

Appendix H

Traffic Impact Analysis

TRAFFIC IMPACT ANALYSIS
OCOTILLO WIND ENERGY FACILITY
County of Imperial, California
February 7, 2012

LLG Ref. 3-10-1956

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APPENDIX

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TRAFFIC IMPACT ANALYSIS
OCOTILLO WIND ENERGY FACILITY
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1.0 INTRODUCTION

The following traffic impact analysis has been prepared to determine the potential impacts to the local circulation system due to truck and employee traffic related to construction of the proposed Ocotillo Wind Energy Facility (OWEF) near Ocotillo, in the County of Imperial, California. Once constructed, the project will generate a minimal amount of traffic related to operations and maintenance. Therefore, the focus of this analysis is on the potential traffic impacts related to construction. This report includes the following sections:

- Project Description
- Existing Conditions
- Analysis Approach and Methodology
- Significance Criteria
- Analysis of Existing Condition
- Trip Generation / Distribution / Assignment
- Cumulative Projects
- Analysis of Construction Year Conditions
- Project Alternatives
- Project Decommissioning
- Post-Construction Operations
- Project Access
- Significance of Impacts and Mitigation Measures

Figure 1-1 depicts the project vicinity.

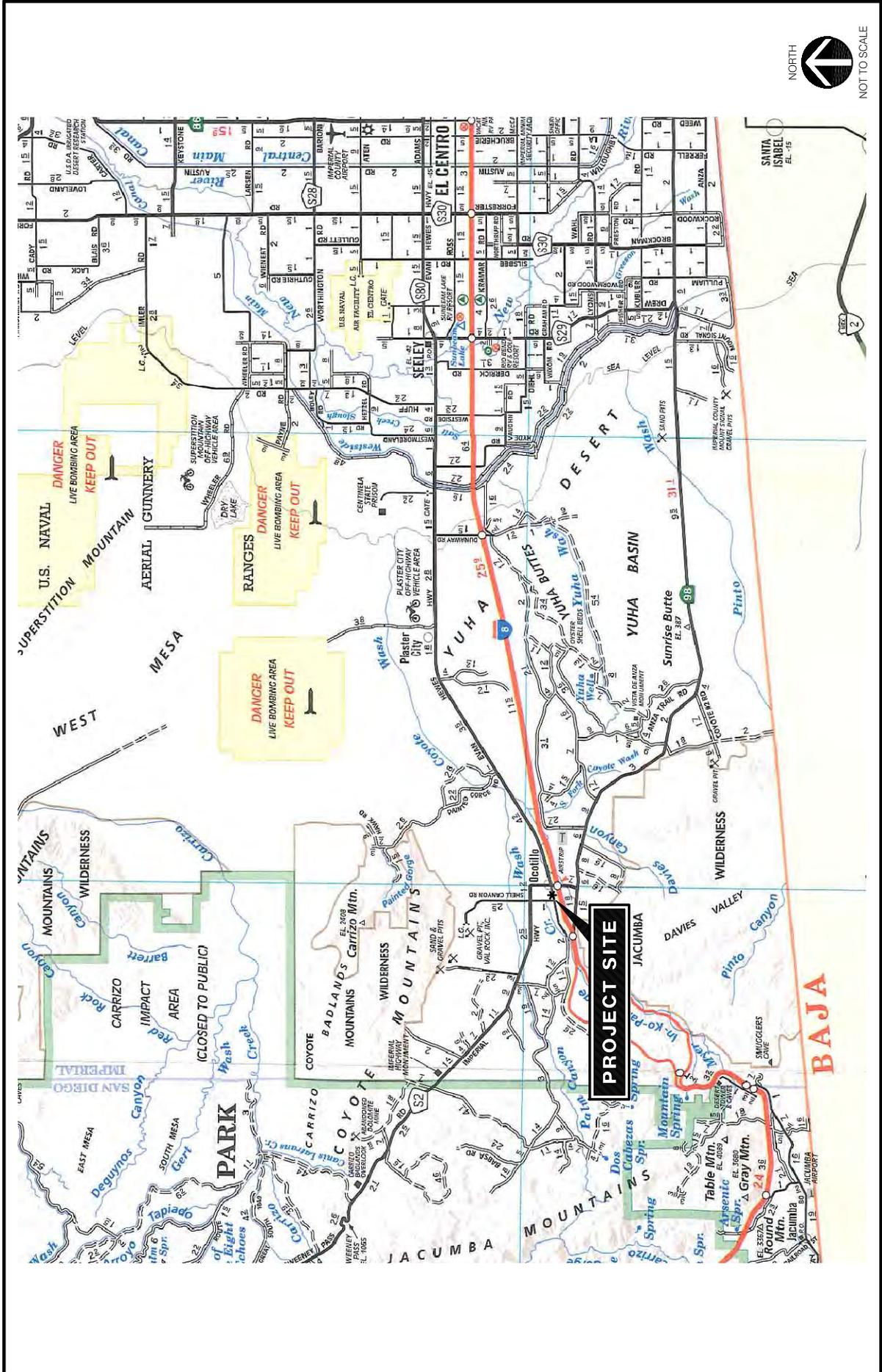


Figure 1-1
Vicinity Map

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 N:/1956/figures/LLG1956 FIG 1-1

2.0 PROJECT DESCRIPTION

2.1 Alternative 1 (Proposed Project): 158 Wind Turbine Generators

Ocotillo Express LLC (Applicant) proposes to construct, operate, maintain, and decommission the proposed Ocotillo Wind Energy Facility (OWEF), a 465-Megawatt (MW) wind energy facility on approximately 12,500 acres in Imperial County, California. The majority of the project site is located on BLM-administered land except approximately 26 acres of private land where a single wind turbine generator would be installed. Additionally, 487 acres of private land would be utilized for road access and collection line ROWs.

A proposed total of 155 Wind Turbine Generators (WTGs) would be located on the project site, designed to produce up to 465 MW of energy. Facilities for the proposed OWEF would consist of wind turbine generators, meteorological towers, an electrical collection system for collecting the power generated by each WTG, an electrical substation, access roads, and an operation and maintenance building. The proposed OWEF would connect to the new San Diego Gas & Electric Sunrise Powerlink 500-kV transmission line.

The project construction is planned to be completed in 11 months, starting in February 2012. *Figure 2-1* depicts the overall project site plan.

2.2 Alternative 2: 137 Wind Turbine Generators

This alternative is conceptually similar to the Proposed Action (Alternative 1), but with 18 fewer WTGs (137 total), 7 of which are optional sites; all are associated with Phase 2 of the Proposed Action. *Figure 2-2* depicts the site plan for Alternative 2. Compared to the Proposed Action, the turbines eliminated under this alternative include 3 in the southern portion of Site 2 and northeast portion of Site 1, and several along the perimeter of the project in the northwest portion of Site 1. The locations of the substation, switchyard, O&M facility, batch plant, rail yard, and meteorological towers are the same as the Proposed Action. Wind turbines have been eliminated to avoid sensitive cultural and biological resources, particularly in the southwestern portion of the site.

Construction of Alternative 2 would utilize the same equipment and materials as the Proposed Action (Alternative 1); however, less material would be required due to the reduction in the number of WTGs. The project construction is planned to be completed in 11 months, starting in February 2012. Land disturbance would be reduced as 18 fewer turbine foundations/crane pads would be required.

2.3 Alternative 3: 105 Wind Turbine Generators

This alternative is conceptually similar to the Proposed Action (Alternative 1), but with 50 fewer WTGs (105 total). *Figure 2-3* depicts the site plan for Alternative 3. Compared to the Proposed Action, the turbines eliminated under this alternative include all those at Site 2 (15), all those in the northeast portion of Site 1, a couple near and the one on the private parcel, and several along the perimeter of the project in the northeast portion of Site 1. In addition, the meteorological tower on

Site 2 would be eliminated. The locations of the substation, switchyard, O&M facility, batch plant, rail yard, and remaining meteorological towers are the same as the Proposed Action.

Construction of Alternative 3 would utilize the same equipment and materials as the Proposed Action (Alternative 1); however, less material would be required due to the reduction in the number of WTGs. The project construction is planned to be completed in 11 months, starting in February 2012. Land disturbance would be reduced as 50 fewer turbine foundations/crane pads would be required.

