2]	A (SB)[3]	9.4	F (SB)[3]	141.8
3	I-15 SB Ramps and Quarry Road	Unsignalized[2]	A (WB)[3]	9.6	C (WB)[3]	22.3
4	Quarry Road and Station Access #1	Unsignalized[2]	-	-	D (NB)[3]	26.5
5	Stoddard Wells Road and Station Access #2	Unsignalized[2]	-	-	A (NB)[3]	9.9

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB= Northbound, SB=Southbound, WB=Westbound

6.2.4 2030 Cumulative Conditions

Under this scenario, the proposed improvements include signalization at all study intersections. Future year 2030 roadway geometry and signal control are presented in Figure 6-8.

2030 BASELINE CONDITIONS

Future year 2030 base volumes were calculated by applying a growth factor to the existing year volumes. These volumes are presented in the Appendix.

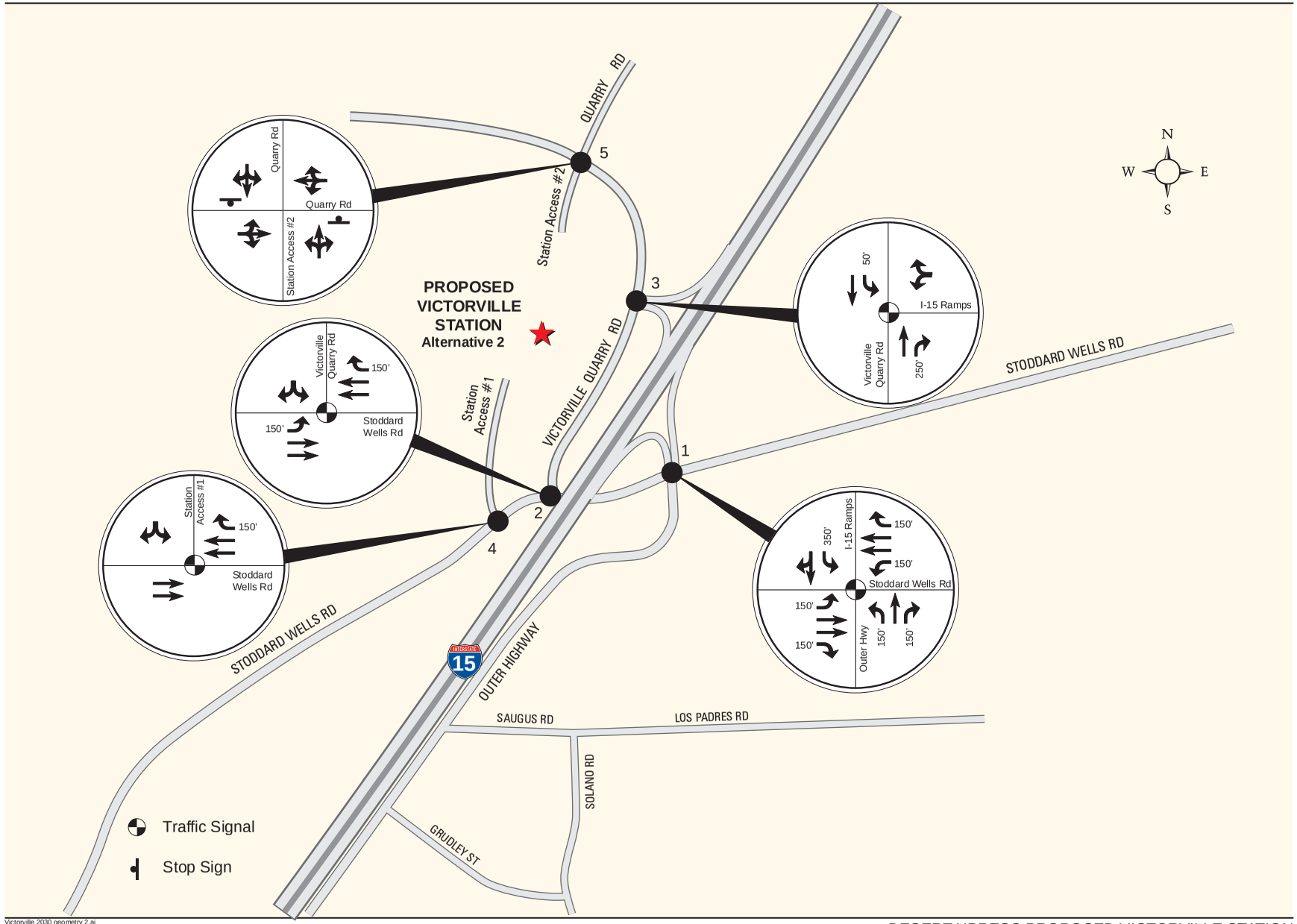
Based on the future base volumes and geometry presented in Figure 6-8, intersection level of service analysis was performed. Table 6-24 presents the results of intersection operating conditions for future year 2030 baseline conditions. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 6-24, all the study intersections operate at acceptable conditions under this scenario.

2030 BASELINE PLUS DMU CONDITIONS

Based on the trip distribution presented in Figure 6-7, project trips accessing the station were assigned to the analysis intersections. The project trips for DMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus DMU volumes.

Based on the 2030 Baseline plus DMU volumes and geometry presented in Figure 6-8, intersection level of service analysis was performed. Table 6-25 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.



Victorville 2030 geometry 2.ai

DESERT XPRESS PROPOSED VICTORVILLE STATION

Figure 6-8

FUTURE YEAR 2030 INTERSECTION LANE GEOMETRY

Victorville Station Alternative 2

Table 6-24
Victorville Option 2 - 2030 Baseline Conditions LOS

	Intersection	Traffic Control	2030 Baseline Conditions	
			LOS	Delay[1]
1	Stoddard Wells Rd and I-15 NB Ramps	Signalized	C	28.3
2	Stoddard Wells Rd and Quarry Road	Signalized	B	19.2
3	I-15 SB Ramps and Quarry Road	Signalized	C	31.2

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 6-25, all the study intersections operate at acceptable conditions under this scenario.

Table 6-25
Victorville Option 2 - 2030 Baseline plus DMU Conditions LOS

	Intersection	Traffic Control	2030 Baseline Conditions		2030 Baseline DMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Stoddard Wells Road & I-15 NB Ramps	Signalized	C	28.3	D	49.4
2	Stoddard Wells Road & Quarry Road	Signalized	B	19.2	B	15.4
3	I-15 SB Ramps & Quarry Road	Signalized	C	31.2	C	22.9
4	Quarry Road & Station Access #1	Unsignalized[2]	-	-	A (NB)[3]	2.6
5	Stoddard Wells Road & Station Access #2	Signalized	-	-	A	7.3

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB= Northbound, SB=Southbound, WB=Westbound

2030 BASELINE PLUS EMU CONDITIONS

Based on the trip distribution presented in Figure 6-7, project trips accessing the station were assigned to the analysis intersections. The project trips for EMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus EMU volumes.

Based on the 2030 Baseline plus EMU volumes geometry presented in Figure 6-8, intersection level of service analysis was performed. Table 6-26 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 6-26, all the study intersections operate at acceptable conditions except the Stoddard Wells Road and I-15 northbound ramps intersection.

Table 6-26
Victorville Option 2 - 2030 Baseline plus EMU Conditions LOS

Intersection		Traffic Control	2030 Baseline Conditions		2030 Baseline EMU Conditions	
			LOS	Delay[1]	LOS	Delay[1]
1	Stoddard Wells Road & I-15 NB Ramps	Signalized	C	28.3	F	99.2
2	Stoddard Wells Road & Quarry Road	Signalized	B	19.2	B	19.6
3	I-15 SB Ramps & Quarry Road	Signalized	C	31.2	C	23.9
4	Quarry Road & Station Access #1	Unsignalized[2]	-	-	A (NB) [3]	2.8
5	Stoddard Wells Road & Station Access #2	Signalized	-	-	B	11.0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB= Northbound, SB=Southbound, WB=Westbound

Comparing the results of 2030 Baseline plus EMU conditions to the 2030 Baseline conditions level of service, it can be noted that due to the addition of project volumes, intersection of Stoddard Wells Road and I-15 northbound ramps and deteriorates from acceptable (LOS C) to unacceptable (LOS F) conditions.

6.2.5 Mitigation Measures

EXISTING PLUS EMU CONDITIONS

As indicated in Table 6-20, two existing intersections are significantly impacted by the proposed project. To mitigate these intersections, following mitigation measures are proposed:

- # 1: Signalize intersection of Stoddard Wells Road at I-15 northbound ramps.
- # 2: Signalize intersection of Stoddard Wells Road at Quarry Road.

After applying above mitigation measures to the existing roadway network, the intersection level of service was calculated. Table 6-27 presents the results of Existing plus EMU mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 6-27, intersections of Stoddard Wells Road at I-15 northbound ramps and Stoddard Wells Road at Quarry Road operate at acceptable conditions (LOS B or better) with mitigation measures.

Table 6-27
Victorville Option 2 - Existing plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	Existing plus EMU Mitigation Conditions	
			LOS	Delay[1]
1	Stoddard Wells Rd and I-15 NB Ramps	Signalized	B	12.9
2	Stoddard Wells Rd and Quarry Road	Signalized	A	6.8

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

The signal warrant analysis at intersection 1 indicates that the warrant for peak hour (Warrants 3A and 3B) is met while it is not satisfied at intersection 2. The signal warrant analysis worksheets are provided in the Appendix.

2013 BASELINE PLUS DMU CONDITIONS

As indicated in Table 6-22, one study intersection operates at unacceptable conditions in the 2013 baseline plus DMU conditions. To mitigate this intersection, following mitigation measure is proposed:

- # 1: Signalize intersection of Stoddard Wells Road at I-15 northbound ramps.

After applying above mitigation measure to the existing roadway network, the intersection level of service was calculated. Table 6-28 presents the results of 2013 baseline plus DMU mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix. The signal warrant analysis at intersection 1 indicates that the warrant for peak hour (Warrants 3A and 3B) is met. The signal warrant analysis worksheets is provided in the Appendix.

Table 6-28
Victorville Option 2 - 2013 Baseline plus DMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus DMU Mitigation Conditions	
			LOS	Delay[1]
1	Stoddard Wells Rd and I-15 NB Ramps	Signalized	C	22.8

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 6-28, intersection of Stoddard Wells Road at I-15 northbound ramps operates at acceptable conditions (LOS C) with the mitigation measures.

2013 BASELINE PLUS EMU CONDITIONS

As indicated in Table 6-23, two study intersections operate at unacceptable conditions in the 2013 baseline plus EMU conditions. To mitigate these intersections, following mitigation measures are proposed:

- # 1: Signalize the intersection of Stoddard Wells Road at I-15 northbound ramps and add northbound left turn lane.
- # 2: Signalize the intersection of Stoddard Wells Road at Quarry Road.

After applying above mitigation measures to the existing roadway network, the intersection level of service was calculated. Table 6-29 presents the results of 2013 baseline plus EMU mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 6-29, the intersections of Stoddard Wells Road at I-15 northbound ramps and Stoddard Wells Road at Quarry Road operate at acceptable conditions (LOS C or better) with mitigation measures.

Table 6-29
Victorville Option 2 - 2013 Baseline plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus EMU Mitigation Conditions	
			LOS	Delay[1]
1	Stoddard Wells Rd and I-15 NB Ramps	Signalized	C	31.0
2	Stoddard Wells Rd and Quarry Rd	Signalized	A	9.5

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

The signal warrant analysis at intersection 1 indicates that the warrant for peak hour (Warrants 3A and 3B) is met while it is not satisfied at intersection 2. The signal warrant analysis worksheets are provided in the Appendix

2030 BASELINE PLUS EMU CONDITIONS

As indicated in Table 6-26, one study intersection operates at unacceptable conditions in the 2030 baseline plus EMU conditions. To mitigate this intersection, following mitigation measure is proposed:

- #11**:** Add a second southbound right turn lane at the intersection of Stoddard Wells Road at I-15 northbound ramps.

After applying above mitigation to the 2030 base roadway network, the intersection level of service was calculated. Table 6-30 presents the results of 2030 baseline plus EMU mitigation conditions analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 6-30
Victorville Option 2 - 2030 Baseline plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline plus EMU Mitigation Conditions	
			LOS	Delay[1]
1	Stoddard Wells Rd & I-15 NB Ramps	Signalized	D	50.2

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 6-30, intersection of Stoddard Wells Road at I-15 northbound ramps operates at acceptable conditions (LOS D) with mitigation measure.

6.2.6 Queuing Analysis

Queuing analysis was performed to identify the required length of turn pockets under the future year 2030 cumulative conditions at the ramp locations. Table 6-31 presents the results of queuing analysis for 2030 baseline and project conditions with and without mitigation measures. The queuing analysis worksheets are included in the Appendix.

It can be noted from table 6-31 that the queue lengths under the mitigated conditions are considerably shorter than the baseline conditions.

Table 6-31
Victorville Option 2 – Queuing Analysis

Intersection		Movement	95th % queue length (ft)		
			2030	2030 + DMU	2030 + EMU
Baseline Conditions					
1	Stoddard Wells Rd & I-15 NB Ramps	EBL	35	59	98
		EBR	170	68	62
		WBL	119	165	235
		WBR	16	20	30
		NBL	178	230	343
		NBR	43	51	36
		SBL	146	105	216
		SBR	36	712	1379
3	I-15 SB Ramps & Quarry Rd	NBR	51	52	348
		SBL	4	60	109
With Mitigations					
1	Stoddard Wells Rd & I-15 NB Ramps	EBL	N/A	N/A	72
		EBR			66
		WBL			199
		WBR			24
		NBL			284
		NBR			46
		SBL			216
		SBR			542
3	I-15 SB Ramps & Quarry Rd	NBR	N/A	N/A	298
		SBL			109

SOURCE: DMJM Harris, 2008.

7.0 LAS VEGAS AREA ANALYSIS

7.1 Downtown Station Location Alternative

The proposed Downtown station would be located east of I-15 in the downtown area. This station is bounded by Union Pacific Railroad to the west, South Main Street to the east, West Charleston Boulevard to the south and West Bonneville Avenue to the north. The proposed downtown station can be accessed from I-15 via ramps located at South Grand Central Parkway and West Charleston Boulevard and from I-515 via ramps located at North Las Vegas Boulevard.

7.1.1 Existing Conditions

Local Access. The existing local access roadway network for Las Vegas, Nevada near the proposed station locations are described below. These descriptions were adopted from "Roadway Functional Classification" map published by Federal Aid Highway System of Nevada in 2004. This map is included in the Appendix.

Las Vegas Boulevard is a two-way north-south minor arterial. The roadway generally has three lanes in each direction with sidewalks on both sides of the street in the study area. In the vicinity of the proposed Downtown station location, this street provides access to I-515 via the ramps located north of the station.

Main Street is a two-way north-south minor arterial. This roadway extends between Las Vegas Boulevard / 5th Street at the north and Las Vegas Boulevard / E St. Louis Avenue intersection at the south. In the vicinity of the proposed Downtown station location, this street generally has one lane in each direction with sidewalks on both sides of the street. On-street parking is permitted on the east side of the street.

Grand Central Parkway is a two-way north-south minor collector. This roadway extends between Main Street at the north and Charleston Boulevard at the south. In the vicinity of the proposed Downtown station location, this street generally has two lanes in each direction with a sidewalk on the west side of the street. On-street parking is generally not permitted on both sides of the street.

Martin Luther King Boulevard is a two-way north-south minor arterial. This roadway extends between Craig Road at the north and Oakey Boulevard at the south. In the vicinity of the proposed Downtown station location, this street generally has two lanes in each direction with a sidewalk on the west side of the street. On-street parking is generally not permitted on both sides of the street. Southbound I-15 from the Downtown station can be accessed via the ramps on Martin Luther King Boulevard south of Charleston Avenue.

Rancho Drive is a two-way north-south roadway that extends between highway 95 at the north and I-15 at the south. In the vicinity of the proposed Downtown station location, this street generally has two lanes in each direction and a center turning lane,

with sidewalks on both sides of the street. On-street parking is generally not permitted on both sides of the street.

Bonneville Avenue/Alta Drive is a two-way east-west minor arterial. Bonneville Avenue extends from east of I-15 to Charleston Boulevard. On the west of I-15, Bonneville Avenue continues as Alta Drive and extends west outside the project limits.

Charleston Boulevard is a two-way east-west principal arterial. This roadway extends from west of Decatur Boulevard to east of Las Vegas Boulevard. In the vicinity of the proposed Downtown station location, this street generally has three lanes in each direction with sidewalks on the both sides of the street. On-street parking is generally not permitted on both sides of the street.

EXISTING TRANSIT CONDITIONS

The proposed station locations in Las Vegas, Nevada are well served by public transit. Following section describes the various transit facilities operating near the proposed station locations:

- The **103-Decatur** is a 24-hour bus service running along Decatur Boulevard. This service runs from Decatur/Rome to Decatur/Tropicana with approximately 20 minute headways from 5:00AM to 8:00PM and 40-60 minute headways for the rest during weekdays.

- The **104-Valley View/ Torrey Pines** is running from Alexander/ Rancho to South Strip Transfer Terminal with approximately 30 minute headways from 4:30 AM to 7:00 PM and 40-60 minute headways for the rest during weekdays.

- The **105-Martin L. King** is a 24-hour bus service running along Martin Luther King Blvd. This service runs from Camino Al Norte/ Ann to Downtown Transportation Center with approximately 30 minute headways from 5:00AM to 8:00 PM and 60 minute headways for the rest during weekdays.

- The **113-Las Vegas Blvd** is a 24-hour service running along Las Vegas Blvd. This service connects from Las Vegas Blvd (Wal-mart Supercenter) to Downtown Transportation Center. This service runs with approximately 30 minute headways.

- The **204-Sahara** is a 24 hour bus service running along Sahara Avenue. This service runs from Sahara/ Fort Apache to Sahara/ Sloan intersection with approximately 20 minute headways from 5:00 AM to 8:00 PM and approximately 30-60 minute headways for the rest of the weekdays.

- The **206-Charleston** is a 24- hour bus service running along Charleston Blvd. This service runs from the Red Rock Station to the Charleston and Sloan intersection with approximately 45 minute headways for the weekdays and 20-35 minute headways for the weekends and holidays.

- The **207-Alta/Stewart** is running from Rainbow/ Westcliff to Bonanza/ Nellis with approximately 60 minute headways for Eastbound. For the Westbound, it runs approximately 30 minute headways from 5:30 AM to 6:30 PM and 40-60 minute headways for the rest during weekdays.