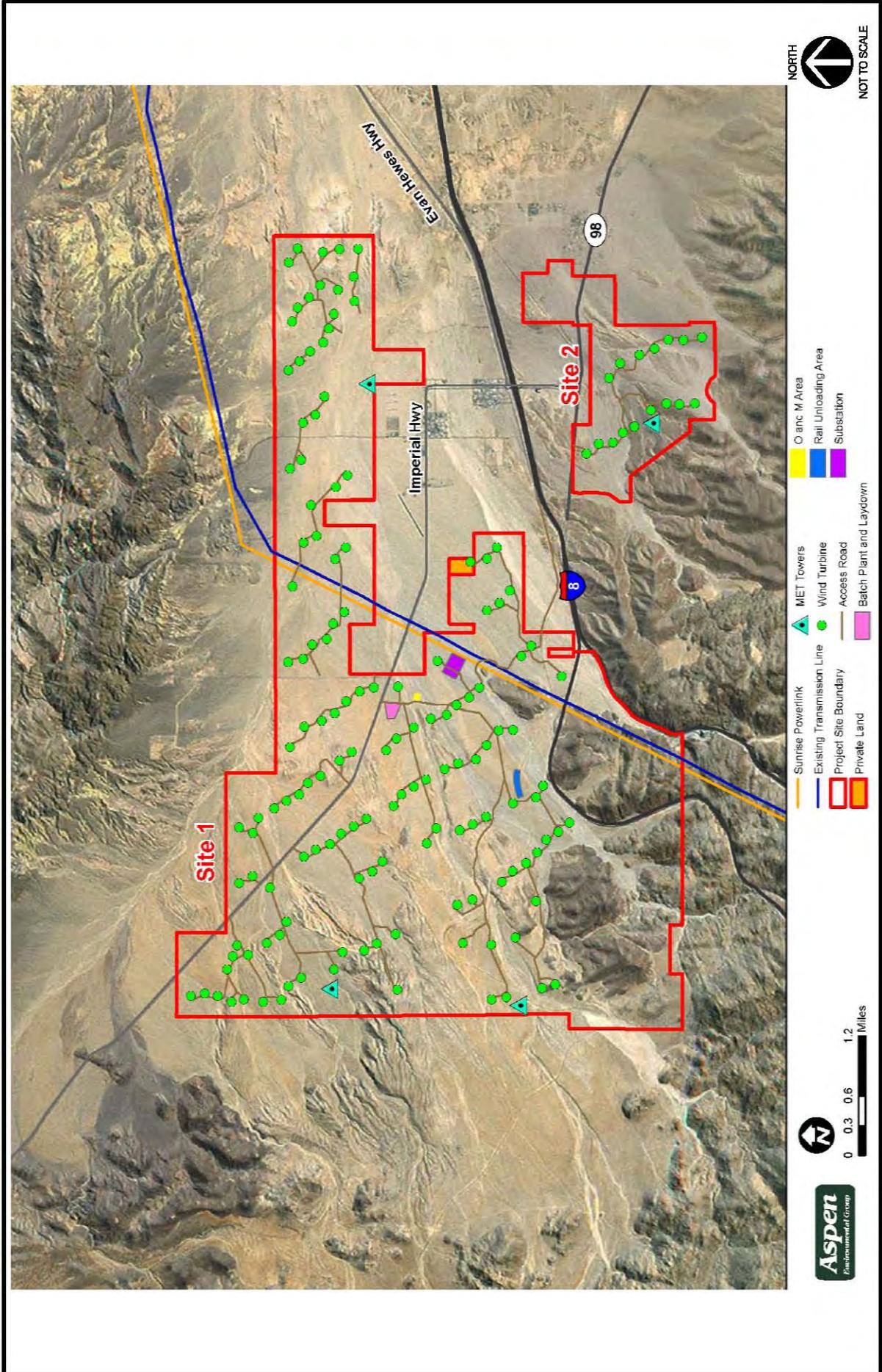


Figure 2-1
Site Plan

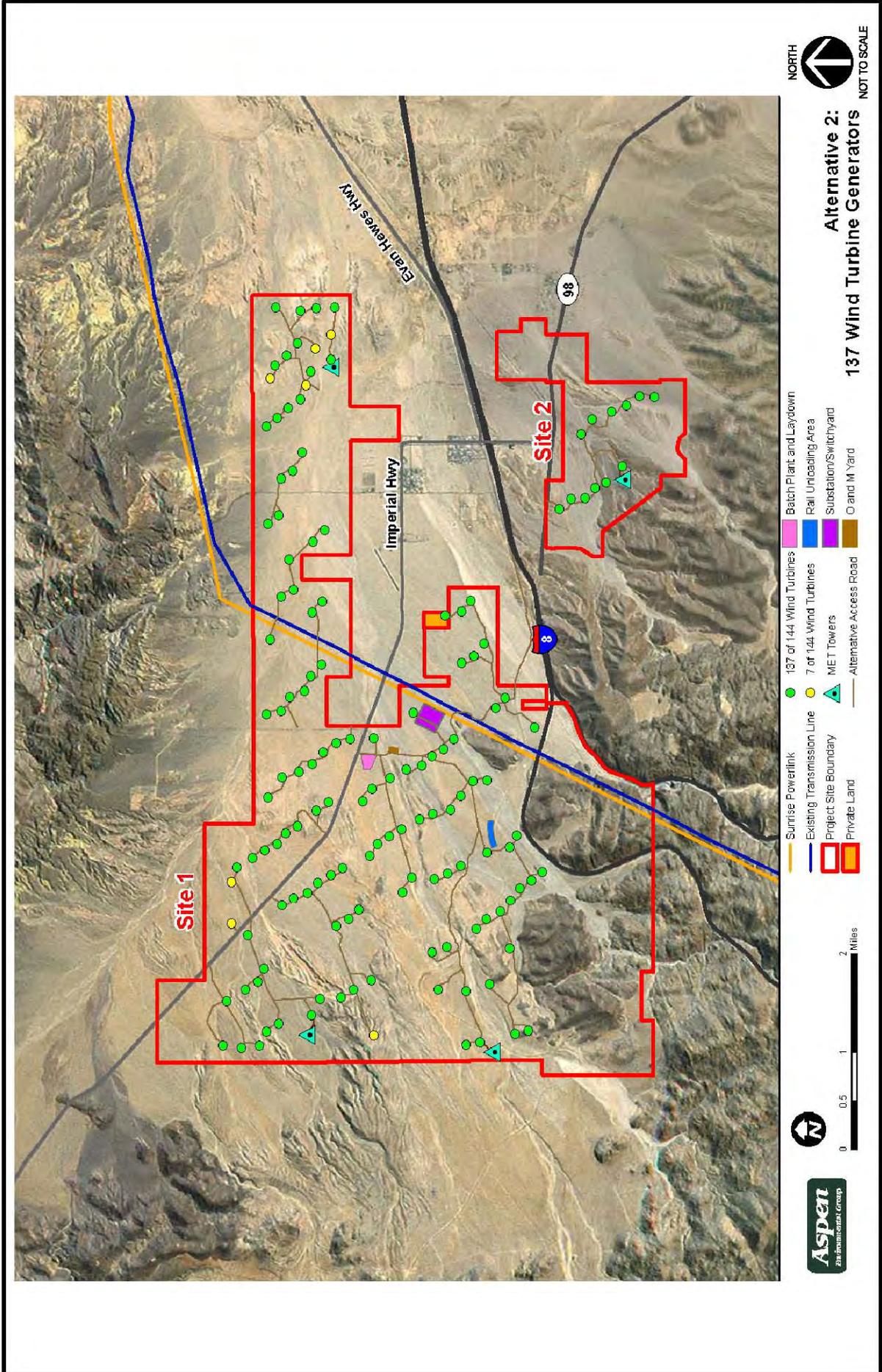
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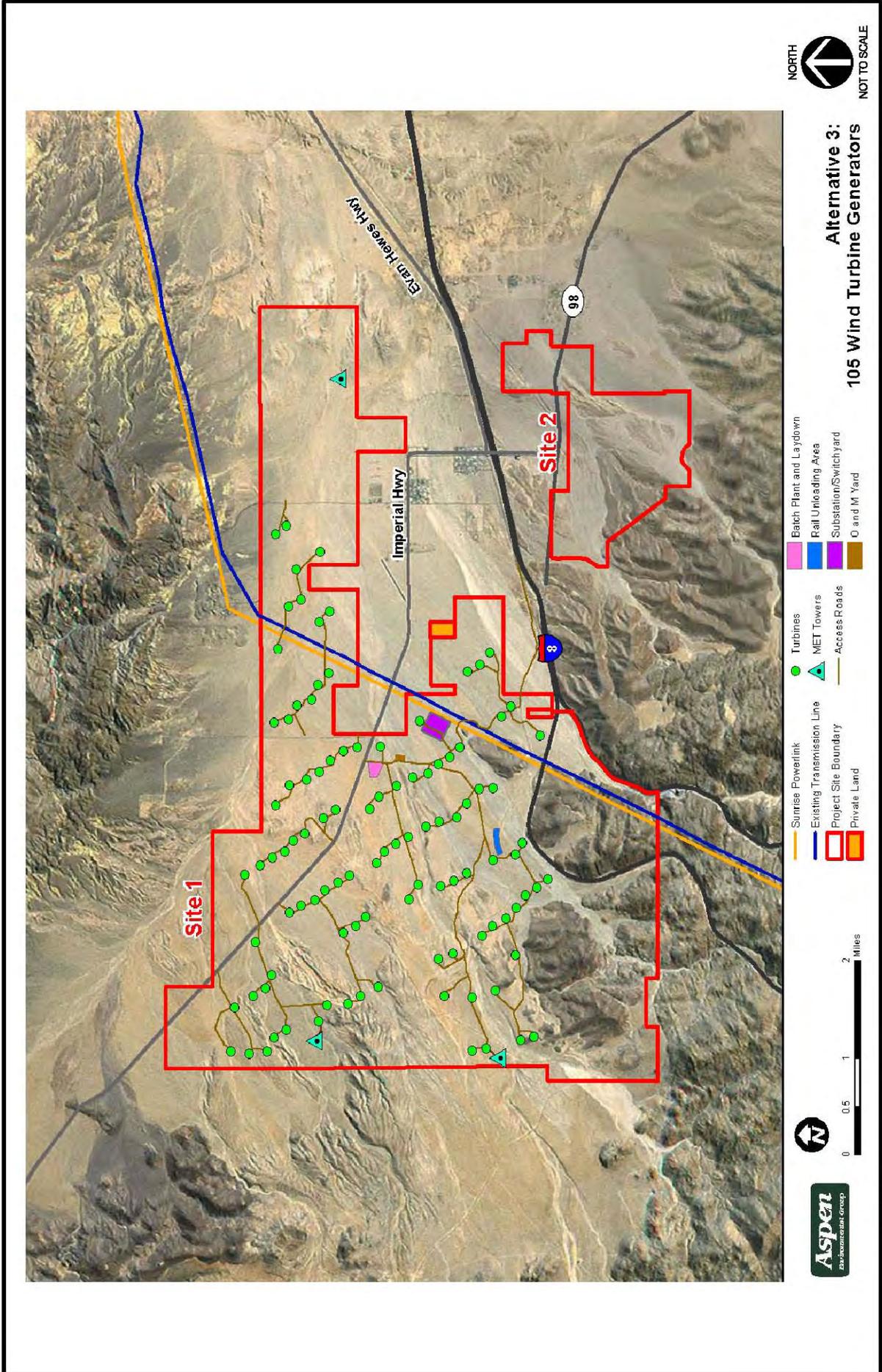
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Miles

NORTH
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Figure 2-2
Alternative 2 Site Plan



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**Figure 2-3
Alternative 3 Site Plan**

3.0 EXISTING CONDITIONS

3.1 Existing Street Network

Following is a brief description of the street segments within the project area. *Figure 3-1* illustrates the existing conditions, including the lane geometry, for the key public street segments and intersections in the study area.



Evan Hewes Highway is an east-west road that parallels I-8 to the north. The road begins east of the City of Holtville at a junction at I-8 and travels through El Centro and Seeley before ending in Ocotillo. This road is typically used for local travel and provides an alternative to I-8. In the project vicinity, Evan Hewes Highway is 2 lanes wide and does not have any bicycle lanes or curb / gutter / sidewalks. The posted speed limit is 55 miles per hour (mph). Evan Hewes Highway is also called Imperial

County Route S80 and has been classified as a historic highway by the State of California since it was once part of United States Highway 80. The photo above depicts a view of Evan Hewes Highway approaching Imperial Highway, looking west.

Interstate 8 is an interregional freeway between San Diego and Arizona. Through Imperial County, I-8 provides 2 lanes in each direction. The posted speed limit is 70 mph. Imperial Highway interchange is the closest access between I-8 and the project site. The photo to the right eastbound Interstate 8 looking east.



Imperial Highway (Co Hwy S2) is classified as a County Highway on the Imperial County General Plan Circulation Element. In the project vicinity, Imperial Highway is constructed as a two-lane undivided north-south roadway, providing one lane of travel per direction north of SR 98 and through the Town of Ocotillo. North of the Town of Ocotillo, this facility turns west and nearly bisects the project site. No bike lanes or bus stops are provided. There are no curb, gutters or sidewalks, only dirt shoulders are

provided. The posted speed limit in town is 35 mph. The photo to the left depicts a view of Imperial Highway at SR 98 (Yuha Cutoff), looking south.

SR 98 (Yuha Cutoff) is classified as a County Highway on the Imperial County General Plan Circulation Element. In the project vicinity, SR 98 is constructed as a two-lane undivided east-west roadway, providing one lane of travel per direction. No bike lanes or bus stops are provided. There are no curb, gutters or sidewalks, but paved shoulders are provided. The posted speed limit on SR 98 is 65 mph. The photo to the right depicts a view of SR 98 (Yuha Cutoff) approaching Imperial Highway, looking east.



3.2 Existing Traffic Volumes

3.2.1 Peak Hour Intersection Turning Movement Volumes

LLG engineers commissioned AM and PM peak hour intersection turning movement volume counts on December 7, 2010 at the following locations:

- West Evan Hewes Highway / Imperial Highway
- I-8 WB Ramps / Imperial Highway
- I-8 EB Ramps / Imperial Highway
- SR 98 (Yuha Cutoff) / Imperial Highway

Figure 3-2 depicts the peak hour intersection turning movement volumes at all the study area intersections.

3.2.2 Segment Volumes

Daily traffic (ADT) volume counts were commissioned by LLG Engineers in on December 7, 2010. **Figure 3-2** depicts the segment ADT volumes at all the study area segments. **Table 3-1** summarizes the segment ADT volumes on all the study area segments.

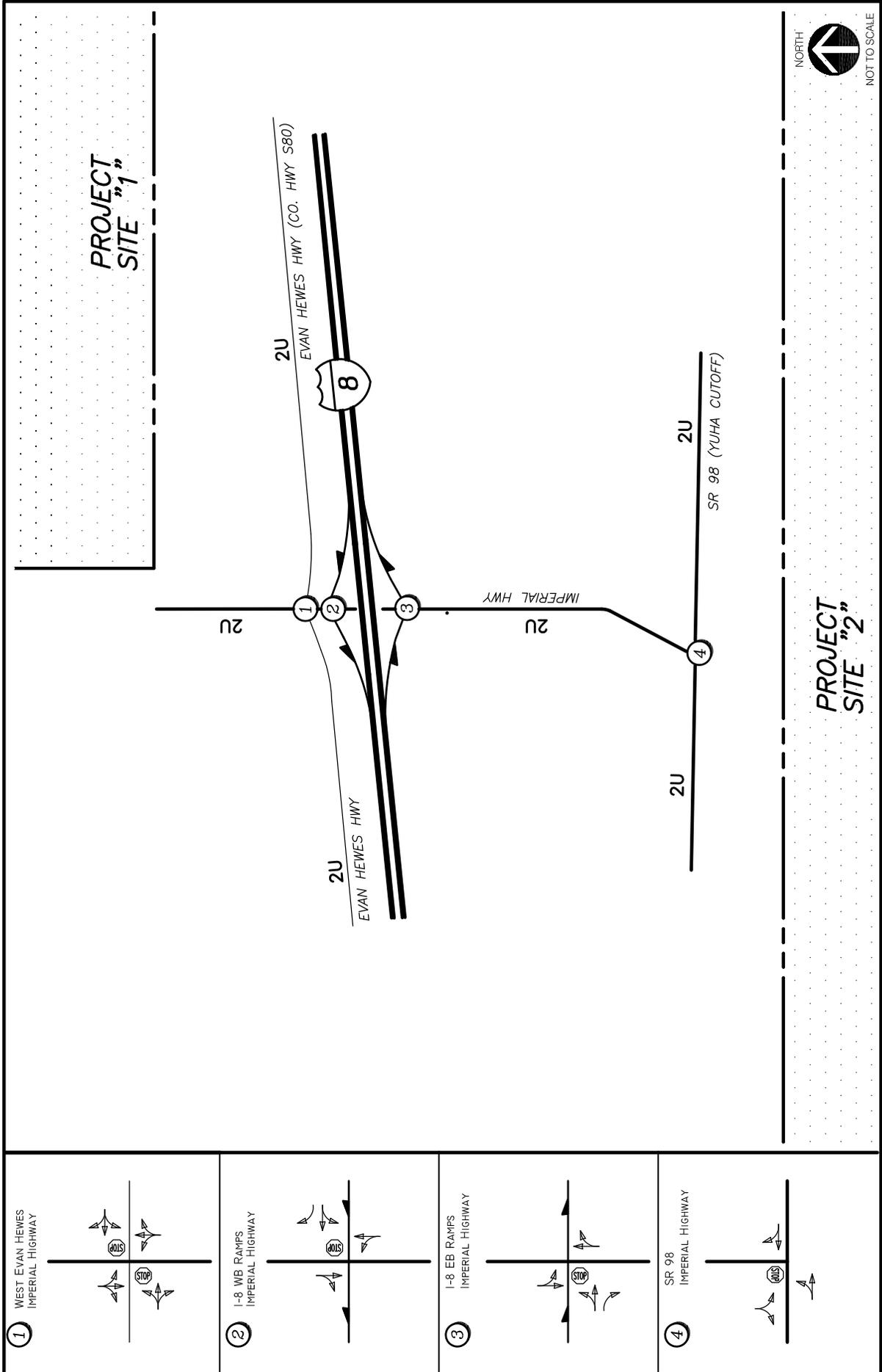
Appendix A contains the manual count sheets.

TABLE 3-1
EXISTING TRAFFIC VOLUMES

Street Segment	Source	Date	ADT ^a
W. Evan Hewes Highway East of Imperial Highway	LLG	December 7, 2010	250
Imperial Highway I-8 EB Ramps to SR-98 Yuha Cutoff	LLG	December 7, 2010	240
SR-98 Yuha Cutoff West of Imperial Highway	LLG	December 7, 2010	1,140

Footnotes

- a. Average Daily Traffic Volume.



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LEGEND

- ⊞ - Stop Sign
- XX - Number of lanes, divided (D) or undivided (U)

Figure 3-1

Existing Conditions Diagram

OCOTILLO WIND ENERGY FACILITY

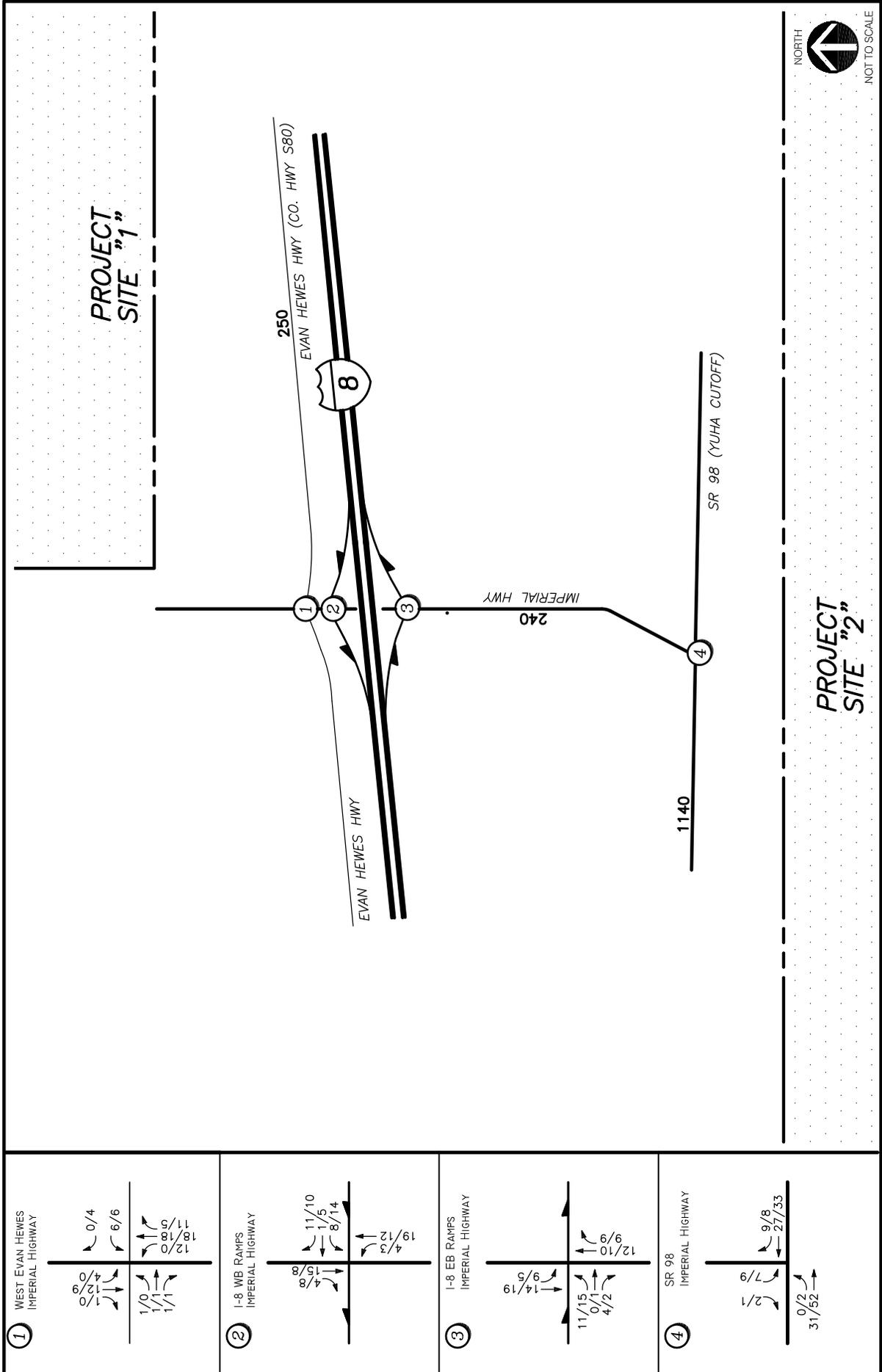


Figure 3-2
Existing Traffic Volumes
AM/PM Peak Hours & ADT

<p>① WEST EVAN HEWES IMPERIAL HIGHWAY</p>	<p>② I-8 WB RAMP IMPERIAL HIGHWAY</p>	<p>③ I-8 EB RAMP IMPERIAL HIGHWAY</p>	<p>④ SR 98 IMPERIAL HIGHWAY</p>
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NOTES:

- ADT (Average Daily Traffic) shown midblock
- AM/PM peak hour volumes are shown at the intersections

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4.0 STUDY AREA, ANALYSIS APPROACH AND METHODOLOGY

4.1 Study Area

This study analyzes the effects of the proposed OWEF project and alternatives during construction. The construction traffic consisting of trucks transporting construction equipment and materials to and from the site and vehicles of management and construction employees during the construction period. Since this is a remote area and all materials have to be brought from large distances and personnel have to travel either from El Centro or San Diego, all traffic will utilize I-8 for regional travel and the Imperial Highway interchange to access the site. Therefore, the interchange and two intersections, one north (Evan Hewes / Imperial highway intersection) and one south (SR 98 / Imperial Highway) of I-8 are included in the Study Area.

Analysis of the freeway (Interstate 8) segments was considered. Freeway analysis is generally not conducted for construction projects. The freeway in the project vicinity is not constrained. The freeway segments are currently operating at LOS B, which is two letter grades better than acceptable level (LOS D). The construction traffic is temporary and will last for a little over a year. The assumptions with regard to the volume of the project construction traffic are conservative and much higher than the actual traffic. The freeway ramp intersections are operating at LOS B with the Project construction and Cumulative projects traffic. The threshold for including freeway segments is 50 peak hour trips in one direction which is exceeded only west of the Imperial Highway interchange in the WB direction during the AM peak hour and in the EB direction during the PM peak hour. Hence, any analysis of the freeway segments is considered not necessary.

4.2 Analysis Scenarios

This report analyzes the effects of the construction portion of the proposed OWEF project and alternatives, and the limited traffic contribution of the project during the subsequent Operations and Maintenance phase (see *Section 7.0* for more information related to project trip generation). Quantitative analyses have been completed for key off-site intersections and roadway segments in the study area affected by construction project traffic.

Analyses of the existing roadway volumes and network (Year 2010) have been completed for reference. Analyses have been prepared for the following scenarios:

- Existing (Year 2010)
- Baseline Without Construction Traffic
- Baseline + Construction Traffic
- Baseline + Construction Traffic + Cumulative projects Traffic

Given the very limited traffic associated with the Operations and Maintenance of the project (61 ADT), no long-term cumulative analyses would be deemed necessary.