- The **Deuce-Las Vegas Blvd** is a 24-hour bus service running along Las Vegas Blvd. This service runs from Las Vegas/ Stewart to South Strip Transfer Terminal Center (SSTT) with 7 minute headways from 3:00 PM to 11:00 PM and 8-17 minute headways at all other times. This service stops at virtually every hotel, casino and every quarter mile in each direction along the Las Vegas Strip.

EXISTING PARKING CONDITIONS

On-Street parking is generally not permitted on any street in the local roadway network near the proposed station location, except the east side of Main Street.

EXISTING INTERSECTION OPERATIONS

The intersection analysis was performed using the Highway Capacity Manual (HCM) methodologies, a requirement of the Regional Transportation Commission, which was implemented using SYNCHRO Version 7 software. Level of Service thresholds and corresponding delays for signalized and unsignalized intersections are provided in Table 6-1.

In Clark County, LOS A through D is considered satisfactory levels, and LOS E and F conditions are considered unsatisfactory service levels. Unsignalized intersections are considered to operate at unsatisfactory conditions if one approach operates at LOS E or F and peak hour volume signal warrants are met.

Based on the station location options, intersections in the vicinity of the station location were identified for analysis purposes. Figure 7-1 presents the existing lane geometry at the study intersections. Intersection Level of Service (LOS) conditions were analyzed for weekday PM peak period (4:00 PM to 6:00 PM) at the study intersections. The results of the analysis are presented in Table 7-1. SYNCHRO analysis worksheets are provided in the Appendix.

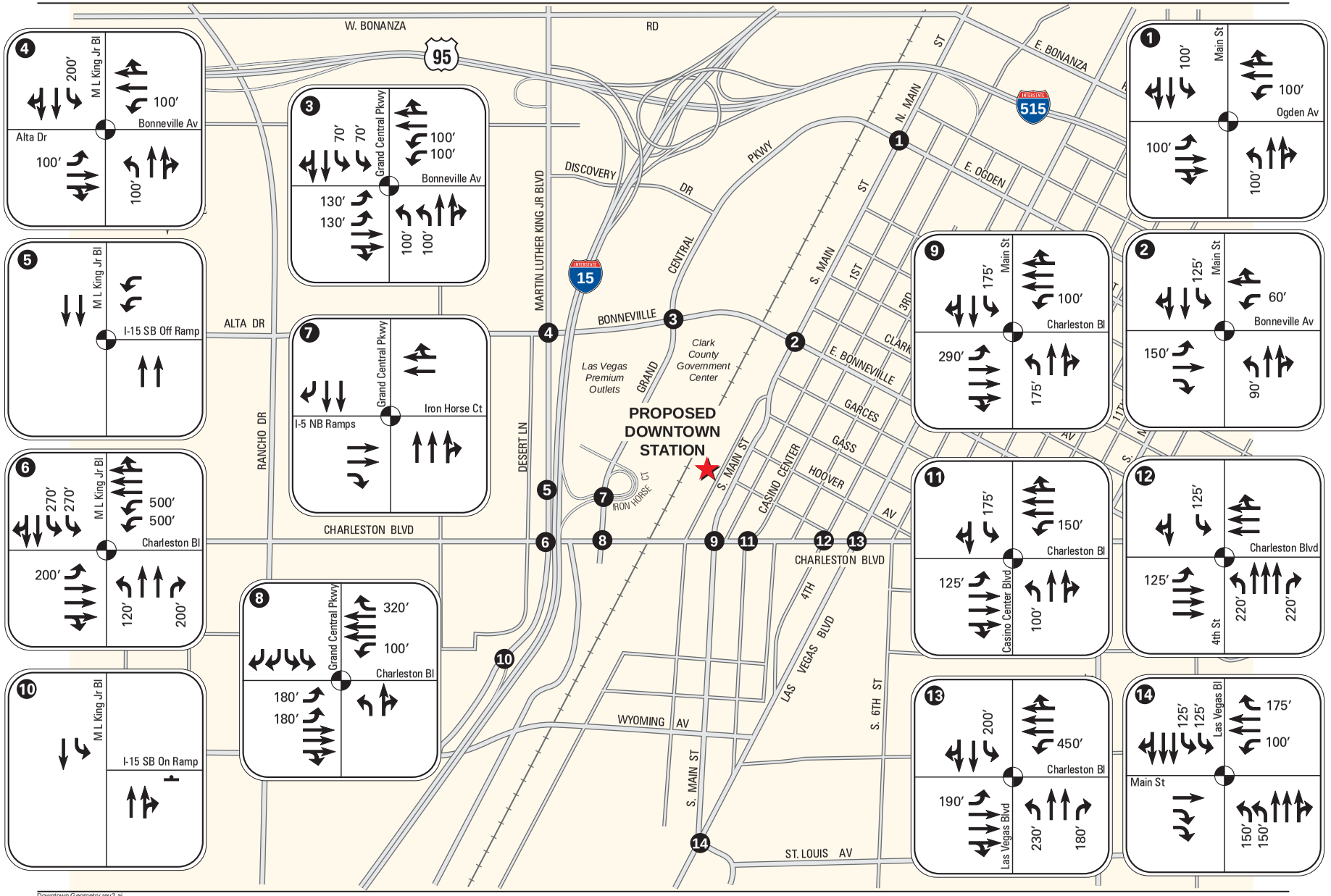
As indicated in Table 7-1, all the study intersections operate at acceptable conditions except two intersections along Martin Luther King at Charleston Boulevard and I-15 SB on-ramp and Grand Central Parkway at Charleston Boulevard that operate at unacceptable conditions (LOS F).

7.1.2 Impact Analysis

This section presents the assessment of transportation impacts due to the proposed project. The transportation conditions were assessed for the following scenarios:

- 2013 Opening Year Conditions;
- 2013 Opening Year plus Project (DMU and EMU alternatives) Conditions;
- 2030 Cumulative Baseline Conditions; and,
- 2030 Cumulative Baseline plus Project (DMU and EMU alternatives) Conditions

AECOM



Downtown Geometry rev2.ai

DESERT XPRESS PROPOSED LAS VEGAS DOWNTOWN STATION

Figure 7-1

EXISTING INTERSECTION GEOMETRY

Downtown Station

Table 7-1
Downtown Station Location Alternative - Existing Conditions LOS

Intersection		Traffic Control	Existing Conditions	
			LOS	Delay[1]
1	N. Main St & S. Grand Central Pkwy	Signalized	B	14.1
2	E. Bonneville & N. Main St	Signalized	D	52.1
3	E. Bonneville & S. Grand Central Pkwy	Signalized	C	30.7
4	W. Bonneville & S. MLK	Signalized	D	54.6
5	S. MLK & I-15 SB Off-Ramp	Signalized	A	9.5
6	S. MLK & W. Charleston	Signalized	F	117.3
7	S. Grand Central Pkwy & Iron Horse Ct / I-15 NB ramps	Signalized	B	16.9
8	S. Grand Central Pkwy & W. Charleston	Signalized	E	71.2
9	S. Main St & W. Charleston	Signalized	D	53.2
10	S. MLK & I-15 SB On-Ramp	Unsignalized[2]	F (NB)[3]	85.1
11	Casino Center & Charleston	Signalized	A	9.7
12	4th Street & Charleston	Signalized	B	10.5
13	Las Vegas Blvd & Charleston	Signalized	D	46.0
14	S. Las Vegas Blvd & S. Main St	Signalized	D	39.8

Notes:
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB=Northbound

SOURCE: DMJM Harris, 2008.

SIGNIFICANCE CRITERIA

The following are the significance criteria required by the Regional Transportation Commission in Nevada for the determination of impacts associated with a proposed project:

- Level of service C will be the design objective for capacity and under no circumstances will less than level of service D be accepted for site and non-site traffic.

PROJECT TRAVEL DEMAND

The Regional Transportation Commission (RTC) travel demand forecasting model was used to develop the base "no-project" travel forecasts for the future year 2013 and 2030 traffic analysis. RTC provided future year 2030 travel forecasts from the model to DMJM Harris. DMJM Harris has applied a straight line method to interpolate the intermediate year growth factors. The calculated growth factors were applied to the existing volumes to generate analysis year volumes. The growth factor calculations are presented in the Appendix. The additional project-related trips were then added to the future year base volumes to determine the "with project conditions".

TRIP DISTRIBUTION

The overall trip distribution for the station is shown in Figure 7-2. This station is served primarily by I-15 and Main Street in the north-south direction and Charleston Road and Bonneville Avenue in the east-west direction. Passengers at the train station would mainly originate or end their trips in commercial developments along 'the Strip'. As such, most traffic would be using

local streets instead of the freeways. Most traffic would head south as the station location is at the northern end of 'The Strip'. Most traffic coming from I-15 would use the Charleston Road interchange. Only a small percentage would use the on/off ramp of I-515.

7.1.3 2013 Conditions (Opening Year Analysis)

2013 BASELINE CONDITIONS

Future year 2013 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix. For analysis purposes, existing intersection geometry was assumed for future year 2013 conditions.

Based on the 2013 base volumes and the existing geometry, intersection level service analysis was performed. Table 7-2 presents the results of the analysis. SYNCHRO analysis worksheets are provided in the Appendix.

As indicated in Table 7-2, intersections along Martin Luther King at Bonneville Avenue, Charleston Boulevard and I-15 SB on-ramp and intersections of Bonneville Avenue at Main Street, Grand Central Parkway at Charleston Boulevard operate at unacceptable conditions (LOS E or F). All other intersections operate at acceptable conditions.

2013 BASELINE PLUS DIESEL-ELECTRIC MULTIPLE UNIT (DMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 7-2, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base volumes to generate the 2013 base plus DMU volumes.

Based on the 2013 Baseline plus DMU volumes and the existing geometry, intersection level service analysis was performed. Table 7-3 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-3, the intersections along Martin Luther King at Bonneville Avenue, Charleston Boulevard and I-15 SB on-ramp and the intersections of Bonneville Avenue at Main Street and Grand Central Parkway at Charleston Boulevard continue to operate at unacceptable conditions (LOS F), while the intersection of Main Street at Charleston deteriorates from acceptable (LOS D) to unacceptable conditions (LOS F) with the addition of project volumes. All other intersections operate at acceptable conditions.

Downtown Station Trip Distribution.ai

DESERT XPRESS PROPOSED LAS VEGAS DOWNTOWN STATION

Figure 7-2

DOWNTOWN STATION TRIP DISTRIBUTION

Table 7-2
Downtown Station Location Alternative - 2013 Baseline Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions	
			LOS	Delay[1]
1	N. Main St & S. Grand Central Pkwy	Signalized	B	13.2
2	E. Bonneville & N. Main St	Signalized	F	82.2
3	E. Bonneville & S. Grand Central Pkwy	Signalized	C	34.2
4	W. Bonneville & S. MLK	Signalized	E	56.3
5	S. MLK & I-15 SB Off-Ramp	Signalized	B	10.8
6	S. MLK & W. Charleston	Signalized	E	60.0
7	S. Grand Central Pkwy & Iron Horse Ct / I-15 NB ramps	Signalized	B	18.1
8	S. Grand Central Pkwy & W. Charleston	Signalized	E	79.2
9	S. Main St & W. Charleston	Signalized	D	54.9
10	S. MLK & I-15 SB On-Ramp	Unsignalized[2]	F (NB)[3]	154.3
11	Casino Center & Charleston	Signalized	A	9.9
12	4th Street & Charleston	Signalized	B	10.9
13	Las Vegas Blvd & Charleston	Signalized	D	46.8
14	S. Las Vegas Blvd & S. Main St	Signalized	D	40.3

Notes:
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB=Northbound

SOURCE: DMJM Harris, 2008.

2013 BASELINE PLUS ELECTRIC MULTIPLE UNIT (EMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 7-2, project trips accessing the station were assigned at the analysis intersections. The project trips for EMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2013 baseline plus EMU volumes.

Based on the 2013 Baseline plus EMU volumes and geometry presented in Figure 7-1, intersection level service analysis was performed. Table 7-4 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-4, the intersections along Martin Luther King at Bonneville Avenue, Charleston Boulevard and I-15 SB on-ramp and the intersections of Grand Central Parkway at Charleston Boulevard and Bonneville at Main Street continue to operate at unacceptable conditions (LOS F) with the addition of project volumes. The intersection of Main Street at Charleston Boulevard deteriorates from acceptable conditions (LOS D) to unacceptable conditions (LOS F) with the addition of project volumes. All other intersections operate at acceptable conditions (LOS D or better).

Table 7-3
Downtown Station Location Alternative - 2013 Baseline plus DMU Conditions LOS

	Intersection	2013 Baseline Conditions		2013 Baseline plus DMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	N. Main St & S. Grand Central Pkwy	B	13.2	B	16.4
2	E. Bonneville & N. Main St	F	82.2	F	96.2
3	E. Bonneville & S. Grand Central Pkwy	C	34.2	C	33.9
4	W. Bonneville & S. MLK	E	56.3	E	56.2
5	S. MLK & I-15 SB Off-Ramp	B	10.8	B	13.3
6	S. MLK & W. Charleston	E	60.0	F	101.4
7	S. Grand Central Pkwy & Iron Horse Ct / I-15 NB ramps	B	18.1	B	19.7
8	S. Grand Central Pkwy & W. Charleston	E	79.2	F	96.0
9	S. Main St & W. Charleston	D	54.9	F	163.8
10	S. MLK & I-15 SB On-Ramp	F (NB)[3]	154.3	F (NB)[3]	236.7
11	Casino Center & Charleston	A	9.9	A	9.7
12	4th Street & Charleston	B	10.9	B	11.1
13	Las Vegas Blvd & Charleston	D	46.8	D	49.3
14	S. Las Vegas Blvd & S. Main St	D	40.3	D	46.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB=Northbound

7.1.4 2030 Cumulative Conditions

In the future year 2030, the proposed roadway improvements in the vicinity of the Downtown station location include the following:

- Interchange reconfiguration at Charleston Boulevard and I-15 northbound and southbound ramps. This interchange will be configured as a Single Point Urban Interchange (SPUI) at Charleston Boulevard.
- Intersection of Martin Luther King Boulevard at Charleston Boulevard would be grade separated in the future.
- Bonneville Avenue would be one-way in the eastbound direction west of Main Street.

Due to the above roadway improvements, the existing southbound on and off ramp intersections at Martin Luther King Boulevard, the existing northbound ramps at Iron Horse Court and Grand Central Parkway and the existing at grade intersection at Martin Luther King Boulevard and Charleston Boulevard would not be analyzed under the 2030 cumulative conditions. Hence for SYNCHRO analysis, intersections 5, 6, 7 and 10 from previous scenarios were replaced by intersection 15 for the 2030 Cumulative (Baseline, DMU and EMU) conditions.

Table 7-4
Downtown Station Location Alternative
2013 Baseline plus EMU Conditions LOS

	Intersection	2013 Baseline Conditions		2013 Baseline plus EMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	N. Main St & S. Grand Central Pkwy	B	13.2	B	17.9
2	E. Bonneville & N. Main St	F	82.2	F	103.6
3	E. Bonneville & S. Grand Central Pkwy	C	34.2	C	33.8
4	W. Bonneville & S. MLK	E	56.3	E	56.1
5	S. MLK & I-15 SB Off-Ramp	B	10.8	B	15.5
6	S. MLK & W. Charleston	E	60.0	F	125.7
7	S. Grand Central Pkwy & Iron Horse Ct / I-15 NB ramps	B	18.1	C	20.9
8	S. Grand Central Pkwy & W. Charleston	E	79.2	F	105.7
9	S. Main St & W. Charleston	D	54.9	F	240.8
10	S. MLK & I-15 SB On-Ramp	F (NB)[3]	154.3	F (NB)[3]	280.2
11	Casino Center & Charleston	A	9.9	A	9.7
12	4th Street & Charleston	B	10.9	B	11.2
13	Las Vegas Blvd & Charleston	D	46.8	D	51.2
14	S. Las Vegas Blvd & S. Main St	D	40.3	D	49.2

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. NB=Northbound

2030 BASELINE CONDITIONS

Future year 2030 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix.

Based on the future base volumes and future analysis intersections, level of service analysis was performed. Table 7-5 presents the results of intersection operating conditions for future year 2030 baseline conditions. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-5, the intersections of Bonneville at Main Street, Bonneville at Martin Luther King Boulevard, Grand Central Parkway at Charleston Boulevard, Main Street at Charleston Boulevard and the new SPUI interchange at Charleston Boulevard operate at unacceptable conditions (LOS E or F). All the other intersections operate at acceptable conditions during the analysis period.

Table 7-5
Downtown Station Location Alternative
2030 Baseline Conditions LOS

Intersection		Traffic Control	2030 Baseline Conditions	
			LOS	Delay[1]
1	N. Main St & S. Grand Central Pkwy	Signalized	B	13.4
2	E. Bonneville & N. Main St	Signalized	E	66.7
3	E. Bonneville & S. Grand Central Pkwy	Signalized	D	48.1
4	W. Bonneville & S. MLK	Signalized	E	65.8
8	S. Grand Central Pkwy & W. Charleston	Signalized	F	97.6
9	S. Main St & W. Charleston	Signalized	E	66.5
11	Casino Center & Charleston	Signalized	B	10.6
12	4th Street & Charleston	Signalized	B	12.0
13	Las Vegas Blvd & Charleston	Signalized	D	50.2
14	S. Las Vegas Blvd & S. Main St	Signalized	D	41.8
15	I-15 ramps & Charleston	Signalized	E	56.9

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

2030 BASELINE PLUS DMU CONDITIONS

Based on the trip distribution presented in Figure 7-2, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus DMU volumes.

Based on the 2030 Baseline plus DMU volumes and future analysis intersections, level service analysis was performed. Table 7-6 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-6, the intersections of Bonneville at Main Street, Bonneville at Martin Luther King Boulevard, Grand Central Parkway at Charleston Boulevard, Main Street at Charleston Boulevard and the new SPUI interchange at Charleston Boulevard continue to operate at unacceptable conditions (LOS E or F) with the addition of project traffic. All the other intersections operate at acceptable conditions during the analysis period.

2030 BASELINE PLUS EMU CONDITIONS

Based on the trip distribution presented in Figure 7-2, project trips accessing the station were assigned at the analysis intersections. The project trips for EMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus EMU volumes.