4.3 Analysis Methodology

The operations of the project area intersections and segments are characterized using the concept of “Level of Service” (LOS). LOS is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. LOS provides an index to the operational qualities of a roadway segment or an intersection. LOS designations range from A through F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments.

Table 4-1 summarizes the description for each level of service.

4.3.1 Unsignalized Intersections

For unsignalized intersections, level of service is determined by the computed or measured control delay and is defined for each minor movement. Level of service is not defined for the intersection as a whole. *Table 4-2* depicts the criteria, which are based on the Average control delay for any particular minor movement.

Level of Service F exists when there are insufficient gaps of suitable size to allow a side street demand to safely cross through a major street traffic stream. This level of service is generally evident from extremely long control delays experienced by side-street traffic and by queuing on the minor-street approaches. The method, however, is based on a constant critical gap size; that is, the critical gap remains constant no matter how long the side-street motorist waits.

LOS F may also appear in the form of side-street vehicles selecting smaller-than-usual gaps. In such cases, safety may be a problem, and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior, which are more difficult to observe in the field than queuing.

4.3.2 Street Segments

Street segments were analyzed based upon the comparison of ADT to the County of Imperial *Roadway Classifications, Levels of Service (LOS) and Average Daily Traffic (ADT)* table (see *Table 4-3* below). *Table 4-3* provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. Segment analysis is a comparison of ADT volumes and an approximate daily capacity on the subject roadway.

TABLE 4-1
INTERSECTION LEVEL OF SERVICE DESCRIPTIONS

Level of Service	Description
A	Occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
C	Generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.
F	Considered to be unacceptable to most drivers. This condition often occurs with over saturation i.e. when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume-to-capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

**TABLE 4-2
LEVEL OF SERVICE THRESHOLDS FOR UNSIGNALIZED INTERSECTIONS**

Average Control Delay Per Vehicle (Seconds/Vehicle)	Level of Service	Expected Delay to Minor Street Traffic
0.0 ≤ 10.0	A	Little or no delay
10.1 to 15.0	B	Short traffic delays
15.1 to 25.0	C	Average traffic delays
25.1 to 35.0	D	Long traffic delays
35.1 to 50.0	E	Very long traffic delays
≥ 50.0	F	Severe congestion

**TABLE 4-3
IMPERIAL COUNTY STANDARD STREET CLASSIFICATION AVERAGE DAILY VEHICLE TRIPS**

Road		Level of Service W/Average Daily Vehicle Trips				
Class	X-Section	A	B	C	D	E
Expressway	128 / 210	30,000	42,000	60,000	70,000	80,000
Prime Arterial	106 / 136	22,200	37,000	44,600	50,000	57,000
Minor Arterial	82 / 102	14,800	24,700	29,600	33,400	37,000
Collector	64 / 84	13,700	22,800	27,400	30,800	34,200
Local Collector	40 / 70	1,900	4,100	7,100	10,900	16,200
Residential Street	40 / 60	*	*	< 1,500	*	*
Residential Cul-de-Sac / Loop Street	40/60	*	*	< 1,500	*	*
Industrial Collector	76 / 96	5,000	10,000	14,000	17,000	20,000
Industrial Local Street	44 / 64	2,500	5,000	7,000	8,500	10,000

* Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

5.0 SIGNIFICANCE CRITERIA

5.1 County of Imperial

The significance criteria summarized in *Table 5-1* is based upon the County of Imperial's goal for intersections and roadway segments to operate at LOS C or better. A cumulative impact can occur if the intersection or segment level of service is already operating below County standards and the project increases the delay by more than 2 seconds or the v/c ratio by more than 0.02.

TABLE 5-1
SIGNIFICANCE CRITERIA

Intersections			
Existing	Existing + Project	Existing + Project + Cumulative Projects	Impact Type
LOS ^a C or better	LOS C or better	LOS C or better	None
LOS C or better	LOS D or worse	—	Direct
LOS D	LOS D and adds 2.0 seconds or more of delay	—	Cumulative
LOS D	LOS E or F	—	Direct
LOS E	LOS F	—	Direct
LOS F	LOS F and delay increases by ≥ 10.0 seconds	—	Direct
Any LOS	Project does not degrade LOS and adds 2.0 to 9.9 seconds of delay	LOS E or worse	Cumulative
Any LOS	Project does not degrade LOS and adds < 2.0 seconds of delay	Any LOS	None
Segments			
Existing	Existing + Project	Existing + Project + Cumulative Projects	Impact Type
LOS C or better	LOS C or better	LOS C or better	None
LOS C or better	LOS C or better and $v/c^b > 0.02$	LOS D or worse	Cumulative
LOS C or better	LOS D or worse	—	Direct ^c
LOS D	LOS D and $v/c > 0.02$	—	Cumulative
LOS D	LOS E or F	—	Direct
LOS E	LOS F	—	Direct
LOS F	LOS F and v/c^c increases by > 0.09	—	Direct
Any LOS	LOS E or worse and v/c 0.02 to 0.09	LOS E or worse	Cumulative
Any LOS	LOS E or worse and $v/c < 0.02$	Any LOS	None

Source: Linscott, Law & Greenspan, Engineers

Footnotes:

- a. Level of Service
- b. Volume to Capacity Ratio
- c. Exception: post-project segment operation is LOS D and intersections along segment are LOS D or better results in no significant impact.

The desirable operation for freeway mainline segments is LOS D or better. Should the mainline level of service degrade to LOS E or F with the addition of project traffic, and increase the volume to capacity ratio (v/c) by more than 0.01, the impact is considered to be direct and significant. An impact is considered cumulative if the mainline is already operating at LOS E or F and the v/c increase is greater than 0.01.

5.2 Caltrans

A project is considered to have a significant impact if the new project traffic has decreased the operations of surrounding roadways by a defined threshold. The defined thresholds for roadway segments and intersections are defined in *Table 5-1* below. If the project exceeds the thresholds in *Table 5-1*, then the project may be considered to have a significant project impact. A feasible mitigation measure will need to be identified to return the impact within the thresholds (pre-project + allowable increase) or the impact will be considered significant and unmitigated.

TABLE 5-1
TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

Level of Service with Project ^a	Allowable Increase Due to Project Impacts ^b					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
D, E & F (or ramp meter delays above 15 minutes)	0.01	1	0.02	1	2	2 ^c

Footnotes:

- a. All level of service measurements are based upon HCM procedures for peak-hour conditions. However, V/C ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table 2 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.
- b. If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are deemed to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigations (within the Traffic Impact Study [TIS] report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see note a above), or if the project adds a significant amount of peak hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

General Notes:

1. V/C = Volume to Capacity Ratio
2. Speed = Arterial speed measured in miles per hour
3. Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters.
4. LOS = Level of Service

6.0 ANALYSIS OF EXISTING CONDITIONS

6.1 Peak Hour Intersection Levels of Service

The project study area is located in a rural setting and all intersections are unsignalized. As seen in *Table 6-1*, all study area intersections are calculated to currently operate at LOS A during both the AM and PM peak hours.

Appendix B contains the *Existing* peak hour intersection analysis worksheets.

TABLE 6-1
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing	
			Delay ^a	LOS ^b
1. West Evan Hewes Highway / Imperial Highway	MSSC ^c	AM	9.0	A
		PM	8.8	A
2. I-8 WB Ramps / Imperial Highway	MSSC	AM	8.6	A
		PM	8.7	A
3. I-8 EB Ramps / Imperial Highway	MSSC	AM	8.8	A
		PM	8.8	A
4. SR 98 (Yuha Cutoff) / Imperial Highway	MSSC	AM	8.8	A
		PM	9.0	A

Footnotes:

- a. Delay per vehicle in seconds
- b. LOS - Level of service
- c. MSSC - Minor street STOP Controlled intersection. Minor street left-turn delay is reported.

UNSIGNALIZED

Delay	LOS
0.0 < 10.0	A
10.1 to 15.0	B
15.1 to 25.0	C
25.1 to 35.0	D
35.1 to 50.0	E
> 50.1	F

6.2 Daily Street Segment Levels of Service

As described above, the project study area is located in a rural setting and all segments are two-lane facilities. As seen in *Table 6-2*, all study area segments are calculated to currently operate at LOS A on a daily basis.

TABLE 6-2
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Functional Roadway Classification ^a	Capacity (LOS E) ^b	ADT ^c	V/C ^d	LOS ^e
W. Evan Hewes Highway East of Imperial Highway	2-Lane Collector	16,200	250	0.015	A
Imperial Highway I-8 EB Ramps to SR-98 Yuha Cutoff	2-Lane Collector	16,200	240	0.015	A
SR-98 Yuha Cutoff West of Imperial Highway	2-Lane Collector	16,200	1,140	0.070	A

Footnotes:

- a. County of Imperial Valley roadway classification
- b. Roadway capacity corresponding to Level of Service E from Imperial County Standard Street Classification, Average Daily Vehicle Trips table.
- c. Average Daily Traffic volumes
- d. Volume / Capacity ratio.
- e. Level of Service

7.0 PROPOSED PROJECT TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

7.1 Description of Construction / Activities

Proposed project traffic generation was determined for *Construction* and *Operations and Maintenance* (O&M) phases based on the intensity of proposed related activities at the project site. The construction phase is expected to commence in March of 2012, with the entire project completed by the end of 2012. As described previously, the project will be constructed in two phases. A total of 158 turbines are proposed to be installed.

Based on the information provided by the project proponent, construction activities include the following types of activities:

1. Decommissioning
2. Roads / Foundations
3. Electrical
4. Erection
5. Administration / Management
6. Post Construction Operations and Maintenance

A matrix summarizing the number of employees and construction trucks required for various activities and the duration for which they are needed is included in *Appendix C*.

7.1.1 *Employee Traffic*

TURBINE CONSTRUCTION

- Thirty one (31) *management employees* will be required from weeks 1 through 48.
- One hundred and forty four (144) *Roads / Foundation employees* will be operating from weeks 1 through 40.
- Forty four (43) *electrical employees* will be operating from weeks 14 through 40.
- Ninety four (94) *erection employees* will be operating from weeks 22 through 48.

OPERATIONS AND MAINTENANCE AND SUB STATION CONSTRUCTION (Will occur simultaneously with Turbine Construction Activities)

- Four (4) *employees* will be required for grading for the Operations and Maintenance (O & M) Building for weeks 23 and 24.
- Twenty six (26) *construction employees* will be required for the (O & M) Building from weeks 25 through 40.
- Eight (8) *employees* will be required for grading for the substation from week 1 through week 3.
- Twelve *employees* will be required for the construction of the substation from weeks 4 through 12.

- Eighteen (18) *electrical employees* will be operating from weeks 13 through 28.
- Fifteen (15) *Substation Transformer Assembly employees* will be operating from weeks 29 through 44.

7.1.2 Construction Truck Traffic

Truck traffic is anticipated for various durations for the following construction related activities:

1. A temporary batch plant will be installed to supply concrete for foundations. Transporting water, aggregate, sand and cement to the batch plant.
2. Transporting concrete from the batch plant to each turbine location at the project site.
3. Transporting gravel / water for the road work.
4. Transporting water for the turbine foundations
5. Transporting concrete from the batch plant for the construction of the Operations and Maintenance building.
6. Deliver specialized equipment such as towers, blades and turbines to each turbine location
7. Miscellaneous delivery and crew trucks
8. Fuel delivery

Table 7-1 summarizes the number of employees and construction trucks required by duration over the entire construction period. The maximum amount of traffic on any given day during the highest intensity is obtained by adding the traffic required for the various overlapping activities during the construction period. As seen in *Table 7-1*, the maximum number of employees required is 167 and the number of trucks required is 154.