Table 7-6
Downtown Station Location Alternative - 2030 Baseline plus DMU Conditions LOS

Intersection		2030 Baseline Conditions		2030 Baseline plus DMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	N. Main St & S. Grand Central Pkwy	B	13.4	B	15.2
2	E. Bonneville & N. Main St	E	66.7	F	86.3
3	E. Bonneville & S. Grand Central Pkwy	D	48.1	D	47.9
4	W. Bonneville & S. MLK	E	65.8	E	71.3
8	S. Grand Central Pkwy & W. Charleston	F	97.6	F	152.1
9	S. Main St & W. Charleston	E	66.5	F	237.5
11	Casino Center & Charleston	B	10.6	B	10.7
12	4th Street & Charleston	B	12.0	B	11.8
13	Las Vegas Blvd & Charleston	D	50.2	D	50.9
14	S. Las Vegas Blvd & S. Main St	D	41.8	D	47.3
15	I-15 ramps & Charleston	E	56.9	F	80.8

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

Based on the 2030 Baseline plus EMU volumes and future analysis intersections, level service analysis was performed. Table 7-7 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-7
Downtown Station Location Alternative - 2030 Baseline plus EMU Conditions LOS

Intersection		2030 Baseline Conditions		2030 Baseline plus EMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	N. Main St & S. Grand Central Pkwy	B	13.4	B	16.1
2	E. Bonneville & N. Main St	E	66.7	F	95.2
3	E. Bonneville & S. Grand Central Pkwy	D	48.1	D	47.8
4	W. Bonneville & S. MLK	E	65.8	E	74.1
8	S. Grand Central Pkwy & W. Charleston	F	97.6	F	177.2
9	S. Main St & W. Charleston	E	66.5	F	327.5
11	Casino Center & Charleston	B	10.6	B	10.7
12	4th Street & Charleston	B	12.0	B	11.8
13	Las Vegas Blvd & Charleston	D	50.2	D	51.3
14	S. Las Vegas Blvd & S. Main St	D	41.8	D	52.6
15	I-15 ramps & Charleston	E	56.9	F	93.9

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-7, the intersections of Bonneville at Main Street, Bonneville at Martin Luther King Boulevard, Grand Central Parkway at Charleston Boulevard, Main Street at Charleston Boulevard and the new SPUI interchange at Charleston Boulevard continue to operate at unacceptable conditions (LOS E or F) with the addition of project traffic. All the other intersections operate at acceptable conditions (LOS D or better) during the analysis period.

7.1.5 Mitigation Measures

It should be noted that the proposed mitigations suggested in this section have not been field verified.

2013 BASELINE CONDITIONS

As indicated in Table 7-2, the intersections along Martin Luther King at Bonneville Avenue, Charleston Boulevard and I-15 SB on-ramp, the intersections of Bonneville Avenue at Main Street and Grand Central Parkway at Charleston Boulevard operate with unacceptable conditions (LOS E or F). To mitigate these intersections, the following mitigations measures are proposed:

- #2. Bonneville/Main Street
  - Add exclusive westbound right turn lane.
- #4. Bonneville/S. Martin Luther King Boulevard
  - Add second eastbound left turn lane.
- #6. Charleston/S. Martin Luther King Boulevard
  - Optimize network offset and signal timing.
- #8. Grand Central Parkway/W. Charleston Boulevard
  - Optimize network offset and signal timing.
- #10. S. Martin Luther King Boulevard/ I-15 southbound On-ramp
  - Signalize the intersection.

Applying above mitigations, intersection level of service was calculated. Table 7-8 presents the results of 2013 Baseline mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-8, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

Table 7-8
Downtown Station Location Alternative
2013 Baseline Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline Mitigation Conditions	
			LOS	Delay[1]
2	E. Bonneville & N. Main St	Signalized	D	47.3
4	W. Bonneville & S. MLK	Signalized	D	35.2
6	S. MLK & W. Charleston	Signalized	D	43.4
8	S. Grand Central Pkwy & W. Charleston	Signalized	C	24.6
10	S. MLK & I-15 SB On-Ramp	Signalized	A	4.7

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

2013 BASELINE PLUS DMU CONDITIONS

As indicated in Table 7-3, the intersections along Martin Luther King at Bonneville Avenue, Charleston Boulevard and I-15 SB on-ramp and the intersections of Bonneville Avenue at Main Street, Grand Central Parkway at Charleston Boulevard and Main Street at Charleston operate with unacceptable conditions (LOS E or F) under 2013 Baseline plus DMU conditions. To mitigate these intersections, the following mitigations measures are proposed:

- #2. Bonneville/Main Street
  - Add exclusive westbound right turn lane.
- #4. Bonneville/S. Martin Luther King Boulevard
  - Add second eastbound left turn lane.
- #6. Charleston/S. Martin Luther King Boulevard
  - Optimize network offset and signal timing.
- #8. Grand Central Parkway/W. Charleston Boulevard
  - Optimize network offset and signal timing.
- #9. Main Street/Charleston Boulevard
  - Add second eastbound left turn lane.
  - Add exclusive dual southbound right turn lanes.
- #10. S. Martin Luther King Boulevard/ I-15 southbound On-ramp
  - Signalize the intersection.

Applying above mitigations, intersection level of service was calculated. Table 7-9 presents the results of 2013 Baseline plus DMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-9
Downtown Station Location Alternative
2013 Baseline plus DMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus DMU Mitigation Conditions	
			LOS	Delay[1]
2	E. Bonneville & N. Main St	Signalized	D	47.1
4	W. Bonneville & S. MLK	Signalized	D	35.2
6	S. MLK & W. Charleston	Signalized	D	50.4
8	S. Grand Central Pkwy & W. Charleston	Signalized	D	38.0
9	S. Main St & W. Charleston	Signalized	D	52.2
10	S. MLK & I-15 SB On-Ramp	Signalized	A	8.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-9, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2013 BASELINE PLUS EMU CONDITIONS

As indicated in Table 7-4, the intersections along Martin Luther King at Bonneville Avenue, Charleston Boulevard and I-15 SB on-ramp and the intersections of Grand Central Parkway at Charleston Boulevard and Main Street at Charleston Boulevard operate with unacceptable conditions (LOS E or F) under 2013 Baseline plus EMU conditions. To mitigate these intersections, following mitigations measures are proposed:

- #2. Bonneville/Main Street
  - Add exclusive westbound right turn lane.
- #4. Bonneville/S. Martin Luther King Boulevard
  - Add second eastbound left turn lane.
- #6. Charleston/S. Martin Luther King Boulevard
  - Add exclusive eastbound right turn lane.
- #8. Grand Central Parkway/W. Charleston Boulevard
  - Optimize network offset and signal timing.
- #9. Main Street/Charleston Boulevard
  - Add fourth westbound through lane.
  - Add exclusive westbound right turn lane.
  - Add second eastbound left turn lane.
  - Add exclusive eastbound right turn lane.
  - Add exclusive dual southbound right turn lanes.
- #10. S. Martin Luther King Boulevard/ I-15 southbound On-ramp

- Signalize the intersection.

Applying above mitigations, intersection level of service was calculated. Table 7-10 presents the results of 2013 Baseline plus EMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-10
Downtown Station Location Alternative
2013 Baseline plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus EMU Mitigation Conditions	
			LOS	Delay[1]
2	E. Bonneville & N. Main St	Signalized	D	52.1
4	W. Bonneville & S. MLK	Signalized	D	35.1
6	S. MLK & W. Charleston	Signalized	D	48.5
8	S. Grand Central Pkwy & W. Charleston	Signalized	D	40.5
9	S. Main St & W. Charleston	Signalized	D	49.4
10	S. MLK & I-15 SB On-Ramp	Signalized	B	12.2

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-10, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2030 BASELINE CONDITIONS

As indicated in Table 7-5, intersections of Bonneville at Main Street, Bonneville at Martin Luther King Boulevard, Grand Central Parkway at Charleston Boulevard, Main Street at Charleston Boulevard and the new SPUI interchange at Charleston Boulevard operate at unacceptable conditions (LOS E or F) under 2030 Baseline conditions. To mitigate these intersections, following mitigations measures are proposed:

- #2. Bonneville/Main Street
  - Optimize network offset and signal timing.
- #4. Bonneville/S. Martin Luther King Boulevard
  - Add exclusive southbound right turn lane.
- #8. Grand Central Parkway/W. Charleston Boulevard
  - Add second eastbound left turn lane.
  - Add third southbound right turn lane.
- #9. Main Street/Charleston Boulevard
  - Optimize network offset and signal timing.

- #15. I-15 Ramps/Charleston Boulevard (SPUI Interchange)
  - Optimize network offset and signal timing.

Applying the above mitigations, intersection level of service was calculated. Table 7-11 presents the results of 2030 Baseline mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-11
Downtown Station Location Alternative
2030 Baseline Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline Mitigation Conditions	
			LOS	Delay[1]
2	E. Bonneville & N. Main St	Signalized	D	43.6
4	W. Bonneville & S. MLK	Signalized	D	49.0
8	S. Grand Central Pkwy & W. Charleston	Signalized	D	42.6
9	S. Main St & W. Charleston	Signalized	D	53.9
15	I-15 ramps & Charleston	Signalized	D	45.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-11, all impacted intersections operate at acceptable conditions (LOS D) with mitigations.

2030 BASELINE PLUS DMU CONDITIONS

As indicated in Table 7-6, the intersections of Bonneville at Main Street, Bonneville at Martin Luther King Boulevard, Grand Central Parkway at Charleston Boulevard, Main Street at Charleston Boulevard and the new SPUI interchange at Charleston Boulevard operate at unacceptable conditions (LOS E or F) under 2030 Baseline plus DMU conditions. To mitigate these intersections, following mitigations measures are proposed:

- #2. Bonneville/Main Street
  - Optimize network offset and signal timing.
- #4. Bonneville/S. Martin Luther King Boulevard
  - Add exclusive southbound right turn lane.
- #8. Grand Central Parkway/W. Charleston Boulevard
  - Add second eastbound left turn lane.
  - Add fourth westbound through lane.
  - Add third southbound right turn lane.

- #9. Main Street/Charleston Boulevard
  - Add two eastbound left turn lanes.
  - Add exclusive eastbound right turn lane.
  - Add exclusive dual southbound right turn lanes.
- #15. I-15 Ramps/Charleston Boulevard (SPUI Interchange)
  - Add third southbound left turn lane.

Applying the above mitigations, intersection level of service was calculated. Table 7-12 presents the results of 2030 Baseline plus DMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-12
Downtown Station Location Alternative
2030 Baseline plus DMU Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline plus DMU Mitigation Conditions	
			LOS	Delay[1]
2	E. Bonneville & N. Main St	Signalized	D	50.6
4	W. Bonneville & S. MLK	Signalized	D	52.4
8	S. Grand Central Pkwy & W. Charleston	Signalized	D	40.0
9	S. Main St & W. Charleston	Signalized	D	52.5
15	I-15 ramps & Charleston	Signalized	D	49.6

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-12, all impacted intersections operate at acceptable conditions (LOS D) with mitigations.

2030 BASELINE PLUS EMU CONDITIONS

As indicated in Table 7-7, the intersections of Bonneville at Main Street, Bonneville at Martin Luther King Boulevard, Grand Central Parkway at Charleston Boulevard, Main Street at Charleston Boulevard and the new SPUI interchange at Charleston Boulevard operate at unacceptable conditions (LOS E or F) under 2030 Baseline plus EMU conditions. To mitigate these intersections, the following mitigations measures are proposed:

- #2. Bonneville/Main Street
  - Optimize network offset and signal timing.
- #4. Bonneville/S. Martin Luther King Boulevard
  - Add exclusive southbound right turn lane.
  - Add exclusive westbound right turn lane.
- #8. Grand Central Parkway/W. Charleston Boulevard

- Add second eastbound left turn lane.
- Add fourth westbound through lane.
- Add third southbound right turn lane.

- #9. Main Street/Charleston Boulevard
  - Add two eastbound left turn lanes.
  - Add exclusive eastbound right turn lane.
  - Add second northbound left turn lane.
  - Add exclusive northbound right turn lane.
  - Add two westbound through lanes.
  - Add exclusive westbound right turn lane.
  - Add exclusive dual southbound right turn lanes.
  - Add second southbound left turn lane.

- #15. I-15 Ramps/Charleston Boulevard (SPUI Interchange)
  - Add third southbound left turn lane.
  - Add fourth westbound through lane.

Applying the above mitigations, intersection level of service was calculated. Table 7-13 presents the results of 2030 Baseline plus EMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-13
Downtown Station Location Alternative
2030 Baseline plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline plus EMU Mitigation Conditions	
			LOS	Delay[1]
2	E. Bonneville & N. Main St	Signalized	D	53.5
4	W. Bonneville & S. MLK	Signalized	D	41.4
8	S. Grand Central Pkwy & W. Charleston	Signalized	D	51.8
9	S. Main St & W. Charleston	Signalized	D	52.6
15	I-15 ramps & Charleston	Signalized	D	48.1

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-13, all impacted intersections operate at acceptable conditions (LOS D) with mitigations.

7.2 Central Station Location "A" Alternative

The proposed Central Station would be located west of I-15, near the existing Rio Suites Hotel and Casino. This station is bounded by South Valley View Boulevard to the west, the Union Pacific Railroad to the east, West Flamingo Road (Route – 592) to the south and West Twain

Avenue to the north. The proposed Central "A" station can be accessed from I-15 via ramps located at Flamingo Road.

7.2.1 Existing Conditions

EXISTING ROADWAY NETWORK

For other north-south streets description, refer to section 7.1.1.

Industrial Boulevard is a two-way north-south minor arterial. This roadway extends from north of Sahara Avenue to Twain Avenue where it merges into Dean Martin Drive. In the vicinity of the proposed Central "A" station, this street generally has two lanes in each direction with sidewalk on the east side of the street. On-street parking is generally not permitted on both sides of the street.

Valley View Boulevard is a two-way north-south minor arterial. This roadway extends from Washington Avenue at the north to Flamingo Road at the south. In the vicinity of the proposed Central "A" station location, this street generally has two lanes in each direction and a center turning lane, with sidewalks on both sides of the street. On-street parking is generally not permitted on both sides of the street.

For other north-south streets description, refer to section 7.1.1.

Spring Mountain Road is a two-way east-west minor collector. This roadway extends from east of Decatur Blvd to Las Vegas Boulevard Avenue where it merges into Sands Avenue. In the vicinity of the proposed Central "A" Station location, this street generally has three lanes in each direction with sidewalks on the both sides of the street. On-street parking is generally not permitted on both sides of the street.

Twain Avenue is a two-way east-west minor collector. This roadway extends from Town Center Drive to the east of Frank Sinatra Drive. In the vicinity of the proposed Central "A" Station location, this street generally has three lanes in the westbound direction and two lanes in the eastbound direction with sidewalks on the both sides of the street. On-street parking is generally not permitted on both sides of the street.

Flamingo Road is a two-way east-west minor arterial. This roadway extends from south of Desert Inn Road/ Red Rock Ranch Road to Stephanie St. In the vicinity of the proposed Central "A" Station location, this street generally has three lanes in each direction with sidewalks on the both sides of the street. On-street parking is generally not permitted on both sides of the street.

EXISTING TRANSIT CONDITIONS

Refer to section 7.1.1 under for other transit lines serving the area.

- The **202-Flamingo** is a 24-hour bus service running along Flamingo Road from Grand Canyon Parkway Shopping Center to Harmon/ Boulder Hwy with approximately 10-15 minute headways from 5:00 AM to 7:00 PM and 20-30 minute headways for the rest during weekdays.

- The **203-Spring Mountain/Twain** is running from Durango/ Tropicana to Flamingo/ Pecos with approximately 30-minute headways from 5:30 AM to 6:30 PM and 40-60 minute headways for the rest during weekdays.

EXISTING PARKING CONDITIONS

On-street parking is generally not permitted on any street in the local roadway network near the proposed station location.

EXISTING INTERSECTION OPERATIONS

Based on the station location options, intersections in the vicinity of the station location were identified for analysis purposes. The existing lane geometry at the study intersections is shown in Figure 7-3. Intersection Level of Service (LOS) conditions were analyzed for weekday PM peak period (4:00 PM to 6:00 PM). The results of the analysis are presented in Table 7-14. SYNCHRO analysis worksheets are provided in the Appendix.

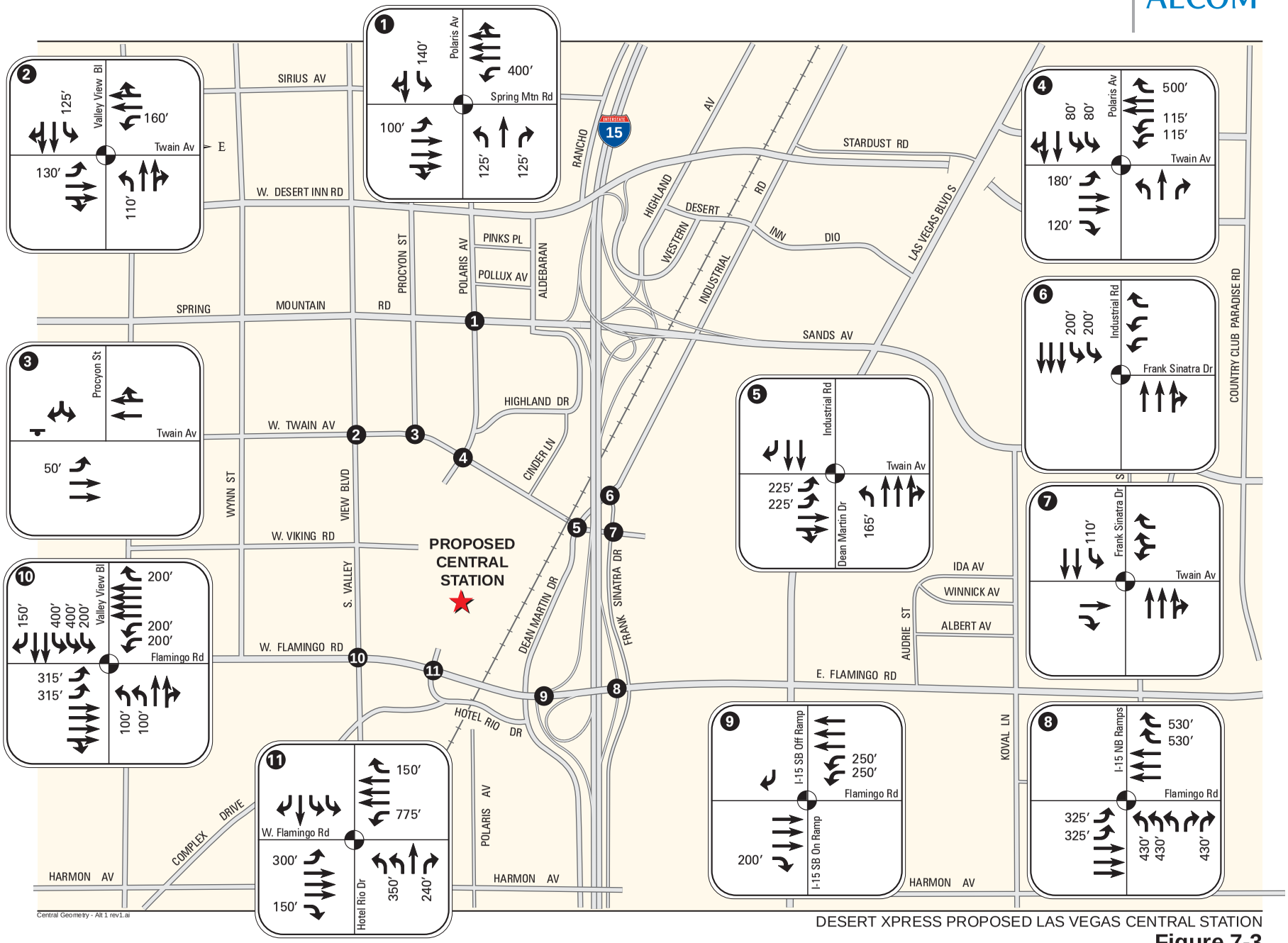
Table 7-14
Central Station Location "A" Alternative - Existing Conditions LOS

Intersection		Traffic Control	Existing Conditions	
			LOS	Delay[1]
1	Spring Mountain & Polaris	Signalized	C	24.6
2	W. Twain & S. Valley View	Signalized	D	53.0
3	W. Twain & Procyon	Unsignalized[2]	B (SB)[3]	11.8
4	W. Twain & Polaris	Signalized	C	25.7
5	W. Twain & Dean Marin Dr/Industrial	Signalized	C	30.9
6	Industrial & Frank Sinatra	Signalized	C	31.0
7	W. Twain & Frank Sinatra	Signalized	C	20.4
8	W. Flamingo & I-15 NB Ramps	Signalized	C	27.7
9	W. Flamingo & I-15 SB Ramps	Signalized	A	7.2
10	W. Flamingo & S. Valley View	Signalized	D	38.2
11	W. Flamingo & Hotel Rio Dr	Signalized	D	41.1

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. SB=Southbound

As indicated in Table 7-14, all intersections operate at acceptable conditions in the existing conditions (LOS D or better).

AECOM



DESERT XPRESS PROPOSED LAS VEGAS CENTRAL STATION

Figure 7-3

EXISTING INTERSECTION GEOMETRY

Central Station Alternative A

7.2.2 Impact Analysis

This section presents the assessment of transportation impacts due to the proposed project. The transportation conditions were assessed for the following scenarios:

- 2013 Opening Year Conditions;
- 2013 Opening Year plus Project Conditions;
- 2030 Cumulative Baseline Conditions; and,
- 2030 Cumulative Baseline plus Project Conditions

SIGNIFICANCE CRITERIA

The following are the significance criteria required by the Regional Transportation Commission in Nevada for the determination of impacts associated with a proposed project:

- Level of service C will be the design objective for capacity and under no circumstances will less than level of service D be accepted for site and non-site traffic.

PROJECT TRAVEL DEMAND

The Regional Transportation Commission (RTC) travel demand forecasting model was used to develop the base "no-project" travel forecasts for future year 2013 and 2030 traffic analysis. RTC provided future year 2030 travel forecasts from the model to DMJM Harris. DMJM Harris has applied a straight line method to interpolate the intermediate year growth factors. The calculated growth factors were applied to the existing volumes to generate analysis year volumes. The growth factor calculations are presented in the Appendix. The additional project-related trips were then added to the future year base volumes to determine the "with project conditions".

TRIP DISTRIBUTION

The overall trip distribution for the station is shown in Figure 7-4. This station is served primarily by I-15, Industrial Road – Dean Martin Drive in the north-south direction and Flamingo Road, Twain Avenue and Spring Mountain Road in the east-west direction. Most train passengers would have origins or destinations at the commercial developments on 'The Strip'; only a small percentage of 10% would travel to/from the west of the proposed location. A good proportion of vehicles heading towards the commercial developments on 'The Strip' would choose to use Industrial Road / Dean-Martin Drive as travel time on Las Vegas Boulevard tends to be higher.

7.2.3 2013 Conditions (Opening Year Analysis)

Under the future with project conditions, station access from Twain Avenue will be located east of the Twain Avenue and Polaris Avenue intersection. It should be noted that this intersection would be analyzed in "with-project conditions" and is designated as intersection 12 on the SYNCHRO network.

Central Station Trip Distribution.ai

DESERT XPRESS PROPOSED LAS VEGAS CENTRAL STATION

Figure 7-4

CENTRAL STATION A TRIP DISTRIBUTION

2013 BASELINE CONDITIONS

Future year 2013 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix. For analysis purposes, existing intersection geometry was assumed for future year 2013 conditions. Based on the future base volumes and the existing geometry, intersection level service analysis was performed.

Table 7-15 presents the results of intersection operating conditions for future year 2013 baseline conditions. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-15
Central Station Location "A" Alternative – 2013 Baseline Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions	
			LOS	Delay[1]
1	Spring Mountain & Polaris	Signalized	C	24.9
2	W. Twain & S. Valley View	Signalized	E	59.3
3	W. Twain & Procyon	Unsignalized[2]	B (SB)[3]	12.0
4	W. Twain & Polaris	Signalized	C	26.5
5	W. Twain & Dean Martin Dr/Industrial	Signalized	C	30.4
6	Industrial & Frank Sinatra	Signalized	D	36.2
7	W. Twain & Frank Sinatra	Signalized	C	20.2
8	W. Flamingo & I-15 NB Ramps	Signalized	C	29.5
9	W. Flamingo & I-15 SB Ramps	Signalized	A	7.5
10	W. Flamingo & S. Valley View	Signalized	D	41.6
11	W. Flamingo & Hotel Rio Dr	Signalized	D	39.1

SOURCE: DMJM Harris, 2008.

Notes:
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. SB=Southbound

As indicated in Table 7-15, all the intersections operate at acceptable conditions except intersection of Twain Avenue at Valley View.

2013 BASELINE PLUS DIESEL-ELECTRIC MULTIPLE UNIT (DMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 7-4, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base conditions volumes to generate the 2013 baseline plus DMU volumes. For analysis purposes, existing intersection geometry was assumed for future year 2013 conditions.

Based on the 2013 Baseline plus DMU volumes and the existing geometry, intersection level service analysis was performed. Table 7-16 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-16
Central Station Location "A" Alternative
2013 Baseline plus DMU Conditions LOS

		2013 Baseline Conditions		2013 Baseline plus DMU Conditions	
Intersection		**LOS**	**Delay[1]**	**LOS**	**Delay[1]**
1	Spring Mountain & Polaris	C	24.9	C	24.9
2	W. Twain & S. Valley View	E	59.3	E	62.9
3	W. Twain & Procyon	B (SB)[3]	12.0	B (SB)[3]	12.4
4	W. Twain & Polaris	C	26.5	C	29.5
5	W. Twain & Dean Martin Dr/Industrial	C	30.4	E	62.1
6	Industrial & Frank Sinatra	D	36.2	D	45.9
7	W. Twain & Frank Sinatra	C	20.2	C	23.4
8	W. Flamingo & I-15 NB Ramps	C	29.5	E	57.3
9	W. Flamingo & I-15 SB Ramps	A	7.5	A	9.0
10	W. Flamingo & S. Valley View	D	41.6	D	42.6
11	W. Flamingo & Hotel Rio Dr	D	39.1	E	76.5
12	W. Twain & Station Access	-	-	B	13.1

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. SB=Southbound

As indicated in Table 7-16, intersections of Twain at Valley View continues to operate at unacceptable conditions (LOS E) while intersections of Twain at Dean Martin Drive, Flamingo at I-15 northbound ramps and Flamingo at Hotel Rio Drive deteriorate from acceptable conditions (LOS D or better) in 2013 baseline conditions to unacceptable conditions (LOS E) with the addition of project volumes.

2013 BASELINE PLUS ELECTRIC MULTIPLE UNIT (EMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 7-4, project trips accessing the station were assigned at the analysis intersections. The project trips for EMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base conditions volumes to generate the 2030 baseline plus EMU volumes.

Based on the 2013 Baseline plus EMU volumes and geometry presented in Figure 7-3, intersection level service analysis was performed. Table 7-17 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-17
Central Station Location "A" Alternative – 2013 Baseline plus EMU Conditions LOS

Intersection		2013 Baseline Conditions		2013 Baseline plus EMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	Spring Mountain & Polaris	C	24.9	C	24.9
2	W. Twain & S. Valley View	E	59.3	E	64.8
3	W. Twain & Procyon	B (SB)[3]	12.0	B (SB)[3]	12.5
4	W. Twain & Polaris	C	26.5	C	30.4
5	W. Twain & Dean Martin Dr/Industrial	C	30.4	F	94.6
6	Industrial & Frank Sinatra	D	36.2	E	55.9
7	W. Twain & Frank Sinatra	C	20.2	C	24.8
8	W. Flamingo & I-15 NB Ramps	C	29.5	E	76.4
9	W. Flamingo & I-15 SB Ramps	A	7.5	B	10.1
10	W. Flamingo & S. Valley View	D	41.6	D	42.9
11	W. Flamingo & Hotel Rio Dr	D	39.1	F	105.7
12	W. Twain & Station Access	-	-	C	31.7

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. SB=Southbound

As indicated in Table 7-17, intersections of Twain at Valley View continues to operate at unacceptable conditions (LOS E) while intersections of Twain at Dean Martin Drive, Industrial at Frank Sinatra, Flamingo at I-15 northbound ramps and Flamingo at Hotel Rio Drive deteriorate from acceptable conditions (LOS D or better) in 2013 baseline conditions to unacceptable conditions (LOS E) with the addition of project volumes.

7.2.4 2030 Cumulative Conditions

2030 BASELINE CONDITIONS

Future year 2030 base volumes were calculated by applying the growth factor to the existing year volumes. These volumes are presented in the Appendix. For analysis purposes, existing intersection geometry was assumed for future year 2030 conditions.

Based on the future base volumes and geometry presented in Figure 7-3, intersection level service analysis was performed. Table 7-18 presents the results of intersection operating conditions for future year 2030 baseline conditions. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-18
Central Station Location "A" Alternative – 2030 Baseline Conditions LOS

Intersection		Traffic Control	2030 Baseline Conditions	
			LOS	Delay[1]
1	Spring Mountain & Polaris	Signalized	C	26.1
2	W. Twain & S. Valley View	Signalized	E	70.8
3	W. Twain & Procyon	Unsignalized[2]	B (SB)[3]	12.5
4	W. Twain & Polaris	Signalized	C	28.2
5	W. Twain & Dean Martin Dr/Industrial	Signalized	D	38.1
6	Industrial & Frank Sinatra	Signalized	E	61.2
7	W. Twain & Frank Sinatra	Signalized	B	17.0
8	W. Flamingo & I-15 NB Ramps	Signalized	D	37.9
9	W. Flamingo & I-15 SB Ramps	Signalized	A	8.6
10	W. Flamingo & S. Valley View	Signalized	F	95.8
11	W. Flamingo & Hotel Rio Dr	Signalized	D	39.1

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. SB=Southbound

As indicated in Table 7-18, intersections of Twain at Valley View, Industrial at Frank Sinatra and Flamingo at Valley View operate with unacceptable conditions (LOS E or F) under the analysis scenario.

2030 BASELINE PLUS DMU CONDITIONS

Based on the trip distribution presented in Figure 7-4, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus DMU volumes.

Based on the 2030 Baseline plus DMU volumes geometry presented in Figure 7-3, intersection level service analysis was performed. Table 7-19 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-19, intersections of Twain Avenue at Valley View, Industrial at Frank Sinatra and Flamingo at Valley View continue to operate with unacceptable conditions (LOS E or F) while intersections of Twain at Dean Martin Drive/Industrial Avenue, Flamingo at I-15 northbound ramps, and Flamingo at Hotel Rio Drive deteriorate from acceptable (LOS D) to unacceptable (LOS E or F) conditions with the addition of project volumes.

Table 7-19
Central Station Location "A" Alternative
2030 Baseline plus DMU Conditions LOS

		2030 Baseline Conditions		2030 Baseline plus DMU Conditions	
Intersection		**LOS**	**Delay[1]**	**LOS**	**Delay[1]**
1	Spring Mountain & Polaris	C	26.1	C	26.1
2	W. Twain & S. Valley View	E	70.8	E	76.1
3	W. Twain & Procyon	B (SB)[3]	12.5	B (SB)[3]	12.8
4	W. Twain & Polaris	C	28.2	C	30.5
5	W. Twain & Dean Martin Dr/Industrial	D	38.1	F	105.4
6	Industrial & Frank Sinatra	E	61.2	E	79.5
7	W. Twain & Frank Sinatra	B	17.0	C	22.4
8	W. Flamingo & I-15 NB Ramps	D	37.9	E	71.8
9	W. Flamingo & I-15 SB Ramps	A	8.6	B	10.9
10	W. Flamingo & S. Valley View	F	95.8	F	95.9
11	W. Flamingo & Hotel Rio Dr	D	39.1	E	77.2
12	W. Twain & Station Access Road	-	-	B	13.1

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. SB=Southbound

2030 BASELINE PLUS EMU CONDITIONS

Based on the trip distribution presented in Figure 7-4, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus EMU volumes.

Based on the 2030 Baseline plus EMU volumes geometry presented in Figure 7-3, intersection level service analysis was performed. Table 7-20 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-20, intersections of Twain Avenue at Valley View, Industrial at Frank Sinatra and Flamingo at Valley View continue to operate with unacceptable conditions (LOS E or F) while intersections of Twain at Dean Martin Drive/Industrial Avenue, Flamingo at I-15 northbound ramps, and Flamingo at Hotel Rio Drive deteriorate from acceptable (LOS D) to unacceptable (LOS E or F) conditions with the addition of project volumes.

Table 7-20
Central Station Location "A" Alternative
2030 Baseline plus EMU Conditions LOS

Intersection		2030 Baseline Conditions		2030 Baseline plus EMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	Spring Mountain & Polaris	C	26.1	C	26.1
2	W. Twain & S. Valley View	E	70.8	E	79.1
3	W. Twain & Procyon	B (SB)[3]	12.5	B (SB)[3]	13.0
4	W. Twain & Polaris	C	28.2	C	31.3
5	W. Twain & Dean Martin Dr/Industrial	D	38.1	F	142.2
6	Industrial & Frank Sinatra	E	61.2	F	90.4
7	W. Twain & Frank Sinatra	B	17.0	C	25.4
8	W. Flamingo & I-15 NB Ramps	D	37.9	F	92.1
9	W. Flamingo & I-15 SB Ramps	A	8.6	B	11.9
10	W. Flamingo & S. Valley View	F	95.8	F	95.8
11	W. Flamingo & Hotel Rio Dr	D	39.1	F	107.2
12	W. Twain & Station Access Road	-	-	D	35.8

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. SB=Southbound

7.2.5 Mitigation Measures

It should be noted that the proposed mitigations suggested in this section have not been field verified.

2013 BASELINE CONDITIONS

As indicated in Table 7-15, the intersection of Twain Avenue at Valley View operates at unacceptable conditions under 2013 Baseline conditions. To mitigate this intersection, following mitigation measure is proposed:

- #2. Twain Avenue & Valley View
  - Optimize network offset.

Applying above mitigation, intersection level of service was calculated. Table 7-21 presents the results of 2013 Baseline mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-21
Central Station Location "A" Alternative
2013 Baseline Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions	
			LOS	Delay[1]
2	W. Twain & S. Valley View	Signalized	D	48.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-21, the intersection of Twain at Valley View operates at acceptable conditions (LOS D) with mitigations.

2013 BASELINE PLUS DMU CONDITIONS

As indicated in Table 7-16, the intersections of Twain at Valley View, Twain at Dean Martin Drive, Flamingo at I-15 northbound ramps and Flamingo at Hotel Rio Drive operate with unacceptable conditions under 2013 Baseline plus DMU conditions. To mitigate these intersections, following mitigation measures are proposed:

- #2. Twain Avenue & Valley View
  - Optimize network offset.
- #5. Twain Avenue & Dean Martin Drive/Industrial
  - Optimize network offset.
- #8. Flamingo & I-15 NB Ramps
  - Optimize network offset.
- #11. Flamingo & Hotel Rio Drive
  - Add third southbound left turn lane.
  - Add fourth westbound through lane.
  - Add second westbound right turn lane.
  - Add fourth eastbound through lane.

Applying above mitigations, intersection level of service was calculated. Table 7-22 presents the results of 2013 Baseline plus DMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-22, all impacted intersections operate at acceptable conditions (LOS D) with mitigations.

Table 7-22
Central Station Location "A" Alternative
2013 Baseline plus DMU Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline plus DMU Mitigation Conditions	
			LOS	Delay[1]
2	W. Twain & S. Valley View	Signalized	D	49.8
5	W. Twain & Dean Martin Dr/Industrial	Signalized	D	51.3
8	W. Flamingo & I-15 NB Ramps	Signalized	D	51.0
11	W. Flamingo & Hotel Rio Drive	Signalized	D	40.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

2013 BASELINE PLUS EMU CONDITIONS

As indicated in Table 7-17, the intersections of Twain at Valley View, Twain at Dean Martin Drive, Industrial at Frank Sinatra, Flamingo at I-15 northbound ramps and Flamingo at Hotel Rio Drive operate with unacceptable conditions (LOS E of F) under 2013 Baseline plus EMU conditions. To mitigate these intersections, following mitigation measures are proposed:

- #2. Twain Avenue & Valley View
  - Optimize network offset.
- #5. Twain Avenue & Dean Martin Drive/Industrial
  - Add second southbound right turn lane.
- #6. Industrial & Frank Sinatra
  - Add second westbound right turn lane
- #8. Flamingo & I-15 NB Ramps
  - Add third eastbound right turn lane
- #11. Flamingo & Hotel Rio Drive
  - Add third southbound left turn lane.
  - Add fourth westbound through lane.
  - Add second westbound right turn lane.
  - Add fourth eastbound through lane.