TABLE 7-1
SUMMARY OF CONSTRUCTION / O&M TRAFFIC

Duration	Employees	Duration	Trucks
Weeks 1 to 48	26	Weeks 1 to 48	6
Weeks 1 to 40	120	Weeks 2 to 40	51
Weeks 14 to 40	36	Weeks 14 to 21	8
Weeks 22 to 48	78	Weeks 22 to 37	36
Weeks 25 to 40	22	Weeks 25 to 40	22
Weeks 1 to 3	7	Week 10	12
Weeks 4 to 12	10	Week 25	7
Weeks 13 to 28	15	Weeks 1 to 3	7
Weeks 29 to 44	13	Weeks 4 to 12	10
		Weeks 5 to 28	15
		Weeks 29 to 44	13
Maximum	297		130

Source: Estimated from construction traffic data from Aspen Engineering, February 2011.

7.1.3 Post Construction Operations and Maintenance

One fork lift will be available on-site and one crane will be brought on-site once a year for on-site maintenance. Approximately 17 full time employees for year round operation and 12 temporary workers for 12 weeks a year are expected to be required for operations and maintenance.

Table 7-2 summarizes the construction and O&M traffic summarized in *Table 7-1* and the calculated total employee and truck traffic generated on a daily basis.

The management employees are assumed to generate 4 trips daily, 2 trips to and from work and 2 trips to various work locations during the work day. The construction employees are assumed to generate two trips per day, one trip from home to work and one trip from work back to home at the end of the day.

**TABLE 7-2
DETERMINING MAXIMUM DAILY CONSTRUCTION AND O & M TRAFFIC**

Description	Quantity	Trips	PCE ^a	Equivalent Passenger Cars ^b
Construction				
Trucks ^c	130	260	1.7	442
Employees				
Management ^d	26	4	1.0	104
Construction ^e	234	2	1.0	468
<i>Subtotal Construction Employees</i>	<i>260</i>			<i>572</i>
Subtotal Daily Construction Traffic	390			1,014
Operations and Maintenance				
Trucks	1	2	1.7	3
Employees	37	2	1.0	74
Subtotal Daily O&M Traffic	38			77
Total Daily Construction and O&M Traffic	428			1,091

Footnotes

- a. "Passenger Car Equivalence" (PCE) factor. The surrounding terrain is generally level and the PCE factor is 1.7 for level terrain per Exhibit 20-9 Highway Capacity Manual (HCM).
- b. Applying the PCE factor to the truck trips, the passenger car equivalent trips is obtained.
- c. Each truck generates two trip ends, one inbound trip to the site and one outbound trip from the site.
- d. Each management employee is assumed to generate four trips, 2 trips to and from work and 2 additional trips to the worksite or other destinations during a workday
- e. Each construction employee is assumed to generate 2 trips, to and from work.

General Notes:

1. Construction Phases I and II will not occur simultaneously. The maximum of construction truck / employee traffic that occurs simultaneously is assumed for the entire construction period.
2. Work hours: 10-hour work days Mondays through Saturdays. May work early morning, evenings or late nights. Construction staff assumed during peak hours to analyze the "worst-case" condition.

TABLE 7-3
PEAK HOUR TRAFFIC

Description	Daily Trips ^a	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
Construction							
Trucks	442	44	22	22	44	22	22
Employees							
Management	104	26	23	3	26	3	23
Construction	468	234	211	23	234	23	211
<i>Subtotal Employee Traffic</i>	572	260	234	26	260	26	234
Subtotal Construction Traffic	1,014	304	256	48	304	48	256
Operations and Maintenance							
Trucks	3	0	0	0	0	0	0
Employees	74	37	30	7	37	7	30
Subtotal O & M Traffic	77	37	30	7	37	7	30
Total Truck Traffic	445	44	22	22	44	22	22
Total Employee Traffic	646	297	264	33	297	33	264
Total Construction and O & M Traffic	1,091	341	286	55	341	55	286

Footnotes

- a. Daily trips in terms of equivalent "Passenger Cars" (Table 7-2).
- b. Each management employee is assumed to generate four trips, 2 trips to and from work and 2 additional trips to the worksite or other destinations during a workday
- c. Each construction employee is assumed to generate 2 trips, to and from work.

General Notes:

1. Work hours: 10-hour work days Mondays through Saturdays. May work early morning, evenings or late nights. Construction staff assumed during peak hours to analyze the "worst-case" condition.

The traffic associated with the proposed construction activities at the project site includes trucks of varying sizes. Trucks potentially have greater impacts on a roadway network than passenger cars. A passenger-car equivalence factor was applied to the truck traffic to account for this fact. Exhibit 20-9, Passenger-Car Equivalents on Two Way and Directional Segments in the *Highway Capacity Manual, 2000* recommends Passenger Car Equivalence of 1.7 for heavy vehicles on level terrain. Most of the study area is level terrain (*Appendix C*). Hence, this factor was applied to the truck trips. **Table 7-3** summarizes the peak hour construction traffic. As seen in *Table 7-3*, the construction related traffic is substantially greater than the O&M traffic, which validates the assertion that analysis of the construction impacts would represent the worst-case potential traffic impacts of the project.

The directional split assumed for truck traffic is 50% inbound and 50% outbound during the AM and PM peak hours. For employees, a directional split of 90% inbound and 10% outbound and 10% inbound and 90% outbound is assumed during the AM and PM peak hours respectively. The total construction and O&M traffic analyzed in this report is 1,191 ADT, with 341 trips (286 inbound / 55

outbound) during the AM peak hour, and 341 trips during the PM peak hour (55 inbound / 286 outbound) during the PM peak hour.

7.2 Trip Distribution

The trip distribution was developed separately for the truck and management / construction employees. Information regarding the source of various construction materials and equipment was first obtained from Aspen Engineering. This information was used to develop the potential percentage of construction related traffic generated by the construction activities, by direction.

7.2.1 Construction Trip Distribution (Trucks)

Based on the sources of various construction materials, the regional distribution of traffic was determined. **Table 7-4** demonstrates the basis for the distribution percentages that are assumed in this analysis. The trip distribution was determined using Phase I traffic since Phase II is expected to have the same mix of construction traffic, but with lower volumes and / or for a shorter duration, since fewer turbines will be installed in Phase II than in Phase I.

The source for road gravel is in Ocotillo, north of I-8 and hence, the traffic generated by this activity is not expected to utilize the study area roadway segments and intersections. The gravel quarry in Ocotillo is located just south of the project Site 1, north of I-8. The traffic generated by the gravel quarry is 20% and therefore localized. Most of the remaining construction materials and equipment (50%) are expected to be from sources north or east of the project site. The route to points north is east on I-8 and north on SR 111. Therefore all traffic to and from points north is also oriented to the east on I-8 at the project site. No truck traffic is anticipated to the south, except to Site 2, at the SR 98 (Yuha Cutoff) / Imperial Highway intersection. The remaining 30% is oriented to the west on I-8.

7.2.2 Construction Trip Distribution (Management / Construction Employees)

As seen in **Table 7-4**, it is assumed that 80% of the employees (management and construction) are from El Centro (East) and the remaining 20% are from San Diego (west).

7.3 Project Trip Assignment

16 turbines are to be built in Site #2, the site south of I-8 (see **Figure 2-1**). Therefore, it is assumed that 16/158 or approximately 10% of the project related construction traffic is destined to Site #2. Daily and peak hour project traffic generation for the construction-related truck (with PCE) and employee vehicle traffic shown in **Tables 7-2** and **7-3** were distributed and assigned separately to the local street system based on their respective distribution percentages shown on **Figures 7-1** and **7-2**.

TABLE 7-4
CONSTRUCTION TRAFFIC DISTRIBUTION ESTIMATE

Description	From	Quantity	Employees ^a				Trucks ^a				
			West	East	North	South	West	East	North	South	
Management											
Employees	From El Centro (E) & San Diego (W)	26 Employees	5	21	0	0	0	0	0	0	0
Roads/Foundation Construction											
Employees	From El Centro (E) & San Diego (W)	120 Employees	24	96	0	0	0	0	0	0	0
Water for Road Maintenance	From Pine Valley (WNW)	8 HHDT ^b	0	0	0	0	8	0	0	0	0
Water for Concrete Foundation	From Pine Valley (WNW)	2 HHDT	0	0	0	0	8	0	0	0	0
Gravel for Roads	From Ocotillo	17 HHDT	0	0	0	0	0	0	0	0	17
Concrete Foundation Aggregate	From near Thermal, California	13 HHDT	0	0	0	0	0	13	0	0	0
Concrete Foundation Sand	From Ocotillo	7 HHDT	0	0	0	0	0	7	0	0	0
Concrete Foundation Cement	From Victorville (NNW)	4 HHDT	0	0	0	0	6	0	0	0	0
Electrical											
Employees	From El Centro (E) & San Diego (W)	36 Employees	7	29	0	0	0	0	0	0	0
Water for Road Maintenance	From Pine Valley (WNW)	8 HHDT	0	0	0	0	4	4	0	0	0
Erection											
Employees	From El Centro (E) & San Diego (W)	78 Employees	16	62	0	0	0	0	0	0	0
WTG Delivery	From Texas (E)	18 HHDT	0	0	0	0	0	18	0	0	0
Total Project			52	208	0	0	26	42	0	17	
<i>Calculated Percentages</i>			<i>20%</i>	<i>80%</i>			<i>31%</i>	<i>49%</i>	<i>0%</i>	<i>20%</i>	
Distribution Percentages Adopted for Analysis			20%	80%			30%	50%	0%	20%	

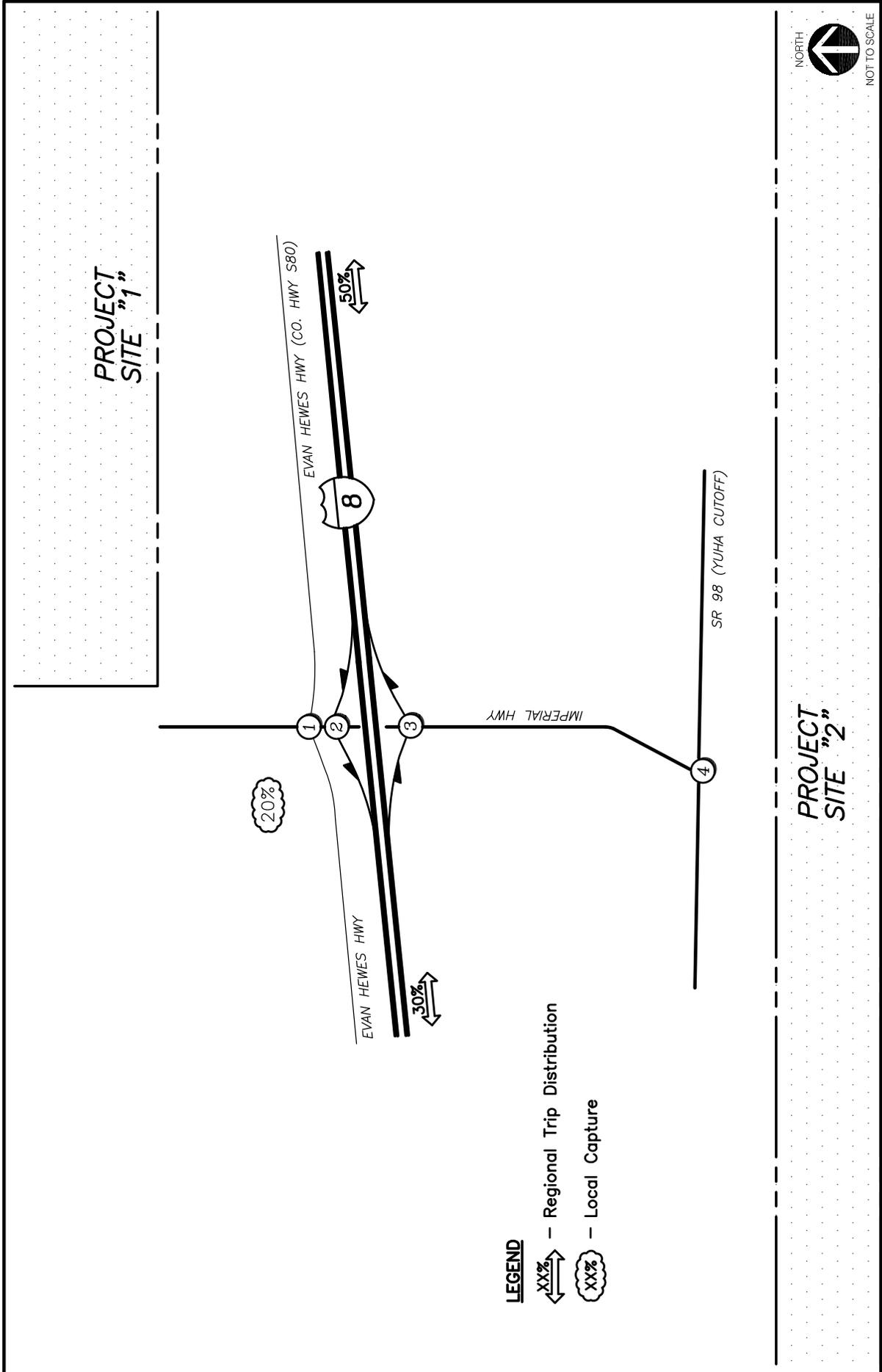
Footnotes:

- a. Information obtained from Aspen Engineering, February 2011.
- b. HHDT - Heavy-Heavy-Duty Diesel Trucks (33,001 to 60,000 pounds)

7.4 Baseline Traffic

As explained in the project description, construction of each of the two phases of the wind generation facility is anticipated to be completed over a period of 12 to 15 months. Phase I is expected to commence in the 3rd quarter of 2011 with completion in the 4th quarter of 2012. Phase II is anticipated to follow in 2013. To account for potential cumulative project traffic increases that may occur between 2010 (existing) and the project completion, a 5% growth factor was applied to all existing 2010 traffic volumes throughout the study area. The Project traffic was added to the baseline traffic to obtain the Baseline with construction traffic volumes.

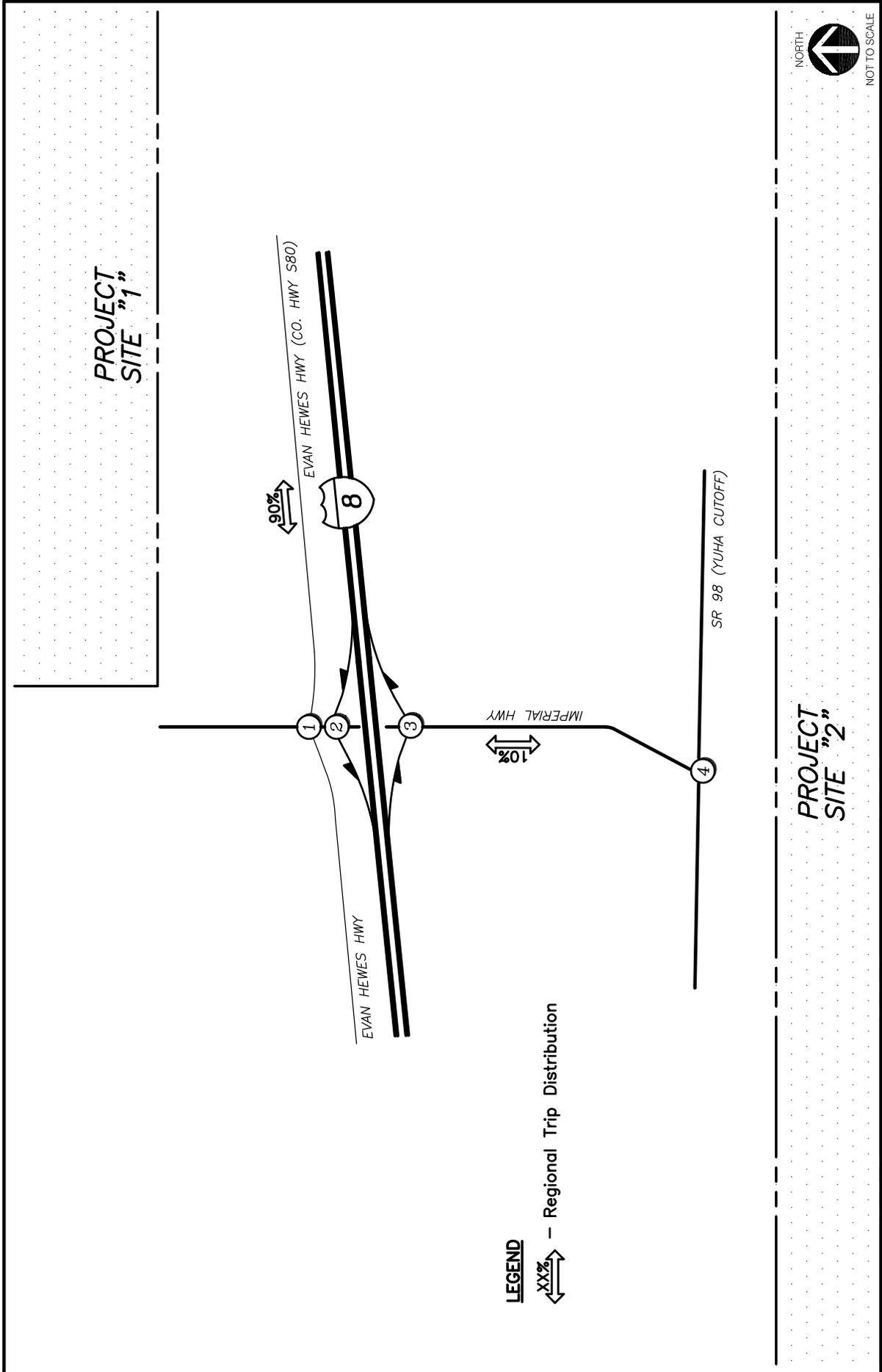
The assignment of Construction Truck traffic is shown on *Figure 7-3*. *Figure 7-4* depicts the Employee vehicle traffic assignment. *Figure 7-5* depicts the total Construction (Employees + Truck) traffic assignment. *Figure 7-6* depicts the Baseline traffic volumes, and *Figure 7-7* depicts the Baseline + Construction traffic volumes.