Applying above mitigations, intersection level of service was calculated. Table 7-23 presents the results of 2013 Baseline plus EMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-23
Central Station Location "A" Alternative
2013 Baseline plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus EMU Conditions	
			LOS	Delay[1]
2	W. Twain & S. Valley View	Signalized	D	50.5
5	W. Twain & Dean Martin Dr/Industrial	Signalized	C	26.5
6	Industrial & Frank Sinatra	Signalized	C	22.5
8	W. Flamingo & I-15 NB Ramps	Signalized	D	42.0
11	W. Flamingo & Hotel Rio Dr	Signalized	D	48.0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-23, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2030 BASELINE CONDITIONS

As indicated in Table 7-18, the intersections of Twain at Valley View, Industrial at Frank Sinatra and Flamingo at Valley View operate with unacceptable conditions (LOS E or F) under 2030 Baseline conditions. To mitigate these intersections, following mitigation measures are proposed:

- #2. Twain Avenue & Valley View
  - Add exclusive westbound right turn lane.
- #6. Industrial & Frank Sinatra
  - Add second westbound right turn lane
- #10. Flamingo & Valley View
  - Add exclusive northbound right turn lane.

Applying above mitigations, intersection level of service was calculated. Table 7-24 presents the results of 2030 Baseline mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-24
Central Station Location "A" Alternative
2030 Baseline Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline Conditions	
			LOS	Delay[1]
2	W. Twain & S. Valley View	Signalized	D	50.5
6	Industrial & Frank Sinatra	Signalized	C	25.5
10	W. Flamingo & S. Valley View	Signalized	D	50.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-24, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2030 BASELINE PLUS DMU CONDITIONS

As indicated in Table 7-19, the intersections of Twain Avenue at Valley View, Industrial at Frank Sinatra, Flamingo at Valley View, Twain at Dean Martin Drive/Industrial Avenue, Flamingo at I-15 northbound ramps, and Flamingo at Hotel Rio Drive operate at unacceptable conditions (LOS E or F) under 2030 Baseline plus DMU conditions. To mitigate these intersections, following mitigation measures are proposed:

- #2. Twain Avenue & Valley View
  - Add exclusive westbound right turn lane.
- #5. Twain Avenue & Dean Martin Drive/Industrial
  - Add second southbound right turn lane.
- #6. Industrial & Frank Sinatra
  - Add second westbound right turn lane
- #8. Flamingo & I-15 NB Ramps
  - Add third eastbound left turn lane
- #10. Flamingo & Valley View
  - Add exclusive northbound right turn lane.
- #11. Flamingo & Hotel Rio Drive
  - Add third southbound left turn lane.
  - Add fourth westbound through lane.

Applying the above mitigations, intersection level of service was calculated. Table 7-25 presents the results of 2030 Baseline plus DMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-25
Central Station Location "A" Alternative
2030 Baseline plus DMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus DMU Conditions	
			LOS	Delay[1]
2	W. Twain & S. Valley View	Signalized	D	53.7
5	W. Twain & Dean Martin Dr/Industrial	Signalized	C	26.5
6	Industrial & Frank Sinatra	Signalized	C	26.3
8	W. Flamingo & I-15 NB Ramps	Signalized	D	47.5
10	W. Flamingo & S. Valley View	Signalized	D	48.3
11	W. Flamingo & Hotel Rio Dr	Signalized	D	46.0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-25, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2030 BASELINE PLUS EMU CONDITIONS

As indicated in Table 7-20, the intersections of Twain Avenue at Valley View, Industrial at Frank Sinatra, Flamingo at Valley View, Twain at Dean Martin Drive/Industrial Avenue, Flamingo at I-15 northbound ramps, and Flamingo at Hotel Rio Drive operate at unacceptable conditions under 2030 Baseline plus EMU conditions. To mitigate these intersections, following mitigation measures are proposed:

- #2. Twain Avenue & Valley View
  - Add exclusive westbound right turn lane.
- #5. Twain Avenue & Dean Martin Drive/Industrial
  - Add second southbound right turn lane.
- #6. Industrial & Frank Sinatra
  - Add second westbound right turn lane.
- #8. Flamingo & I-15 NB Ramps
  - Add third eastbound left turn lane.
  - Add fourth westbound through lane.
- #10. Flamingo & Valley View
  - Add exclusive northbound right turn lane.
- #11. Flamingo & Hotel Rio Drive
  - Add third southbound left turn lane.
  - Add fourth westbound through lane.
  - Add second westbound right turn lane.

Applying above mitigations, intersection level of service was calculated. Table 7-26 presents the results of 2030 Baseline plus EMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-26
Central Station Location "A" Alternative
2030 Baseline plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus EMU Conditions	
			LOS	Delay[1]
2	W. Twain & S. Valley View	Signalized	D	54.6
5	W. Twain & Dean Martin Dr/Industrial	Signalized	C	24.5
6	Industrial & Frank Sinatra	Signalized	C	29.0
8	W. Flamingo & I-15 NB Ramps	Signalized	D	40.6
10	W. Flamingo & S. Valley View	Signalized	D	49.3
11	W. Flamingo & Hotel Rio Dr	Signalized	D	50.1

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-26, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

7.3 South Station Location Alternative

The proposed South Station would be located west of I-15, to the south end of the Strip. This station is bounded by Polaris Avenue to the west, I-15 to the east, West Russell Road to the south and West Hacienda Avenue to the north. The proposed south station can be accessed from I-15 via ramps located at West Russell Road.

7.3.1 Existing Conditions

EXISTING ROADWAY NETWORK

For north-south streets description, refer to section 7.1.1.

Tropicana Avenue is a two-way east-west principal arterial. This roadway extends from south of Town Center Drive to the north of Broadbent Boulevard. In the vicinity of the proposed South Station location, this street generally has three lanes in each direction with sidewalks on the both sides of the street. On-street parking is generally not permitted on both sides of the street.

Hacienda Avenue is a two-way east-west minor collector. This roadway extends from Wynn Road to Dean Martin Drive where it merges Mandalay Bay Road. In the vicinity of the proposed South Station location, this street generally has two lanes in each direction with sidewalks on

the both sides of the street. On-street parking is generally not permitted on both sides of the street.

Mandalay Bay Road is a two-way east-west minor collector. This roadway extends from Dean Martin Drive to Las Vegas Blvd where it merges Hacienda Ave. In the vicinity of the proposed South Station location, this street generally has three lanes in each direction with sidewalks on the both sides of the street. On-street parking is generally not permitted on both sides of the street.

Russell Road is a two-way east-west minor arterial. This roadway extends from John Boulevard to west of Las Vegas Boulevard. In the vicinity of the proposed South Station location, this street generally has three lanes in each direction with sidewalks on the both sides of the street. On-street parking is generally not permitted on both sides of the street.

EXISTING TRANSIT CONDITIONS

Refer to section 7.1.1 under for other transit lines serving the area.

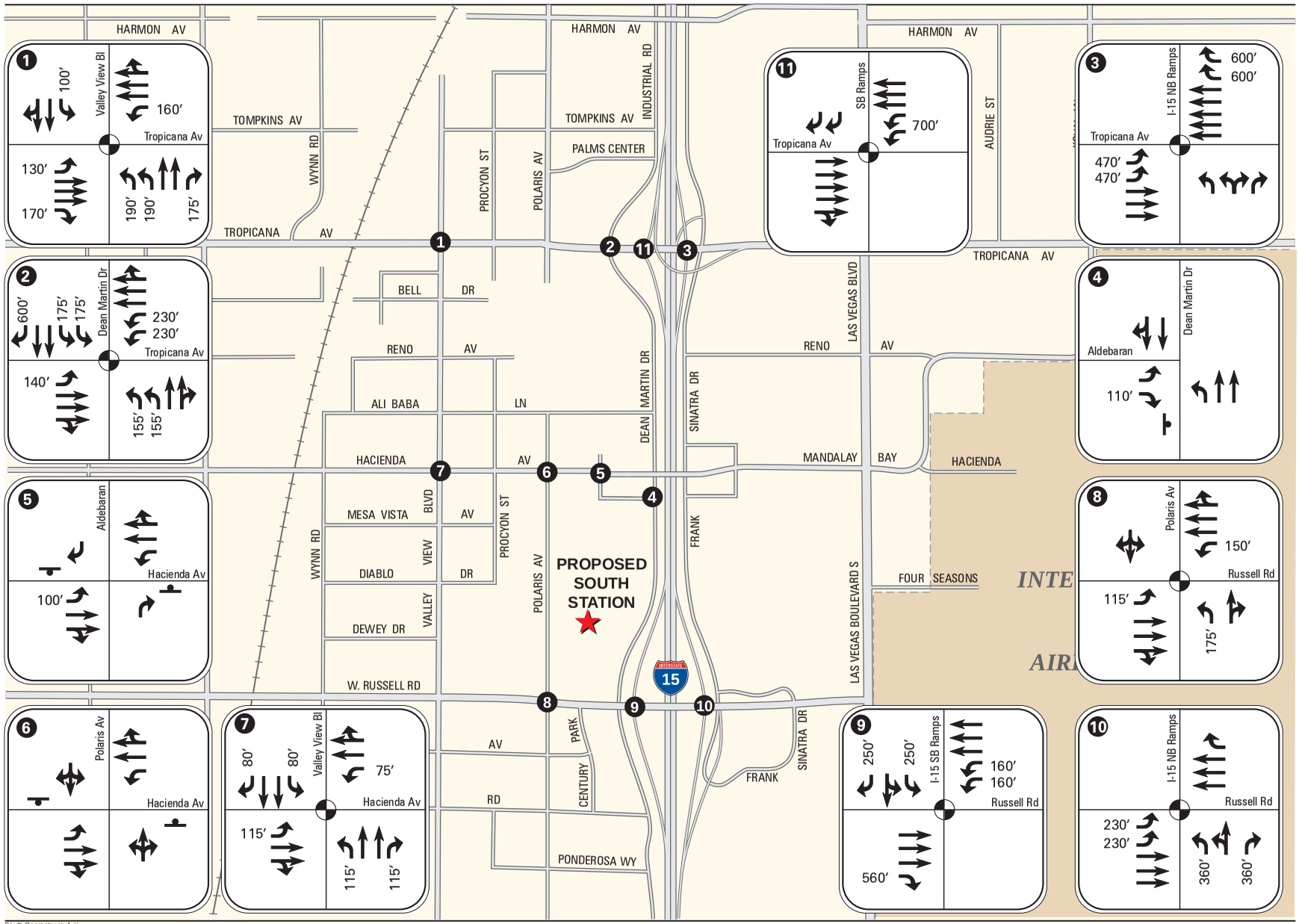
- The **201-Tropicana** is a 24-hour bus service running along Tropicana Avenue. This service connects Andover on the east (east of I-515) to Durango Avenue intersection on the west (west of I-15). This service runs with approximately 15 minute headways from 5:00 AM to 8:00 PM and approximately 20-60 minute headways for the rest during weekdays.

EXISTING PARKING CONDITIONS

On-Street parking is generally not permitted on any street in the local roadway network near the proposed station location.

EXISTING INTERSECTION OPERATIONS

Based on the station location options, intersections in the vicinity of the station location were identified for analysis purposes. The existing lane geometry at the study intersections is shown in Figure 7-5. Intersection Level of Service (LOS) conditions were analyzed for weekday PM peak period (4:00 PM to 6:00 PM). The results of the analysis are presented in Table 7-27. SYNCHRO analysis worksheets are provided in the Appendix.



DESERT XPRESS PROPOSED LAS VEGAS SOUTH STATION

Figure 7-5

EXISTING INTERSECTION GEOMETRY

South Station

Table 7-27
South Station Location Alternative
Existing Conditions LOS

Intersection		Traffic Control	Existing Conditions	
			LOS	Delay[1]
1	W. Tropicana & S. Valley View	Signalized	E	55.2
2	W. Tropicana & Dean Martin Dr	Signalized	D	52.6
3	W. Tropicana & I-15 NB Ramps	Signalized	C	26.4
4	Dean Martin Dr & Circulation	Unsignalized[2]	C (EB)[3]	16.9
5	Aldebaran & W. Hacienda	Unsignalized[2]	B (SB)[3]	12.9
6	W. Hacienda & Polaris Ave	Unsignalized[2]	F (NB)[3]	128.8
7	W. Hacienda & S. Valley View	Signalized	C	24.1
8	W. Russell & Polaris	Signalized	D	46.2
9	W. Russell & I-15 SB Ramps	Signalized	E	68.1
10	W. Russell & I-15 NB Ramps	Signalized	C	33.5
11	W. Tropicana & I-15 SB Ramps	Signalized	B	15.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, NB=Northbound, SB=Southbound

As indicated in Table 7-27, the signalized intersections of Tropicana at Valley View and I-15 southbound ramps at Russell Road and unsignalized intersection of Hacienda at Polaris operate at unacceptable conditions (LOS E or F) under the existing conditions.

7.3.2 Impact Analysis

This section presents the assessment of transportation impacts due to the proposed project. The transportation conditions were assessed for the following scenarios:

- 2013 Opening Year Conditions;
- 2013 Opening Year plus Project Conditions;
- 2030 Cumulative Baseline Conditions; and,
- 2030 Cumulative Baseline plus Project Conditions

SIGNIFICANCE CRITERIA

The following are the significance criteria required by the Regional Transportation Commission of Southern Nevada for the determination of impacts associated with a proposed project:

- Level of service C will be the design objective for capacity and under no circumstances will less than level of service D be accepted for site and non-site traffic.

PROJECT TRAVEL DEMAND

The Regional Transportation Commission (RTC) travel demand forecasting model was used to develop the base "no-project" travel forecasts for future year 2013 and 2030 traffic analysis. RTC provided future year 2030 travel forecasts from the model to DMJM Harris. DMJM Harris has applied a straight line method to interpolate the intermediate year growth factors. The calculated growth factors were applied to the existing volumes to generate analysis year volumes. The growth factor calculations are presented in the Appendix. The additional project-related trips were then added to the future year base volumes to determine the "with project conditions".

TRIP DISTRIBUTION

The overall trip distribution for the station is shown in Figure 7-6. This station is served primarily by I-15, Industrial Road – Dean Martin Drive and Frank Sinatra Drive in the north-south direction. Industrial Road – Dean Martin Drive and Frank Sinatra Drive provided an alternative to Las Vegas Boulevard on which travel time tends to be high. Most passengers of the proposed DesertXpress train would contribute to local traffic with origin or destination on or near 'The Strip'. As a result, only a small percentage would make use of the freeway system.

7.3.3 2013 Conditions (Opening Year Analysis)

Under the future with project conditions, project trips along Dean Martin Drive would access the station by turning at Circulation Road and making left turns at the Hacienda/Circulation-Aldebaran and Hacienda/Polaris intersections. Under the existing conditions, there is no left turn lane at Hacienda/Circulation-Aldebaran intersection. The project would add a left turn lane at this intersection. It should be noted that this intersection would be analyzed with a northbound left turn lane under "with-project conditions".

2013 BASELINE CONDITIONS

Future year 2013 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix. For analysis purposes, existing intersection geometry was assumed for future year 2013 conditions. Based on the future base volumes and the existing geometry, intersection level service analysis was performed.

Table 7-28 presents the results of intersection operating conditions for future year 2013 baseline conditions. SYNCHRO analysis worksheets are provided in the Appendix.

South Study Trip Distribution.ai

DESERT XPRESS PROPOSED LAS VEGAS SOUTH STATION

Figure 7-6

SOUTH STATION TRIP DISTRIBUTION

Table 7-28
South Station Location Alternative
2013 Baseline Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions	
			LOS	Delay[1]
1	W. Tropicana & S. Valley View	Signalized	E	70.3
2	W. Tropicana & Dean Martin Dr	Signalized	E	59.8
3	W. Tropicana & I-15 NB Ramps	Signalized	C	31.3
4	Dean Martin Dr & Circulation	Unsignalized[2]	C (EB)[3]	18.2
5	Circulation/Aldebaran & W. Hacienda	Unsignalized[2]	B (SB)[3]	13.8
6	W. Hacienda & Polaris Ave	Unsignalized[2]	F (NB)[3]	336.9
7	W. Hacienda & S. Valley View	Signalized	D	35.2
8	W. Russell & Polaris	Signalized	D	52.9
9	W. Russell & I-15 SB Ramps	Signalized	F	83.1
10	W. Russell & I-15 NB Ramps	Signalized	D	36.4
11	W. Tropicana & I-15 SB Ramps	Signalized	B	16.2

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle e
2. LOS and Delay reported for worst approach
3. EB=Eastbound, NB=Northbound, SB=Southbound

As indicated in Table 7-28, signalized intersections of Tropicana at Valley View, Tropicana at Dean Martin Drive and I-15 southbound ramps at Russell Road and unsignalized intersection of Hacienda at Polaris operate at unacceptable conditions (LOS E or F) under the 2013 baseline conditions.

2013 BASELINE PLUS DIESEL-ELECTRIC MULTIPLE UNIT (DMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 7-6, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base conditions volumes to generate the 2013 baseline plus DMU volumes. For analysis purposes, existing intersection geometry was assumed for future year 2013 conditions.

Based on the 2013 Baseline plus DMU volumes and the existing geometry, intersection level service analysis was performed. Table 7-29 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-29
South Station Location Alternative
2013 Baseline plus DMU Conditions LOS

Intersection		2013 Baseline Conditions		2013 Baseline plus DMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	W. Tropicana & S. Valley View	E	70.3	E	74.7
2	W. Tropicana & Dean Martin Dr	E	59.8	E	70.5
3	W. Tropicana & I-15 NB Ramps	C	31.3	C	31.5
4	Dean Martin Dr & Circulation	C (EB)[3]	18.2	C (EB)[3]	18.8
5	Circulation/Aldebaran & W. Hacienda	B (SB)[3]	13.8	F (NB)[3]	232.1
6	W. Hacienda & Polaris Ave	F (NB)[3]	336.9	F (NB)[3]	-
7	W. Hacienda & S. Valley View	D	35.2	D	40.1
8	W. Russell & Polaris	D	52.9	F	327.7
9	W. Russell & I-15 SB Ramps	F	83.1	F	89.1
10	W. Russell & I-15 NB Ramps	D	36.4	D	37.5
11	W. Tropicana & I-15 SB Ramps	B	16.2	B	18.0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, NB=Northbound, SB=Southbound

As indicated in Table 7-29, signalized intersections of Tropicana at Valley View, Tropicana at Dean Martin Drive and I-15 southbound ramps at Russell Road and unsignalized intersection of Hacienda at Polaris continue to operate at unacceptable conditions (LOS E or F). However, intersections at Hacienda/Circulation-Aldebaran and Russell at Polaris deteriorate from acceptable (LOS D or better) to unacceptable conditions (LOS F) with the addition of project volumes.