REV. 12/1/2011
N:/1936/Figures/LLG1956 FIG 7-1

Figure 7-1

Truck Traffic Distribution



LEGEND



— Regional Trip Distribution

REV. 12/1/2011
N:/1936/Figures/LLG1956 FIG 7-2

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Figure 7-2

Employee Traffic Distribution

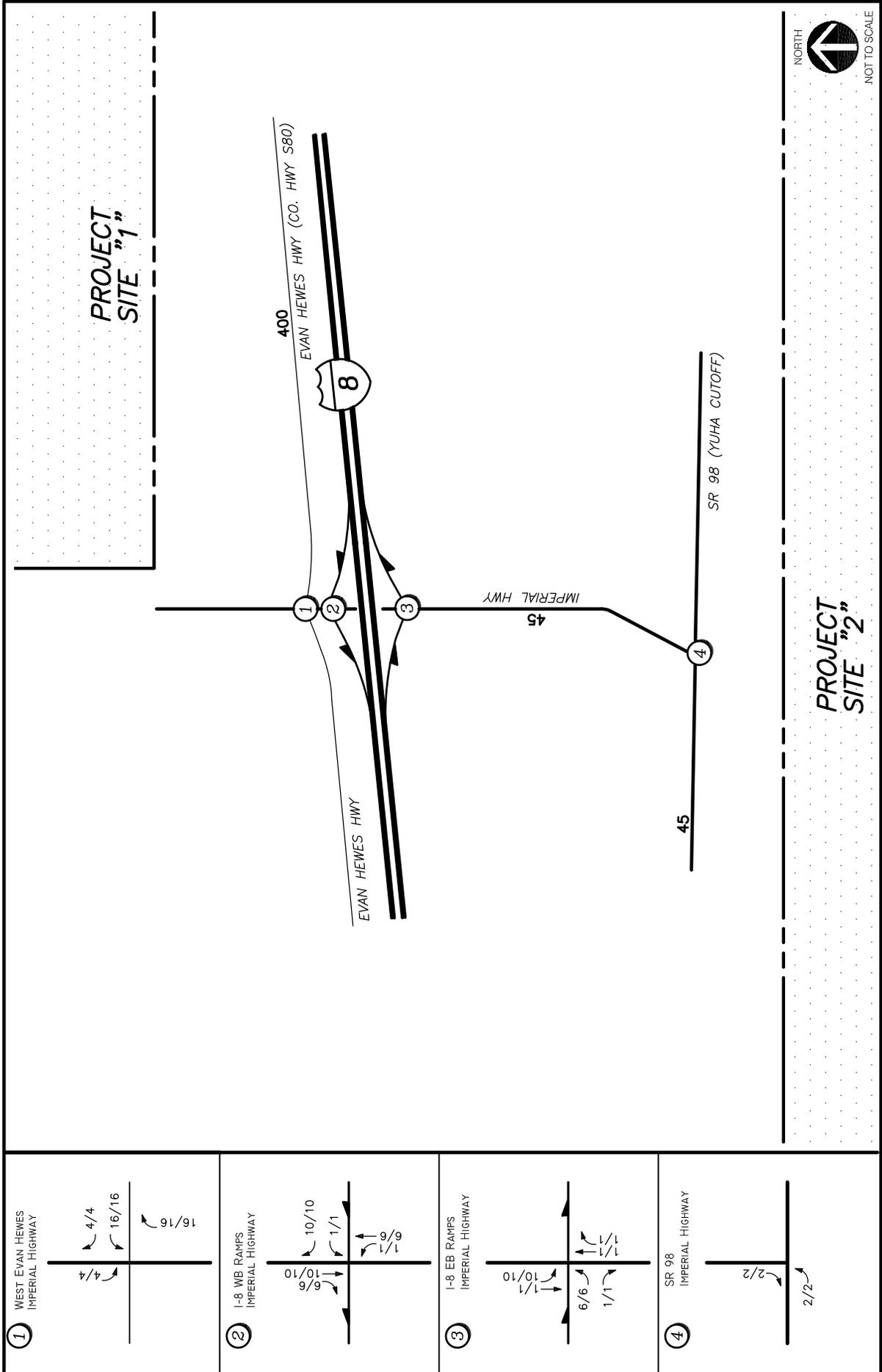
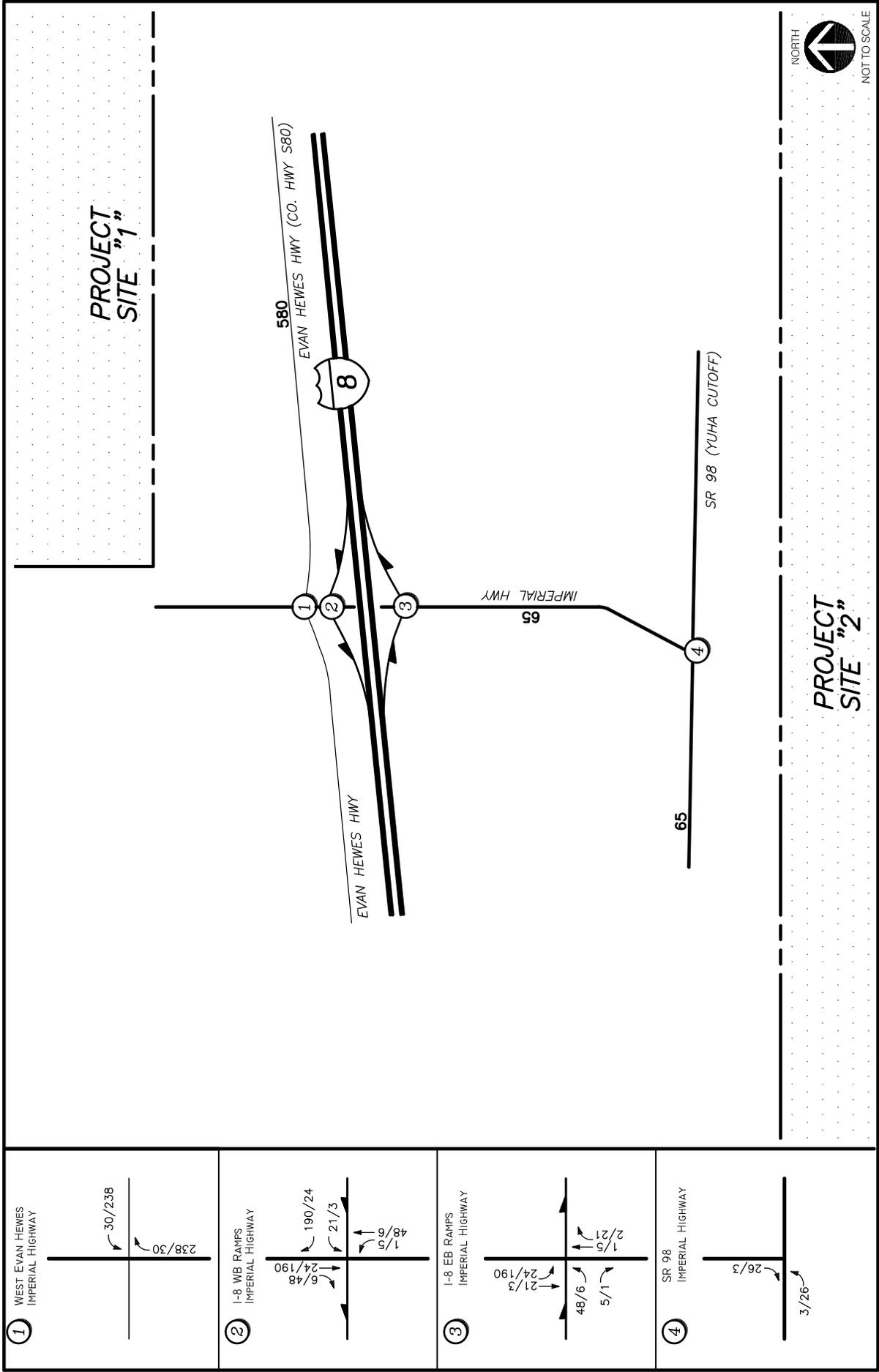


Figure 7-3
Construction Truck Project Traffic Volumes
AM/PM Peak Hours & ADT

REV. 12/1/2011
 N:/1956/Figures/LL1956 FIG 7-3

NOTES:

- ADT (Average Daily Traffic) shown midblock
- AM/PM peak hour volumes are shown at the intersections

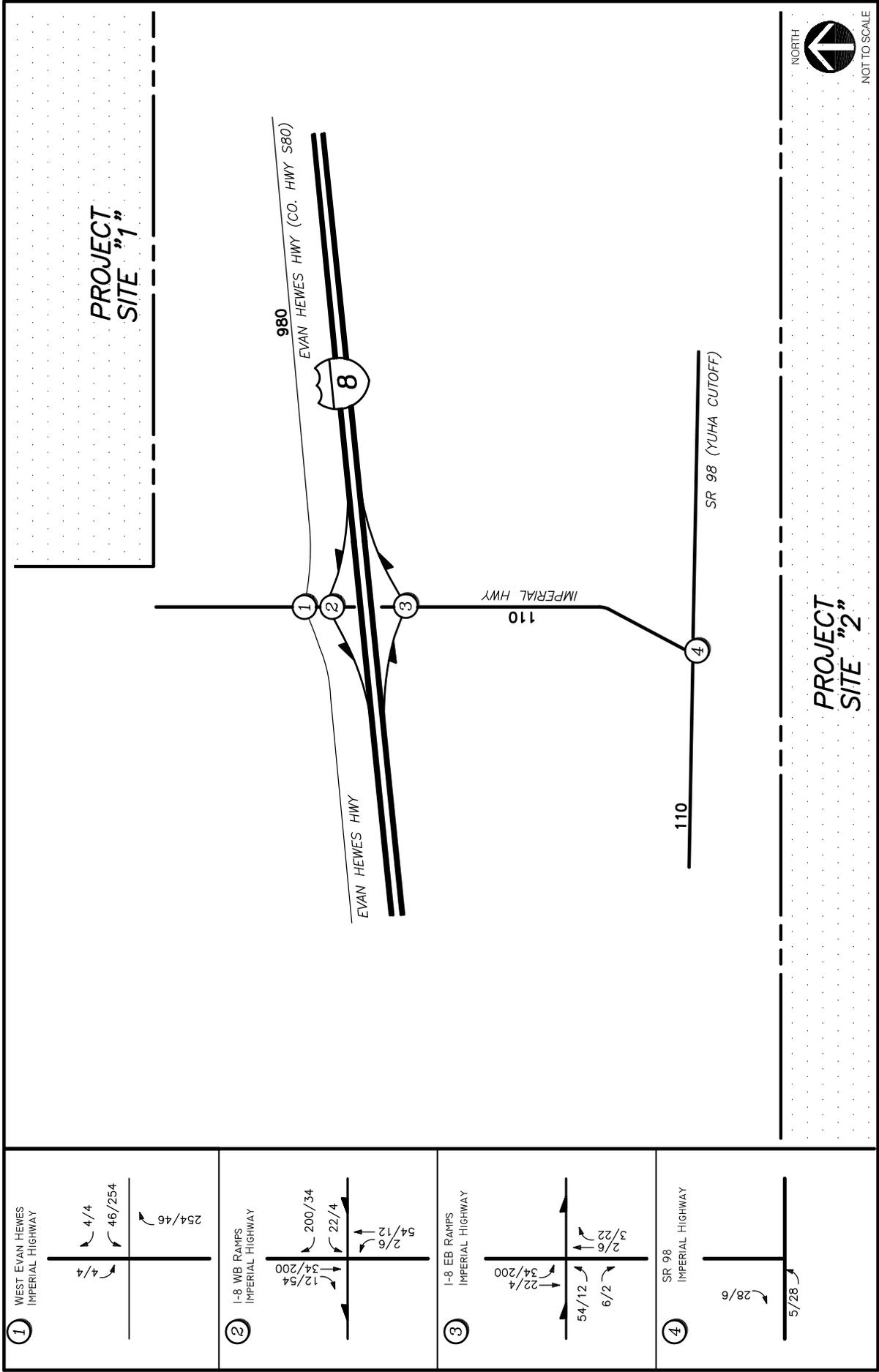


REV. 12/1/2011
N:/1956/Figures/LLG1956 FIG 7-4

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- NOTES:
- ADT (Average Daily Traffic) shown midblock
 - AM/PM peak hour volumes are shown at the intersections

Figure 7-4
Construction Employee Project Traffic Volumes
AM/PM Peak Hours & ADT
OCOTILLO WIND ENERGY FACILITY

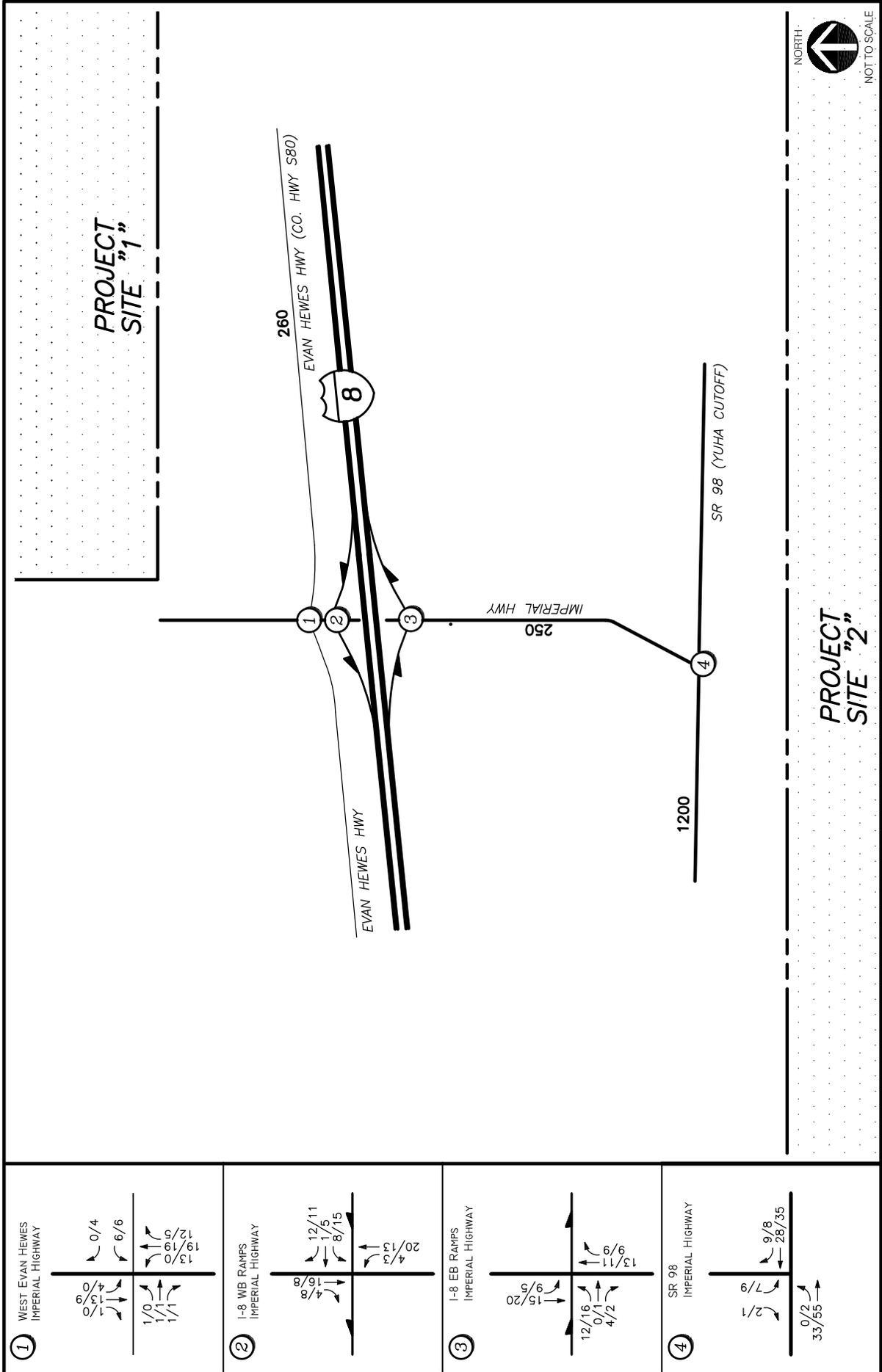


REV. 12/1/2011
 N:/1956/Figures/LLG1956 FIG 7-5

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- NOTES:
- ADT (Average Daily Traffic) shown midblock
 - AM/PM peak hour volumes are shown at the intersections