2013 BASELINE PLUS ELECTRIC MULTIPLE UNIT (EMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 7-6, project trips accessing the station were assigned at the analysis intersections. The project trips for EMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base conditions volumes to generate the 2030 baseline plus EMU volumes.

Based on the 2013 Baseline plus EMU volumes and geometry presented in Figure 7-5, intersection level service analysis was performed. Table 7-30 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-30
South Station Location Alternative
2013 Baseline plus EMU Conditions LOS

Intersection		2013 Baseline Conditions		2013 Baseline plus EMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	W. Tropicana & S. Valley View	E	70.3	E	76.4
2	W. Tropicana & Dean Marin Dr	E	59.8	E	76.7
3	W. Tropicana & I-15 NB Ramps	C	31.3	C	31.6
4	Dean Marin Dr & Circulation	C (EB)[3]	18.2	C (EB)[3]	19.0
5	Circulation/Aldebaran & W. Hacienda	B (SB)[3]	13.8	F (NB)[3]	-
6	W. Hacienda & Polaris Ave	F (NB)[3]	336.9	F (NB)[3]	-
7	W. Hacienda & S. Valley View	D	35.2	D	42.4
8	W. Russell & Polaris	D	52.9	F	550.8
9	W. Russell & I-15 SB Ramps	F	83.1	F	94.9
10	W. Russell & I-15 NB Ramps	D	36.4	D	38.9
11	W. Tropicana & I-15 SB Ramps	B	16.2	B	19.0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, NB=Northbound, SB=Southbound

As indicated in Table 7-30, signalized intersections of Tropicana at Valley View, Tropicana at Dean Martin Drive and I-15 southbound ramps at Russell Road and unsignalized intersection of Hacienda at Polaris continue to operate at unacceptable conditions (LOS E or F). However, intersections at Hacienda/Circulation-Aldebaran and Russell at Polaris deteriorate from acceptable (LOS D or better) to unacceptable conditions (LOS F) with the addition of project volumes.

7.3.4 2030 Cumulative Conditions

Under the future with project conditions, project trips along Dean Martin Drive would access the station by turning at Circulation Road and making left turns at the Hacienda/Circulation-Aldebaran and Hacienda/Polaris intersections. Under existing conditions, there is no left turn lane at Hacienda/Circulation-Aldebaran intersection. The project would add a left turn lane at this intersection. It should be noted that this intersection would be analyzed with a northbound left turn lane under “with-project conditions”.

2030 BASELINE CONDITIONS

Future year 2030 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix. For analysis purposes, existing intersection geometry was assumed for future year 2030 conditions.

Based on the future base volumes and geometry presented in Figure 7-5, intersection level service analysis was performed. Table 7-31 presents the results of intersection operating conditions for future year 2030 baseline conditions. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-31
South Station Location Alternative
2030 Baseline Conditions LOS

Intersection		Traffic Control	2030 Baseline Conditions	
			LOS	Delay[1]
1	W. Tropicana & S. Valley View	Signalized	F	425.2
2	W. Tropicana & Dean Martin Dr	Signalized	F	80.0
3	W. Tropicana & I-15 NB Ramps	Signalized	E	78.3
4	Dean Martin Dr & Circulation	Unsignalized[2]	C (EB)[3]	24.9
5	Circulation/Aldebaran & W. Hacienda	Unsignalized[2]	C (SB)[3]	17.3
6	W. Hacienda & Polaris Ave	Unsignalized[2]	F (NB)[3]	-
7	W. Hacienda & S. Valley View	Signalized	F	618.8
8	W. Russell & Polaris	Signalized	F	81.3
9	W. Russell & I-15 SB Ramps	Signalized	F	144.1
10	W. Russell & I-15 NB Ramps	Signalized	E	67.7
11	W. Tropicana & I-15 SB Ramps	Signalized	C	20.7

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, NB=Northbound, SB=Southbound

As indicated in Table 7-31, all the intersections operate at unacceptable conditions during the analysis period except two unsignalized intersections of Dean Martin Drive at Aldebaran and Hacienda at Circulation/Aldebaran.

2030 BASELINE PLUS DMU CONDITIONS

Based on the trip distribution presented in Figure 7-6, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus DMU volumes.

Based on the 2030 Baseline plus DMU volumes geometry presented in Figure 7-5, intersection level service analysis was performed. Table 7-32 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-32
South Station Location Alternative
2030 Baseline plus DMU Conditions LOS

Intersection		2030 Baseline Conditions		2030 Baseline plus DMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	W. Tropicana & S. Valley View	F	425.2	F	423.4
2	W. Tropicana & Dean Martin Dr	F	80.0	F	95.4
3	W. Tropicana & I-15 NB Ramps	E	78.3	E	78.4
4	Dean Martin Dr & Circulation	C (EB)[3]	24.9	D (EB)[3]	26.0
5	Circulation/Aldebaran & W. Hacienda	C (SB)[3]	17.3	F (SB)[3]	-
6	W. Hacienda & Polaris Ave	F (NB)[3]	-	F (NB)[3]	-
7	W. Hacienda & S. Valley View	F	618.8	F	617.4
8	W. Russell & Polaris	F	81.3	F	472.6
9	W. Russell & I-15 SB Ramps	F	144.1	F	158.0
10	W. Russell & I-15 NB Ramps	E	67.7	F	90.8
11	W. Tropicana & I-15 SB Ramps	C	20.7	C	23.9

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, NB=Northbound, SB=Southbound

As indicated in Table 7-32, all the intersections continue to operate at unacceptable conditions during the analysis period except the unsignalized intersection of Dean Martin and Aldebaran that operates at acceptable conditions (LOS D). However, intersection of Hacienda/Circulation-Aldebaran deteriorates from LOS C to LOS F with the addition of project volumes.

2030 BASELINE PLUS EMU CONDITIONS

Based on the trip distribution presented in Figure 7-6, project trips accessing the station were assigned at the analysis intersections. The project trips for EMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus EMU volumes.

Based on the 2030 Baseline plus EMU volumes geometry presented in Figure 7-5, intersection level service analysis was performed. Table 7-33 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-33
South Station Location Alternative
2030 Baseline plus EMU Conditions LOS

Intersection		2030 Baseline Conditions		2030 Baseline plus EMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	W. Tropicana & S. Valley View	F	425.2	F	422.4
2	W. Tropicana & Dean Martin Dr	F	80.0	F	103.2
3	W. Tropicana & I-15 NB Ramps	E	78.3	E	78.4
4	Dean Martin Dr & Circulation	C (EB)[3]	24.9	D (EB)[3]	26.5
5	Circulation/Aldebaran & W. Hacienda	C (SB)[3]	17.3	F (SB)[3]	-
6	W. Hacienda & Polaris Ave	F (NB)[3]	-	F (NB)[3]	-
7	W. Hacienda & S. Valley View	F	618.8	F	617.2
8	W. Russell & Polaris	F	81.3	F	818.7
9	W. Russell & I-15 SB Ramps	F	144.1	F	164.8
10	W. Russell & I-15 NB Ramps	E	67.7	F	103.6
11	W. Tropicana & I-15 NB Ramps	C	20.7	C	25.3

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle
2. LOS and Delay reported for worst approach
3. EB=Eastbound, NB=Northbound, SB=Southbound

As indicated in Table 7-33, all the intersections continue to operate at unacceptable conditions during the analysis period except the unsignalized intersection of Dean Martin and Aldebaran that operates at acceptable conditions (LOS D). However, the intersection of Hacienda/Circulation-Aldebaran deteriorates from LOS C to LOS F with the addition of project volumes.

7.3.5 Mitigation Measures

It should be noted that the feasibility of the proposed mitigations suggested in this section have not been field verified.

2013 BASELINE CONDITIONS

As indicated in Table 7-28, intersections of Tropicana at Valley View, Tropicana at Dean Martin Drive, I-15 southbound ramps at Russell Road, and Hacienda at Polaris operate at unacceptable conditions (LOS E or F) under the 2013 baseline conditions. To mitigate these intersections, following mitigation measures are proposed:

- #1. Tropicana/Valley View
  - Add exclusive southbound free right turn lane.
- #2. Tropicana & Dean Martin Drive/Industrial
  - Optimize signal offset along Tropicana.

- #6. Hacienda/Polaris
  - Signalize this intersection.
- #9. Russell/I-15 SB Ramps
  - Optimize signal offset along Russell Road.

Applying above mitigations, intersection level of service was calculated. Table 7-34 presents the results of 2013 Baseline mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-34
South Station Location Alternative
2013 Baseline Mitigation Conditions LOS

	Intersection	Traffic Control	2013 Baseline Mitigation Conditions	
			LOS	Delay[1]
1	W. Tropicana & S. Valley View	Signalized	D	41.3
2	W. Tropicana & Dean Martin Dr	Signalized	D	50.0
6	W. Hacienda & Polaris Ave	Signalized	A	7.5
9	W. Russell & I-15 SB Ramps	Signalized	D	44.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-34, all intersections operate at acceptable conditions (LOS D or better) with mitigations.

2013 BASELINE PLUS DMU CONDITIONS

As indicated in Table 7-29, intersections of Tropicana at Valley View, Tropicana at Dean Martin Drive and I-15 southbound ramps at Russell Road, Hacienda at Polaris, Hacienda/Circulation-Aldebaran and Russell at Polaris operate with unacceptable conditions (LOS E or F) under 2013 Baseline plus DMU conditions. To mitigate these intersections, following mitigations measures are proposed:

- #1. Tropicana & Valley View
  - Add exclusive southbound free right turn lane
- #2. Tropicana & Dean Martin Drive/Industrial
  - Add exclusive westbound right turn lane.
  - Add exclusive northbound right turn lane.

- #5. Hacienda & Aldebaran
  - Signalize this intersection.

- #6. Hacienda & Polaris
  - Signalize this intersection.
  - Add exclusive northbound left turn lane.
- #8. Russell/Polaris
  - Add exclusive westbound right turn lane.
  - Add exclusive northbound right turn lane.
  - Add southbound dual left turn lanes.
- #9. Russell/I-15 SB Ramps
  - Optimize signal offsets along Russell Road.

Applying above mitigations, intersection level of service was calculated. Table 7-35 presents the results of 2013 Baseline plus DMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-35
South Station Location Alternative
2013 Baseline plus DMU Mitigation Conditions LOS

	Intersection	Traffic Control	2013 Baseline plus DMU Mitigation Conditions	
			LOS	Delay[1]
1	W. Tropicana & S. Valley View	Signalized	D	49.0
2	W. Tropicana & Dean Martin Dr	Signalized	D	40.6
5	Circulation/Aldebaran & W. Hacienda	Signalized	B	11.0
6	W. Hacienda & Polaris Ave	Signalized	D	37.5
8	W. Russell & Polaris	Signalized	C	31.7
9	W. Russell & I-15 SB Ramps	Signalized	D	37.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-35, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2013 BASELINE PLUS EMU CONDITIONS

As indicated in Table 7-30, intersections of Tropicana at Valley View, Tropicana at Dean Martin Drive, I-15 southbound ramps at Russell Road, Hacienda at Polaris, Hacienda/Circulation-Aldebaran and Russell at Polaris operate with unacceptable conditions (LOS E or F) under 2013 Baseline plus EMU conditions. To mitigate these intersections, following mitigation measures are proposed:

- #1. Tropicana & Valley View
  - Add exclusive southbound free right turn lane.

- #2. Tropicana & Dean Martin Drive/Industrial
  - Add exclusive westbound right turn lane.
  - Add exclusive northbound right turn lane.
- #5. Hacienda & Aldebaran
  - Signalize this intersection.
- #6. Hacienda & Polaris
  - Signalize this intersection.
  - Add exclusive eastbound right turn lane.
  - Add second westbound left turn lane.
  - Add exclusive northbound left turn lane.
- #8. Russell/Polaris
  - Add exclusive westbound right turn lane.
  - Add exclusive northbound right turn lane.
  - Add southbound dual left turn lanes.
  - Add exclusive southbound right turn lane.
- #9. Russell/I-15 SB Ramps
  - Add second southbound right turn lane.

Applying above mitigations, intersection level of service was calculated. Table 7-36 presents the results of 2013 Baseline plus EMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-36
South Station Location Alternative
2013 Baseline plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	2013 Baseline plus EMU Mitigation Conditions	
			LOS	Delay[1]
1	W. Tropicana & S. Valley View	Signalized	D	54.4
2	W. Tropicana & Dean Martin Dr	Signalized	D	43.0
5	Circulation/Aldebaran & W. Hacienda	Signalized	A	9.2
6	W. Hacienda & Polaris Ave	Signalized	D	44.7
8	W. Russell & Polaris	Signalized	D	47.3
9	W. Russell & I-15 SB Ramps	Signalized	D	49.1

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-36, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2030 BASELINE CONDITIONS

As indicated in Table 7-31, the intersections along Tropicana at Valley View, Dean Martin Drive, and I-15 northbound ramps, the intersections along Hacienda at Valley View and Polaris, and the intersections along Russell Road at Polaris, I-15 northbound ramps and I-15 southbound ramps operate with unacceptable conditions under 2030 Baseline conditions. To mitigate these intersections, following mitigation measures are proposed:

- #1. Tropicana & Valley View
  - Add exclusive westbound right turn lane.
  - Add exclusive southbound free right turn lane.
  - Add second southbound left turn lane.
- #2. Tropicana & Dean Martin Drive/Industrial
  - Add fourth eastbound through lane.
  - Add fourth westbound through lane.
- #3. Tropicana & I-15 NB Ramps
  - Add second northbound right turn lane.
- #6. Hacienda & Polaris
  - Signalize this intersection.
- #7. Hacienda & Valley View
  - Add second eastbound left turn lane.
  - Add exclusive eastbound right turn lane.
  - Add third eastbound through lane.
  - Add exclusive westbound right turn lane.
  - Add third westbound through lane.
  - Add second northbound left turn lane.
  - Add third northbound through lane.
- #8. Russell & Polaris
  - Add exclusive northbound right turn lane.
  - Add exclusive southbound left turn lane.
- #9. Russell & I-15 SB Ramps
  - Add second southbound right turn lane.
- #10. Russell/I-15 NB Ramps
  - Optimize signal offset along Russell Road.

Applying above mitigations, intersection level of service was calculated. Table 7-37 presents the results of 2030 Baseline mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-37
South Station Location Alternative
2030 Baseline Mitigation Conditions LOS

	Intersection	Traffic Control	2030 Baseline Mitigation Conditions	
			LOS	Delay[1]
1	W. Tropicana & S. Valley View	Signalized	D	51.7
2	W. Tropicana & Dean Marin Dr	Signalized	D	53.4
3	W. Tropicana & I-15 NB Ramps	Signalized	D	45.7
6	W. Hacienda & Polaris Ave	Signalized	B	16.1
7	W. Hacienda & S. Valley View	Signalized	D	49.8
8	W. Russell & Polaris	Signalized	D	37.1
9	W. Russell & I-15 SB Ramps	Signalized	D	48.9
10	W. Russell & I-15 NB Ramps	Signalized	D	50.0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-37, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2030 BASELINE PLUS DMU CONDITIONS

As indicated in Table 7-32, all the intersections operate at unacceptable conditions during the analysis period except the unsignalized intersection of Dean Martin and Aldebaran that operates at acceptable conditions (LOS D). To mitigate these intersections, following mitigation measures are proposed:

- #1. Tropicana & Valley View
  - Add exclusive westbound right turn lane.
  - Add second westbound left turn lane.
  - Add exclusive southbound free right turn lane.
  - Add second southbound left turn lane.
- #2. Tropicana & Dean Martin Drive/Industrial
  - Add fourth eastbound through lane.
  - Add fourth westbound through lane.
- #3. Tropicana & I-15 NB Ramps
  - Add second northbound right turn lane.
- #5. Hacienda & Aldebaran
  - Signalize this intersection.
- #6. Hacienda & Polaris
  - Signalize this intersection.
  - Add exclusive northbound left turn lane.
  - Add exclusive northbound right turn lane.

- #7. Hacienda & Valley View
  - Add two additional eastbound left turn lanes.
  - Add exclusive eastbound right turn lane.
  - Add third eastbound through lane.
  - Add second westbound left turn lane.
  - Add second northbound left turn lane.
- #8. Russell & Polaris
  - Add exclusive westbound right turn lane.
  - Add exclusive northbound right turn lane.
  - Add three southbound left turn lanes.
- #9. Russell & I-15 SB Ramps
  - Add second eastbound right turn lane.
  - Add second southbound right turn lane.
- #10. Russell/I-15 NB Ramps
  - Add second northbound left turn lane.

Applying above mitigations, intersection level of service was calculated. Table 7-38 presents the results of 2030 Baseline plus DMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-38
South Station Location Alternative -
2030 Baseline plus DMU Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline plus DMU Mitigation Conditions	
			LOS	Delay[1]
1	W. Tropicana & S. Valley View	Signalized	D	49.5
2	W. Tropicana & Dean Martin Dr	Signalized	D	43.6
3	W. Tropicana & I-15 NB Ramps	Signalized	D	46.2
5	Circulation/Aldebaran & W. Hacienda	Signalized	A	7.1
6	W. Hacienda & Polaris Ave	Signalized	C	27.1
7	W. Hacienda & S. Valley View	Signalized	D	54.0
8	W. Russell & Polaris	Signalized	D	54.2
9	W. Russell & I-15 SB Ramps	Signalized	C	32.4
10	W. Russell & I-15 NB Ramps	Signalized	D	49.6

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-38, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2030 BASELINE PLUS EMU CONDITIONS

As indicated in Table 7-33, all the intersections operate at unacceptable conditions during the analysis period except unsignalized intersection of Dean Martin and Aldebaran that operates at acceptable conditions (LOS D). To mitigate these intersections, following mitigation measures are proposed:

- #1. Tropicana & Valley View
  - Add exclusive westbound right turn lane.
  - Add second westbound left turn lane.
  - Add second southbound left turn lane.
  - Add exclusive southbound free right turn lane.
- #2. Tropicana & Dean Martin Drive/Industrial
  - Add fourth eastbound through lane.
  - Add fourth westbound through lane.
  - Add exclusive westbound right turn lane.
  - Add third northbound through lane.
  - Add exclusive northbound right turn lane.
- #3. Tropicana & I-15 NB Ramps
  - Add second northbound right turn lane.
- #5. Hacienda & Aldebaran
  - Signalize this intersection.
- #6. Hacienda & Polaris
  - Signalize this intersection.
  - Add two additional westbound left turn lanes.
  - Add exclusive northbound left turn lane.
  - Add exclusive northbound right turn lane.
- #7. Hacienda & Valley View
  - Add two additional eastbound left turn lanes.
  - Add exclusive eastbound right turn lane.
  - Add third eastbound through lane.
  - Add second westbound left turn lane
  - Add second northbound left turn lane.
  - Add second southbound left turn lane.
- #8. Russell & Polaris
  - Add exclusive westbound right turn lane.
  - Add exclusive northbound right turn lane.
  - Add three southbound left turn lanes.

- #9. Russell & I-15 SB Ramps
  - Add second eastbound right turn lane.
  - Add second westbound left turn lane.
  - Add second southbound right turn lane.
- #10. Russell/I-15 NB Ramps
  - Add third eastbound left turn lane.
  - Add second northbound left turn lane.

Applying above mitigations, intersection level of service was calculated. Table 7-39 presents the results of 2030 Baseline plus EMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-39
South Station Location Alternative
2030 Baseline plus EMU Mitigation Conditions LOS

Intersection		Traffic Control	2030 Baseline plus EMU Mitigation Conditions	
			LOS	Delay[1]
1	W. Tropicana & S. Valley View	Signalized	D	50.4
2	W. Tropicana & Dean Martin Dr	Signalized	D	41.5
3	W. Tropicana & I-15 NB Ramps	Signalized	D	46.0
5	Circulation/Aldebaran & W. Hacienda	Signalized	A	6.2
6	W. Hacienda & Polaris Ave	Signalized	D	39.5
7	W. Hacienda & S. Valley View	Signalized	D	53.7
8	W. Russell & Polaris	Signalized	D	40.9
9	W. Russell & I-15 SB Ramps	Signalized	D	44.2
10	W. Russell & I-15 NB Ramps	Signalized	D	36.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-39, all impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

7.4 Central Station Location "B" Alternative

The proposed Central Station Alternative "B" would be located west of I-15, near the existing Rio Suites Hotel and Casino. This station is bounded by Union Pacific Railroad and Polaris Avenue to the west, Dean Martin Drive to the east, Hotel Rio Drive to the North and West Harmon Avenue to the South. The proposed central station can be accessed from I-15 via ramps located at Flamingo Road and Tropicana Avenue.

7.4.1 Existing Conditions

EXISTING ROADWAY NETWORK

- **Las Vegas Boulevard** Refer to Section 7.1.1
- **Flamingo Road** Refer to Section 7.2.1
- **Tropicana Avenue** Refer to Section 7.3.1

EXISTING TRANSIT CONDITIONS

- **Deuce-Las Vegas Blvd** Refer to Section 7.1.1
- **202-Flamingo** Refer to Section 7.2.1
- **201-Tropicana** Refer to Section 7.3.1

EXISTING PARKING CONDITIONS

On-Street parking is generally not permitted on any street in the local roadway network near the proposed station location.

EXISTING INTERSECTION OPERATIONS

Based on the station location options, intersections in the vicinity of the station location were identified for analysis purposes. The existing lane geometry at the study intersections is shown in Figure 7-7. Intersection Level of Service (LOS) conditions were analyzed for weekday PM peak period (4:00 PM to 6:00 PM). The results of the analysis are presented in Table 7-40. SYNCHRO analysis worksheets are provided in the Appendix.

Table 7-40
Central Station Location "B" Alternative - Existing Conditions LOS

	Intersection	Traffic Control	Existing Conditions	
			LOS	Delay[1]
1	W Flamingo Rd/Hotel Rio Dr	Signalized	D	40.9
2	Flamingo/I-15 SB Ramps	Signalized	A	7.2
3	Flamingo/I-15 NB Ramps	Signalized	C	27.1
4	Hotel Rio Dr/Dean Martin Dr	Signalized	C	24.1
5	W Harmon Ave/Polaris Ave	Signalized	C	20.2
6	W Tropicana Ave/Polaris Ave	Signalized	B	11.4
7	W Tropicana Ave/Dean Martin Dr	Signalized	D	53.6
8	Tropicana/I-15 SB Ramps	Signalized	B	15.3
9	Tropicana/I-15 NB Ramps	Signalized	C	26.5
10	W Harmon Ave/Aldebaran Ave	Signalized	B	11.7

Notes:
1. Delay reported in seconds per vehicle

SOURCE: DMJM Harris, 2008.

Central Geometry - Alt 2.ai

DESERT XPRESS PROPOSED LAS VEGAS CENTRAL STATION

Figure 7-7

EXISTING INTERSECTION GEOMETRY

Central Station Alternative B

As indicated in Table 7-40, all intersections operate at acceptable conditions (LOS D or better) in the existing conditions.

7.4.2 Impact Analysis

This section presents the assessment of transportation impacts due to the proposed project. The transportation conditions were assessed for the following scenarios:

- 2013 Opening Year Conditions;
- 2013 Opening Year plus Project (DMU and EMU alternatives) Conditions;
- 2030 Cumulative Baseline Conditions; and,
- 2030 Cumulative Baseline plus Project (DMU and EMU alternatives) Conditions

SIGNIFICANCE CRITERIA

The following are the significance criteria required by the Regional Transportation Commission of Southern Nevada for the determination of impacts associated with a proposed project:

- Level of service C will be the design objective for capacity and under no circumstances will less than level of service D be accepted for site and non-site traffic.

PROJECT TRAVEL DEMAND

The Regional Transportation Commission (RTC) travel demand forecasting model was used to develop the base "no-project" travel forecasts for future year 2013 and 2030 traffic analysis. RTC provided future year 2030 travel forecasts from the model to DMJM Harris. DMJM Harris has applied a straight line method to interpolate the intermediate year growth factors. The calculated growth factors were applied to the existing volumes to generate analysis year volumes. The growth factor calculations are presented in the **Appendix**. The additional project-related trips were then added to the future year base volumes to determine the "with project conditions".

TRIP DISTRIBUTION

The overall trip distribution for the station is shown in Figure 7-8. This station is served primarily by I-15 and Industrial Road – Dean Martin Drive in the north-south direction; Flamingo Road and Tropicana Avenue serve the east-east direction. Most trips to/from the commercial developments on 'The Strip' would use Tropicana Avenue and Flamingo Road due to accessibility.

Central Station Trip Distribution Alt 2.ai

DESERT XPRESS PROPOSED LAS VEGAS CENTRAL STATION

Figure 7-8

CENTRAL STATION B TRIP DISTRIBUTION

2013 Conditions (Opening Year Analysis)

2013 BASELINE CONDITIONS

Future year 2013 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix. For analysis purposes, existing intersection geometry was assumed for future year 2013 conditions. Based on the future base volumes and the existing geometry, intersection level service analysis was performed.

Table 7-41 presents the results of intersection operating conditions for future year 2013 baseline conditions. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-41
Central Station Location "B" Alternative
2013 Baseline Conditions LOS

Intersection		Traffic Control	2013 Baseline Conditions	
			LOS	Delay[1]
1	W Flamingo Rd/Hotel Rio Dr	Signalized	D	39.0
2	Flamingo/I-15 SB	Signalized	A	7.5
3	Flamingo/I-15 NB	Signalized	C	29.0
4	Hotel Rio Dr/Dean Martin Dr	Signalized	C	24.5
5	W Harmon Ave/Polaris Ave	Signalized	C	20.6
6	W Tropicana Ave/Polaris Ave	Signalized	B	12.7
7	W Tropicana Ave/Dean Martin Dr	Signalized	E	60.2
8	Tropicana/I-15 SB Ramp	Signalized	B	16.2
9	Tropicana/I-15 NB Ramp	Signalized	C	31.2
10	W Harmon Ave/Aldebaran Ave	Signalized	B	11.6

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-41, all the intersections operate at acceptable conditions except intersection of Tropicana Avenue at Dean Martin Drive that operates at unacceptable conditions (LOS E) under 2013 Baseline conditions.

2013 BASELINE PLUS DIESEL-ELECTRIC MULTIPLE UNIT (DMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 7-8, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base conditions volumes to generate the 2013 baseline plus DMU volumes. For analysis purposes, existing intersection geometry was assumed for future year 2013 conditions.

Based on the 2013 Baseline plus DMU volumes and the existing geometry, intersection level service analysis was performed. Table 7-42 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-42
Central Station Location "B" Alternative
2013 Baseline plus DMU Conditions LOS

Intersection		2013 Baseline Conditions		2013 Baseline plus DMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	W Flamingo Rd/Hotel Rio Dr	D	39.0	F	180.0
2	Flamingo/I-15 SB	A	7.5	A	7.4
3	Flamingo/I-15 NB	C	29.0	D	38.5
4	Hotel Rio Dr/Dean Martin Dr	C	24.5	D	46.9
5	W Harmon Ave/Polaris Ave	C	20.6	C	22.8
6	W Tropicana Ave/Polaris Ave	B	12.7	C	20.7
7	W Tropicana Ave/Dean Martin Dr	E	60.2	F	115.3
8	Tropicana/I-15 SB Ramp	B	16.2	B	15.5
9	Tropicana/I-15 NB Ramp	C	31.2	C	34.0
10	W Harmon Ave/Aldebaran Ave	B	11.6	C	22.0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-42, intersection of Tropicana Avenue at Dean Martin Drive continues to operate at unacceptable conditions while intersection of Flamingo at Hotel Rio Drive deteriorates from acceptable conditions (LOS D) to unacceptable conditions (LOS F) with addition of the project volumes.

2013 BASELINE PLUS ELECTRIC MULTIPLE UNIT (EMU) ALTERNATIVE CONDITIONS

Based on the trip distribution presented in Figure 7-8, project trips accessing the station were assigned at the analysis intersections. The project trips for EMU alternative conditions for year 2013 are presented in the Appendix. These project trips were added to the 2013 base conditions volumes to generate the 2013 baseline plus EMU volumes.

Based on the 2013 Baseline plus EMU volumes and geometry presented in Figure 7-7, intersection level service analysis was performed. Table 7-43 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-43, intersection of Tropicana Avenue at Dean Martin Drive continues to operate at unacceptable conditions while intersections of Flamingo at Hotel Rio Drive deteriorates from acceptable conditions (LOS D) to unacceptable conditions (LOS F) and Hotel Rio Drive at Dean Martin Drive deteriorates from acceptable (LOS C) to unacceptable (LOS F) conditions with addition of the project volumes.

7.4.3 2030 Cumulative Conditions

2030 BASELINE CONDITIONS

Future year 2030 base volumes were calculated by applying the growth factor on the existing year volumes. These volumes are presented in the Appendix. For analysis purposes, existing intersection geometry was assumed for future year 2030 conditions.

Table 7-43
Central Station Location "B" Alternative
2013 Baseline plus EMU Conditions LOS

Intersection		2013 Baseline Conditions		2013 Baseline plus EMU Conditions	
		LOS	Delay[1]	LOS	Delay[1]
1	W Flamingo Rd/Hotel Rio Dr	D	39.0	F	293.4
2	Flamingo/I-15 SB	A	7.5	A	7.7
3	Flamingo/I-15 NB	C	29.0	D	45.5
4	Hotel Rio Dr/Dean Martin Dr	C	24.5	F	87.6
5	W Harmon Ave/Polaris Ave	C	20.6	C	25.7
6	W Tropicana Ave/Polaris Ave	B	12.7	C	26.5
7	W Tropicana Ave/Dean Martin Dr	E	60.2	F	149.7
8	Tropicana/I-15 SB Ramp	B	16.2	B	15.4
9	Tropicana/I-15 NB Ramp	C	31.2	D	35.7
10	W Harmon Ave/Aldebaran Ave	B	11.6	C	23.7

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

Based on the future base volumes and geometry presented in Figure 7-7, intersection level service analysis was performed. Table 7-44 presents the results of intersection operating conditions for future year 2030 baseline conditions. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-44
Central Station Location "B" Alternative
2030 Baseline Conditions

Intersection		Traffic Control	2030 Baseline Conditions	
			LOS	Delay[1]
1	W Flamingo Rd/Hotel Rio Dr	Signalized	D	39.1
2	Flamingo/I-15 SB	Signalized	A	8.6
3	Flamingo/I-15 NB	Signalized	D	37.9
4	Hotel Rio Dr/Dean Martin Dr	Signalized	C	26.6
5	W Harmon Ave/Polaris Ave	Signalized	B	18.7
6	W Tropicana Ave/Polaris Ave	Signalized	B	17.6
7	W Tropicana Ave/Dean Martin Dr	Signalized	F	80.2
8	Tropicana/I-15 SB Ramp	Signalized	C	20.7
9	Tropicana/I-15 NB Ramp	Signalized	E	77.0
10	W Harmon Ave/Aldebaran Ave	Signalized	B	11.8

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-44, all the study intersections operate at acceptable conditions except intersections of Tropicana Avenue at Dean Martin Drive and Tropicana Avenue at I-15 northbound ramps that operate at unacceptable conditions (LOS E or F) under 2030 Baseline conditions.

2030 BASELINE PLUS DMU CONDITIONS

Based on the trip distribution presented in Figure 7-8, project trips accessing the station were assigned at the analysis intersections. The project trips for DMU alternative conditions for year 2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus DMU volumes.

Based on the 2030 Baseline plus DMU volumes geometry presented in Figure 7-7, intersection level service analysis was performed. Table 7-45 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-45, the intersections of Tropicana Avenue at Dean Martin Drive and Tropicana Avenue at I-15 northbound ramps continue to operate at unacceptable conditions (LOS E or F). However, the intersections of Flamingo Road at Hotel Rio Drive deteriorate from LOS D to LOS F and Flamingo Road at I-15 northbound ramps deteriorates from LOS D to LOS E with the addition of project volumes.

Table 7-45
Central Station Location "B" Alternative
2030 Baseline plus DMU Conditions LOS

		2030 Baseline Conditions		2030 Baseline plus DMU Conditions	
Intersection		**LOS**	**Delay[1]**	**LOS**	**Delay[1]**
1	W Flamingo Rd/Hotel Rio Dr	D	39.1	F	185.7
2	Flamingo/I-15 SB	A	8.6	A	8.7
3	Flamingo/I-15 NB	D	37.9	E	55.4
4	Hotel Rio Dr/Dean Martin Dr	C	26.6	D	49.2
5	W Harmon Ave/Polaris Ave	B	18.7	C	24.3
6	W Tropicana Ave/Polaris Ave	B	17.6	C	27.8
7	W Tropicana Ave/Dean Martin Dr	F	80.2	F	146.1
8	Tropicana/I-15 SB Ramp	C	20.7	C	20.1
9	Tropicana/I-15 NB Ramp	E	77.0	F	85.3
10	W Harmon Ave/Aldebaran Ave	B	11.8	C	22.9

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

2030 BASELINE PLUS EMU CONDITIONS

Based on the trip distribution presented in Figure 7-8, project trips accessing the station were assigned at the analysis intersections. The project trips for EMU alternative conditions for year

2030 are presented in the Appendix. These project trips were added to the 2030 base conditions volumes to generate the 2030 baseline plus EMU volumes.

Based on the 2030 Baseline plus EMU volumes geometry presented in Figure 7-7, intersection level service analysis was performed. Table 7-46 presents the results of the analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-46
Central Station Location "B" Alternative
2030 Baseline plus EMU Conditions LOS

		2030 Baseline Conditions		2030 Baseline plus EMU Conditions	
Intersection		**LOS**	**Delay[1]**	**LOS**	**Delay[1]**
1	W Flamingo Rd/Hotel Rio Dr	D	39.1	F	301.2
2	Flamingo/I-15 SB	A	8.6	A	9.0
3	Flamingo/I-15 NB	D	37.9	E	64.4
4	Hotel Rio Dr/Dean Martin Dr	C	26.6	F	87.0
5	W Harmon Ave/Polaris Ave	B	18.7	C	27.5
6	W Tropicana Ave/Polaris Ave	B	17.6	D	35.0
7	W Tropicana Ave/Dean Martin Dr	F	80.2	F	181.2
8	Tropicana/I-15 SB Ramp	C	20.7	C	20.1
9	Tropicana/I-15 NB Ramp	E	77.0	F	87.6
10	W Harmon Ave/Aldebaran Ave	B	11.8	C	23.8

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-46, the intersections of Tropicana Avenue at Dean Martin Drive and Tropicana Avenue at I-15 northbound ramps continue to operate at unacceptable conditions (LOS E or F). However, the intersections of Flamingo Road at Hotel Rio Drive deteriorates from LOS D to LOS F, Flamingo Road at I-15 northbound ramps deteriorates from LOS D to LOS E and Hotel Rio Drive at Dean Martin Drive deteriorates from LOS C to LOS F with the addition of project volumes.

7.4.4 Mitigation Measures

It should be noted that the feasibility of the proposed mitigations suggested in this section have not been field verified.

2013 BASELINE CONDITIONS

As indicated in Table 7-41, all the intersections operate at acceptable conditions except the intersection of Tropicana Avenue at Dean Martin Drive that operates at unacceptable conditions (LOS E) under 2013 Baseline conditions. To mitigate this intersection, following mitigation measure is proposed:

- #7. Tropicana Avenue & Dean Martin Drive
  - Optimize signal offset along Tropicana Avenue.

Applying above mitigation, intersection level of service was calculated. Table 7-47 presents the results of 2013 Baseline mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-47
Central Station Location "B" Alternative
2013 Baseline Mitigation Conditions

Intersection		Traffic Control	2013 Baseline Mitigation Conditions	
			LOS	Delay[1]
7	W Tropicana Ave/Dean Martin Dr	Signalized	D	46.1

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-47, the intersection of Tropicana Avenue at Dean Martin Drive operates at acceptable conditions (LOS D) with mitigation.

2013 BASELINE PLUS DMU CONDITIONS

As indicated in Table 7-42, the intersections of Tropicana Avenue at Dean Martin Drive and Flamingo Road at Hotel Rio Drive operate at unacceptable conditions (LOS F) under 2013 Baseline plus DMU conditions. To mitigate these intersections, following mitigation measures are proposed:

- #1. Flamingo Road & Hotel Rio Drive
  - Add fourth eastbound through lane.
  - Add second westbound left turn lane.
  - Add second northbound right turn lane.
- #7. Tropicana Avenue & Dean Martin Drive
  - Add exclusive eastbound right turn lane.

Applying above mitigations, intersection level of service was calculated. Table 7-48 presents the results of 2013 Baseline plus DMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

As indicated in Table 7-48, all the impacted intersections operate at acceptable conditions (LOS D) with mitigations.

2013 BASELINE PLUS EMU CONDITIONS

As indicated in Table 7-43, the intersections of Tropicana Avenue at Dean Martin Drive, Flamingo at Hotel Rio Drive and Hotel Rio Drive at Dean Martin Drive operate at unacceptable conditions under 2013 Baseline plus EMU conditions. To mitigate these intersections, following mitigation measures are proposed:

Table 7-48
Central Station Location "B" Alternative
2013 Baseline plus DMU Mitigation Conditions

Intersection		Traffic Control	2013 Baseline plus DMU Mitigation Conditions	
			LOS	Delay[1]
1	W Flamingo Rd/Hotel Rio Dr	Signalized	D	46.1
7	W Tropicana Ave/Dean Martin Dr	Signalized	D	49.0

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

- #1. Flamingo Road & Hotel Rio Drive
  - Add fourth eastbound through lane.
  - Add second westbound left turn lane.
  - Add fourth westbound through lane.
  - Add second northbound right turn lane.
- #4. Hotel Rio Drive & Dean Martin Drive
  - Modify eastbound right turn to have overlap phasing.
- #7. Tropicana Avenue & Dean Martin Drive
  - Add exclusive eastbound right turn lane.
  - Add exclusive westbound right turn lane.
  - Add exclusive northbound right turn lane.
  - Add third southbound left turn lane.

Applying above mitigations, intersection level of service was calculated. Table 7-49 presents the results of 2013 Baseline plus EMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-49
Central Station Location "B" Alternative
2013 Baseline plus EMU Mitigation Conditions

Intersection		Traffic Control	2013 Baseline plus EMU Mitigation Conditions	
			LOS	Delay[1]
1	W Flamingo Rd/Hotel Rio Dr	Signalized	D	51.6
4	Hotel Rio Dr/Dean Martin Dr	Signalized	C	30.5
7	W Tropicana Ave/Dean Martin Dr	Signalized	D	42.2

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-49, all the impacted intersections operate at acceptable conditions (LOS D or better) with mitigations.

2030 BASELINE CONDITIONS

As indicated in Table 7-44, the intersections of Tropicana Avenue at Dean Martin Drive and Tropicana Avenue at I-15 northbound ramps operate at unacceptable conditions (LOS E or F) under 2030 Baseline conditions. To mitigate these intersections, following mitigation measures are proposed:

- #7. Tropicana Avenue & Dean Martin Drive
  - Add exclusive northbound right turn lane.
- #9. Tropicana Avenue & I-15 NB Ramps
  - Optimize signal offsets along Tropicana Avenue.

Applying above mitigations, intersection level of service was calculated. Table 7-50 presents the results of 2030 Baseline mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-50
Central Station Location "B" Alternative
2030 Baseline Mitigation Conditions

Intersection		Traffic Control	2030 Baseline Mitigation Conditions	
			LOS	Delay[1]
7	W Tropicana Ave/Dean Martin Dr	Signalized	D	54.0
9	Tropicana/I-15 NB Ramps	Signalized	D	46.3

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-50, all the impacted intersections operate at acceptable conditions (LOS D) with mitigations.

2030 BASELINE PLUS DMU CONDITIONS

As indicated in Table 7-45, the intersections of Tropicana Avenue at Dean Martin Drive, Tropicana Avenue at I-15 northbound ramps, Flamingo Road at Hotel Rio Drive and Flamingo Road at I-15 northbound ramps operate at unacceptable conditions under 2030 Baseline plus DMU conditions. To mitigate these intersections, following mitigation measures are proposed:

- #1. Flamingo & Hotel Rio Drive
  - Add fourth eastbound through lane.
  - Add fourth westbound through lane.
  - Stripe existing northbound through lane as share through right lane.
- #3. Flamingo Road & I-15 NB Ramps
  - Optimize signal offsets along Flamingo Road.
- #7. Tropicana Avenue & Dean Martin Drive

- Add fourth eastbound through lane.
- Add fourth westbound through lane.
- Add exclusive westbound right turn lane.
- Add exclusive northbound right turn lane.
- Add third southbound left turn lane.

- #9. Tropicana Avenue & I-15 NB Ramps
  - Add second northbound right turn lane.

Applying above mitigations, intersection level of service was calculated. Table 7-51 presents the results of 2030 Baseline plus DMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-51
Central Station Location "B" Alternative
2030 Baseline plus DMU Mitigation Conditions

Intersection		Traffic Control	2030 Baseline plus DMU Mitigation Conditions	
			LOS	Delay[1]
1	W Flamingo Rd/Hotel Rio Dr	Signalized	D	42.5
3	Flamingo/I-15 NB Ramps	Signalized	D	51.4
7	W Tropicana Ave/Dean Martin Dr	Signalized	D	42.8
9	Tropicana/I-15 NB Ramps	Signalized	D	51.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-51, all the impacted intersections operate at acceptable conditions (LOS D) with mitigations.

2030 BASELINE PLUS EMU CONDITIONS

As indicated in Table 7-46, the intersections of Tropicana Avenue at Dean Martin Drive, Tropicana Avenue at I-15 northbound ramps, Flamingo Road at Hotel Rio Drive, Flamingo Road at I-15 northbound ramps and Hotel Rio Drive at Dean Martin Drive operate at unacceptable conditions under 2030 Baseline plus EMU conditions. To mitigate these intersections, following mitigation measures are proposed:

- #1. Flamingo & Hotel Rio Drive
  - Add fourth eastbound through lane.
  - Add fourth westbound through lane.
  - Stripe existing northbound through lane as share through right lane.
- #3. Flamingo & I-15 NB Ramps
  - Add fourth westbound through lane.
- #4. Hotel Rio Drive & Dean Martin Drive
  - Add second northbound left turn lane.

- #7. Tropicana Avenue & Dean Martin Drive
  - Add fourth eastbound through lane.
  - Add fourth westbound through lane.
  - Add exclusive westbound right turn lane.
  - Add exclusive northbound right turn lane.
  - Add third southbound left turn lane.
- #9. Tropicana Avenue & I-15 NB Ramps
  - Add second northbound right turn lane.

Applying above mitigations, intersection level of service was calculated. Table 7-52 presents the results of 2030 Baseline plus EMU mitigation analysis. SYNCHRO analysis worksheets are presented in the Appendix.

Table 7-52
Central Station Location "B" Alternative
2030 Baseline plus EMU Mitigation Conditions

Intersection		Traffic Control	2030 Baseline plus EMU Mitigation Conditions	
			LOS	Delay[1]
1	W Flamingo Rd/Hotel Rio Dr	Signalized	D	48.4
3	Flamingo/I-15 NB	Signalized	D	37.0
4	Hotel Rio Dr/Dean Martin Dr	Signalized	D	54.2
7	W Tropicana Ave/Dean Martin Dr	Signalized	D	47.1
9	Tropicana/I-15 NB Ramp	Signalized	D	54.4

Notes: SOURCE: DMJM Harris, 2008.
1. Delay reported in seconds per vehicle

As indicated in Table 7-52, all the impacted intersections operate at acceptable conditions (LOS D) with mitigations.

8.0 SUMMARY AND CONCLUSIONS

The preceding analysis indicates that implementation of the DesertXpress project would result in a reduction in traffic on Interstate 15 between Victorville and Las Vegas, when compared to the no-project condition. This reduction ranges from 400 to 500 vehicles per peak hour in the peak direction in 2013, and 1,100 to 1,400 vehicles in 2030, depending on whether the DMU or EMU alternative is selected.

In the areas around the proposed rail stations, the DesertXpress project would result in higher traffic volumes through some nearby intersections. In general, these higher volumes can be mitigated by adding signalization and/or adding lanes to the intersection approaches. Tables 8-1 and 8-2 summarize the mitigation measures recommended for the DMU and EMU alternatives respectively.

The following paragraphs describe the mitigation measures identified for the EMU alternative in 2013 for each alternative station site:

Victorville Station – Option 1: Signalize all four intersections that comprise the South Stoddard Wells Road interchange with I-15, and add a left turn lane to the southbound approach of the southbound ramp intersection.

Victorville Station – Option 2: Signalize the two intersections on Stoddard Wells Road that serve the I-15 interchange, and add a left turn lane to the northbound approach of the northbound ramp intersection.

Las Vegas Station – Downtown Alternative: At Main Street/Charleston Boulevard, which is the primary intersection serving the station, add:

- Fourth westbound through lane.
- Exclusive westbound right turn lane.
- Second eastbound left turn lane.
- Exclusive eastbound right turn lane.
- Exclusive dual southbound right turn lanes.

Also add a right turn lane to the eastbound approach of the Charleston Boulevard/South Martin Luther King Boulevard intersection.

Las Vegas Station – Central Location "A" Alternative: Add the following to the Flamingo Road/Hotel Rio Drive intersection, which would be one of the primary access points to the station:

- Third southbound left turn lane.
- Fourth westbound through lane.
- Second westbound right turn lane.
- Fourth eastbound through lane.

Add one right turn lane to one approach at each of the following intersections: Twain Avenue/Dean Martin Drive/Industrial, Industrial/Frank Sinatra Drive, and Flamingo Road/Northbound I-15 Ramps.

Las Vegas Station – South Alternative: At the Polaris Avenue/Hacienda Avenue intersection, add one turn lane to the eastbound, westbound and northbound approaches. At the Polaris Avenue/Russell Road intersection, add the following:

- Exclusive eastbound right turn lane.
- Second westbound left turn lane.
- Exclusive northbound left turn lane.

Signalize the Hacienda Avenue/Aldebaran intersection. Add a right turn lane to the southbound approach of the Russell Road/Southbound I-15 Ramps intersection. At the Tropicana Avenue/Dean Martin Drive/Industrial Road intersection, add right turn lanes to the westbound and northbound approaches. (Note that of the four Las Vegas alternatives, this location is in the least developed neighborhood with the lowest-capacity existing street system.)

Las Vegas Station – Central Location "B" Alternative: Add the following to the Flamingo Road/Hotel Rio Drive intersection, which would be one of the primary access points to the station:

- Fourth eastbound through lane.
- Second westbound left turn lane.
- Fourth westbound through lane.
- Second northbound right turn lane.

At Tropicana Avenue/Dean Martin Drive add one lane to each approach.

Table 8-1
Project Mitigations – DMU Alternatives

Station Location Alternative	Existing	2013	2030
Victorville Option 1	#1. Outer Highway & I-15 NB Ramps − Signalize #4. Stoddard Wells Road & I-15 SB Off-ramp − Signalize		#5. Stoddard Wells Road & Station Access #1 − Add third southbound through lane #7 & #8. Stoddard Wells Road & i-15 Ramps − Future intersections cannot be mitigated under 2030 Baseline (No build) conditions.

Station Location Alternative	Existing	2013	2030
Victorville Option 2	No mitigations required under this scenario.	#1. Stoddard Wells Road & I-15 NB Ramps − Signalize	No mitigations required under this scenario.
Downtown Station Location Alternative	No analysis performed for Existing plus DMU project conditions.	#9. Main Street / Charleston Boulevard − Add second eastbound left turn lane − Add exclusive dual southbound right turn lanes	#8. Grand Central Parkway / W. Charleston Boulevard − Add fourth westbound through lane. #9. Main Street/Charleston Boulevard − Add third eastbound left turn lane. − Add exclusive eastbound right turn lane. #15. I15 Ramps/Charleston Boulevard (SPUI Interchange) − Add third southbound left turn lane
Central Station Location "A"	No analysis performed for Existing plus DMU project conditions.	#5. Twain Avenue & Dean Martin Drive/Industrial − Optimize network offset. #8. Flamingo & I-15 NB Ramps − Optimize network offset. #11. Flamingo & Hotel Rio Drive − Add third southbound left turn lane. − Add fourth westbound through lane. − Add second westbound right turn lane. − Add fourth eastbound through lane.	#5. Twain Avenue & Dean Martin Drive/Industrial − Add second southbound right turn lane. #8. Flamingo & I-15 NB Ramps − Add third eastbound left turn lane
South Station Location	No analysis performed for Existing plus DMU project conditions.	#2. Tropicana & Dean Martin Drive/Industrial − Add exclusive westbound right turn lane. − Add exclusive northbound right turn lane. #5. Hacienda & Aldebaran − Signalize this intersection. #6. Hacienda & Polaris − Add exclusive northbound left turn lane. #8. Russell/Polaris − Add exclusive westbound right turn lane.	#1. Tropicana & Valley View − Add second westbound left turn lane. #6. Hacienda & Polaris − Add exclusive northbound right turn lane. #7. Hacienda & Valley View − Add third eastbound left turn lane. − Add second westbound left turn lane. #8. Russell & Polaris − Add third southbound left turn lane.

Station Location Alternative	Existing	2013	2030
		− Add exclusive northbound right turn lane. − Add southbound dual left turn lanes.	#9. Russell & I-15 SB Ramps − Add second eastbound right turn lane. #10. Russell/I-15 NB Ramps − Add second north-bound left turn lane.
Central Station Location "B"	No analysis performed for Existing plus DMU project conditions.	#1. Flamingo Road & Hotel Rio Drive − Add fourth eastbound through lane. − Add second westbound left turn lane. − Add second northbound right turn lane. #7. Tropicana Avenue & Dean Martin Drive − Add exclusive eastbound right turn lane.	#1. Flamingo & Hotel Rio Drive − Add fourth westbound through lane. − Stripe existing northbound through lane as shared through/right lane. #3. Flamingo Road & I-15 NB Ramps − Optimize signal offsets along Flamingo Road. #7. Tropicana Avenue & Dean Martin Drive − Add fourth eastbound through lane. − Add fourth westbound through lane. − Add exclusive westbound right turn lane. − Add third southbound left turn lane. #9. Tropicana Avenue & I-15 NB Ramps − Add second northbound right turn lane.

Table 8-2
Project Mitigations – EMU Alternatives

Station Location Alternative	Existing	2013	2030
Victorville Option 1	#1. Outer Highway & I-15 NB Ramps − Signalize #2. Outer Highway & Stoddard Wells Road − Signalize − Add northbound left turn lane − Add south-bound right turn lane #3. Stoddard Wells Road & I-15 SB On-ramp − Signalize #4. Stoddard Wells Road & I-15 SB Off-ramp − Signalize		#5. Stoddard Wells Road & Station Access #1 − Add third southbound through lane #7 & #8. Stoddard Wells Road & i-15 Ramps Future intersections cannot be mitigated under 2030 Baseline (No build) conditions.
Victorville Option 2	#1. Stoddard Wells Road & I-15 NB Ramps − Signalize #2. Stoddard Wells Road & Quarry Road − Signalize	#1. Stoddard Wells Road & I-15 NB Ramps − Add northbound left turn lane	#1. Stoddard Wells Road & I-15 NB Ramps − Add second southbound right turn lane
Downtown Station Location Alternative	No analysis performed for Existing plus EMU project conditions.	#6. Charleston/S. Martin Luther King Boulevard − Add exclusive eastbound right turn lane. #9. Main Street/Charleston Boulevard − Add fourth westbound through lane. − Add exclusive westbound right turn lane. − Add second eastbound left turn lane. − Add exclusive eastbound right turn lane. − Add exclusive dual southbound right turn lanes.	#4. Bonneville/S. Martin Luther King Boulevard − Add exclusive westbound right turn lane. #8. Grand Central Parkway/W. Charleston Boulevard − Add fourth westbound through lane. #9. Main Street/Charleston Boulevard − Add third eastbound left turn lane. − Add second northbound left turn lane. − Add exclusive northbound right turn lane.

Station Location Alternative	Existing	2013	2030
			− Add fifth westbound through lane. − Add second southbound left turn lane. #15. I-15 Ramps / Charleston Boulevard (SPUI Interchange) − Add third southbound left turn lane. − Add fourth westbound through lane.
Central Station Location "A"	No analysis performed for Existing plus EMU project conditions.	#5. Twain Avenue & Dean Martin Drive/Industrial − Add second southbound right turn lane. #6. Industrial & Frank Sinatra − Add second westbound right turn lane #8. Flamingo & I-15 NB Ramps − Add third eastbound right turn lane #11. Flamingo & Hotel Rio Drive − Add third southbound left turn lane. − Add fourth westbound through lane. − Add second westbound right turn lane. − Add fourth eastbound through lane.	#8. Flamingo & I-15 NB Ramps − Add third eastbound left turn lane. − Add fourth westbound through lane.
South Station Location	No analysis performed for Existing plus EMU project conditions.	#2. Tropicana & Dean Martin Drive/Industrial − Add exclusive westbound right turn lane. − Add exclusive northbound right turn lane. #5. Hacienda & Aldebaran − Signalize this intersection. #6. Hacienda & Polaris − Add exclusive eastbound right turn lane. − Add second westbound left turn lane. − Add exclusive northbound left turn lane. #8. Russell/Polaris	#1. Tropicana & Valley View − Add second westbound left turn lane. #2. Tropicana & Dean Martin Drive/Industrial − Add exclusive westbound right turn lane. − Add third northbound through lane. − Add exclusive northbound right turn lane. #6. Hacienda & Polaris − Add third westbound left turn lane. − Add exclusive northbound right turn lane.

Station Location Alternative	Existing	2013	2030
		− Add exclusive westbound right turn lane. − Add exclusive northbound right turn lane. − Add southbound dual left turn lanes. − Add exclusive southbound right turn lane. #9. Russell/I-15 SB Ramps − Add second southbound right turn lane.	#7. Hacienda & Valley View − Add third eastbound left turn lane. − Add second westbound left turn lane − Add second southbound left turn lane. #8. Russell & Polaris − Add third southbound left turn lane. #9. Russell & I-15 SB Ramps − Add second eastbound right turn lane. − Add second westbound left turn lane. #10. Russell/I-15 NB Ramps − Add third eastbound left turn lane. − Add second northbound left turn lane.
Central Station Location "B"	No analysis performed for Existing plus EMU project conditions.	#1. Flamingo Road & Hotel Rio Drive − Add fourth eastbound through lane. − Add second westbound left turn lane. − Add fourth westbound through lane. − Add second northbound right turn lane. #4. Hotel Rio Drive & Dean Martin Drive − Modify eastbound right turn to have overlap phasing. #7. Tropicana Avenue & Dean Martin Drive − Add exclusive eastbound right turn lane. − Add exclusive westbound right turn lane. − Add exclusive northbound right turn lane. − Add third southbound left turn lane.	#1. Flamingo & Hotel Rio Drive − Stripe existing northbound through lane as shared through/right lane. #3. Flamingo & I-15 NB Ramps − Add fourth westbound through lane. #4. Hotel Rio Drive & Dean Martin Drive − Add second northbound left turn lane. #7. Tropicana Avenue & Dean Martin Drive − Add fourth eastbound through lane. − Add fourth westbound through lane. #9. Tropicana Avenue & I-15 NB Ramp − Add second northbound right turn lane.