Figure 7-5
Total Construction Project Traffic Volumes
AM/PM Peak Hours & ADT
 OCOTILLO WIND ENERGY FACILITY



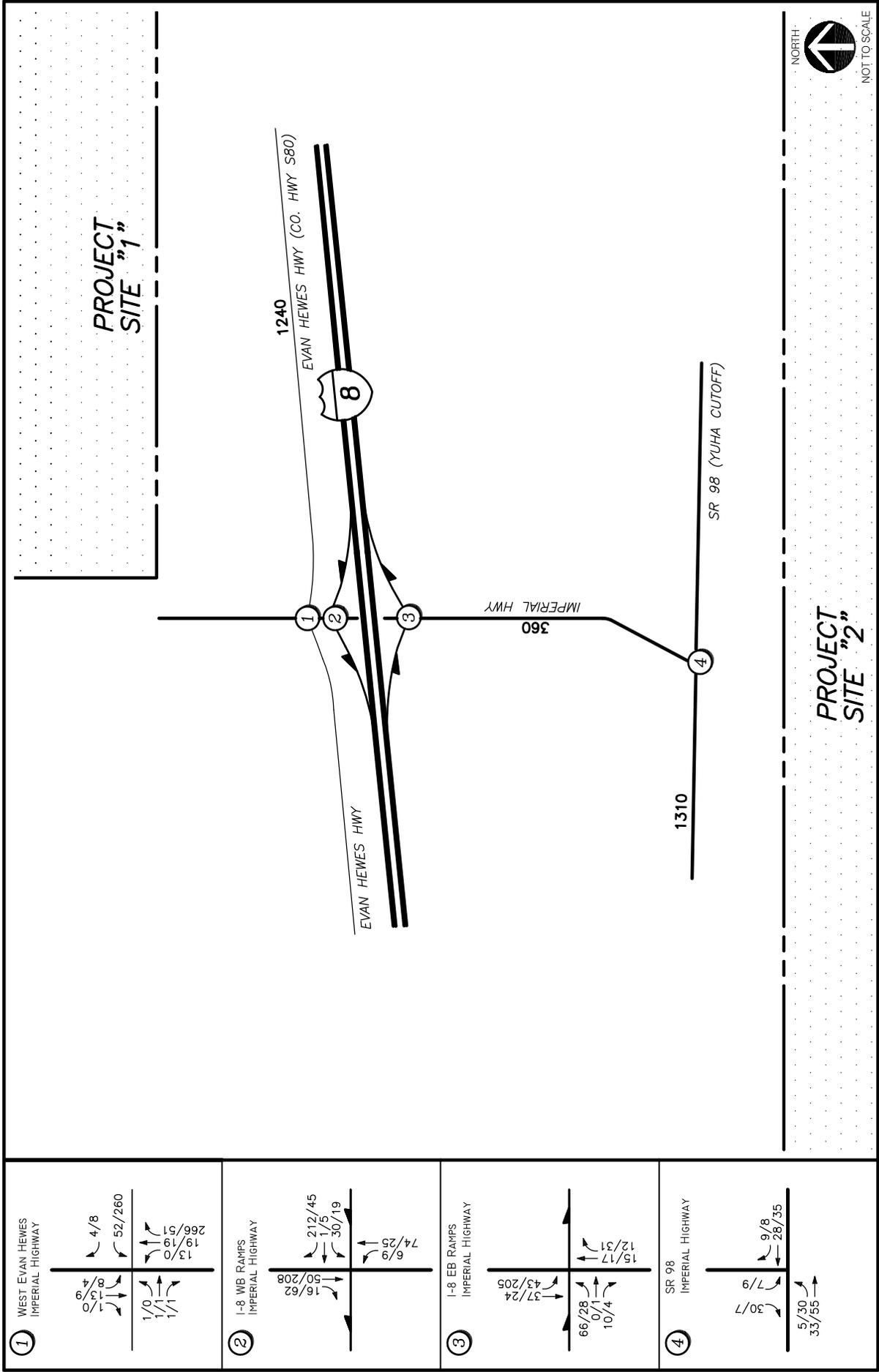


Figure 7-7
Baseline + Construction Project Traffic Volumes
AM/PM Peak Hours & ADT

8.0 CUMULATIVE PROJECTS

8.1 Cumulative Projects Study Area

Several cumulative projects in the region were reviewed in consultation with County of Imperial Staff. Most of these projects are located over a large area including Imperial, San Diego, Riverside and San Bernardino Counties. However, this traffic study includes only the projects that contribute traffic to the project study area. The Coyote Wells Specific Plan project is expected to add traffic to the project study area intersections in the construction timeframe of the project (Year 2012). The remaining cumulative projects that have been identified are not expected to add traffic to the project study area intersections or segments. Therefore, traffic from only the following project is considered cumulative traffic.

8.2 The Coyote Wells Specific Plan

The proposed Coyote Wells Specific Plan (project), a mixed-use, three-phase development on approximately 944 acres in western Imperial County would consist of twenty-two (22) parcels and ten (10) land use designations. The project is located within the Ocotillo/Nomirage Community Area Plan in an unincorporated area of Imperial County. It would be comprised of two main components, the open space/recreational area and the open space/preservation area. Within these major areas are other land uses including open space, recreation, education and training, tourism, residential, storage, hotel/resort, and infrastructure land uses.

This project is estimated to ultimately generate a total of 4,591 Average Daily Traffic (ADT). However, the project is not expected to be completed within the next couple of years, which is the timeframe for the construction phase of the Ocotillo Wind Energy. Therefore, only traffic generated by Phase I of this project is included in the analysis. With the implementation of Phase I, the Coyote Wells Specific Plan is estimated to generate a total of 538 Average Daily Traffic (ADT) with 134 trips during the AM peak hour (102 inbound and 32 outbound) and 134 trips during the PM peak hour (32 inbound and 102 outbound trips).

Figure 8-1 and *8-2* depict the locations of all identified Cumulative projects in San Diego and Imperial Counties. *Figure 8-3* depicts the Cumulative project traffic volumes, and *Figure 8-4* depicts the Baseline + Construction + Cumulative project traffic volumes.

The list of cumulative projects that were reviewed is included in *Appendix D*.

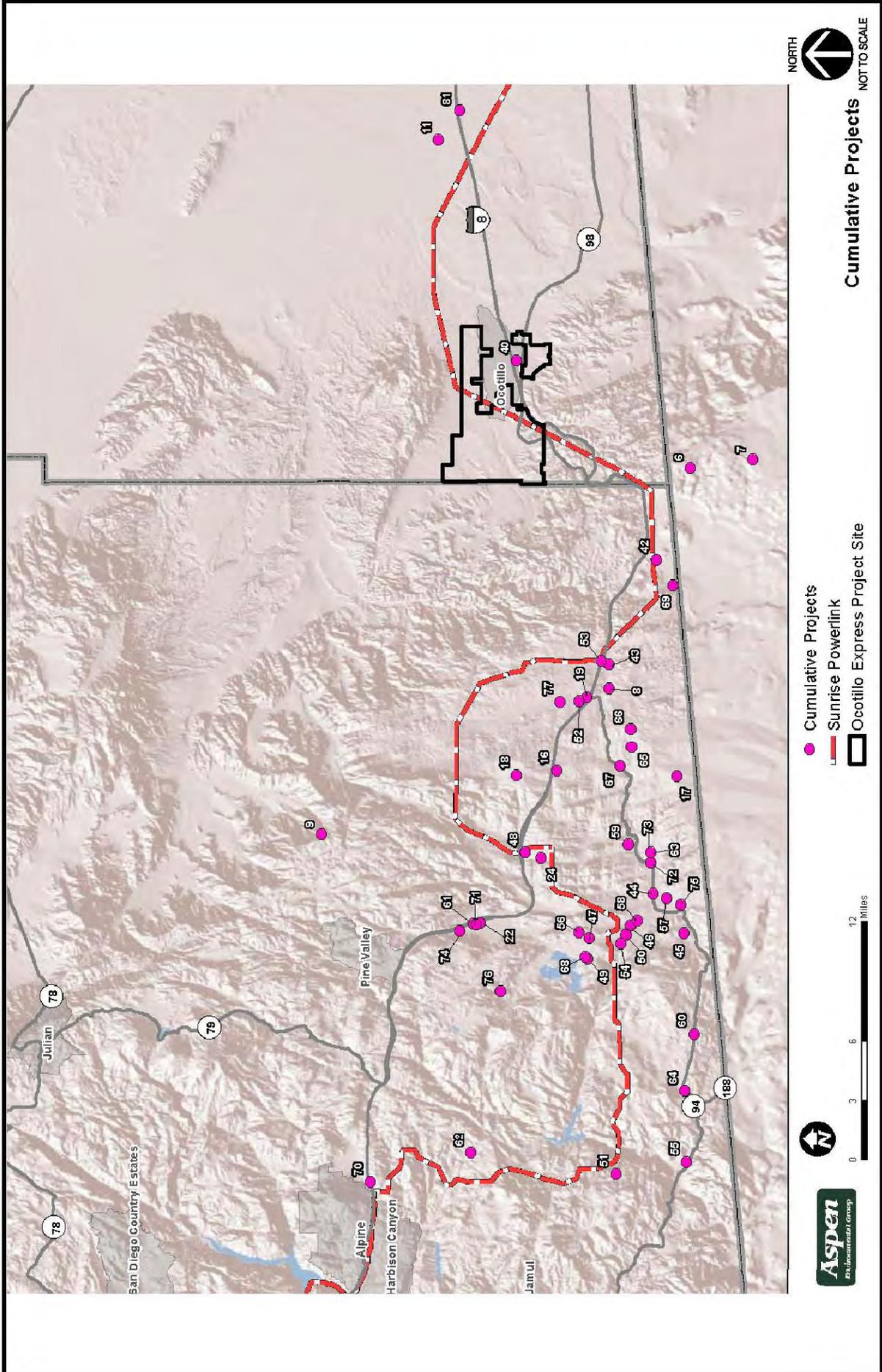


Figure 8-1
Cumulative Project Locations - San Diego County

REV. 5/24/2011
 N:\1956\Figures\LLG1956 FIG 8-1.dwg

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0 3 6 12
 Miles



Cumulative Projects
 NOT TO SCALE

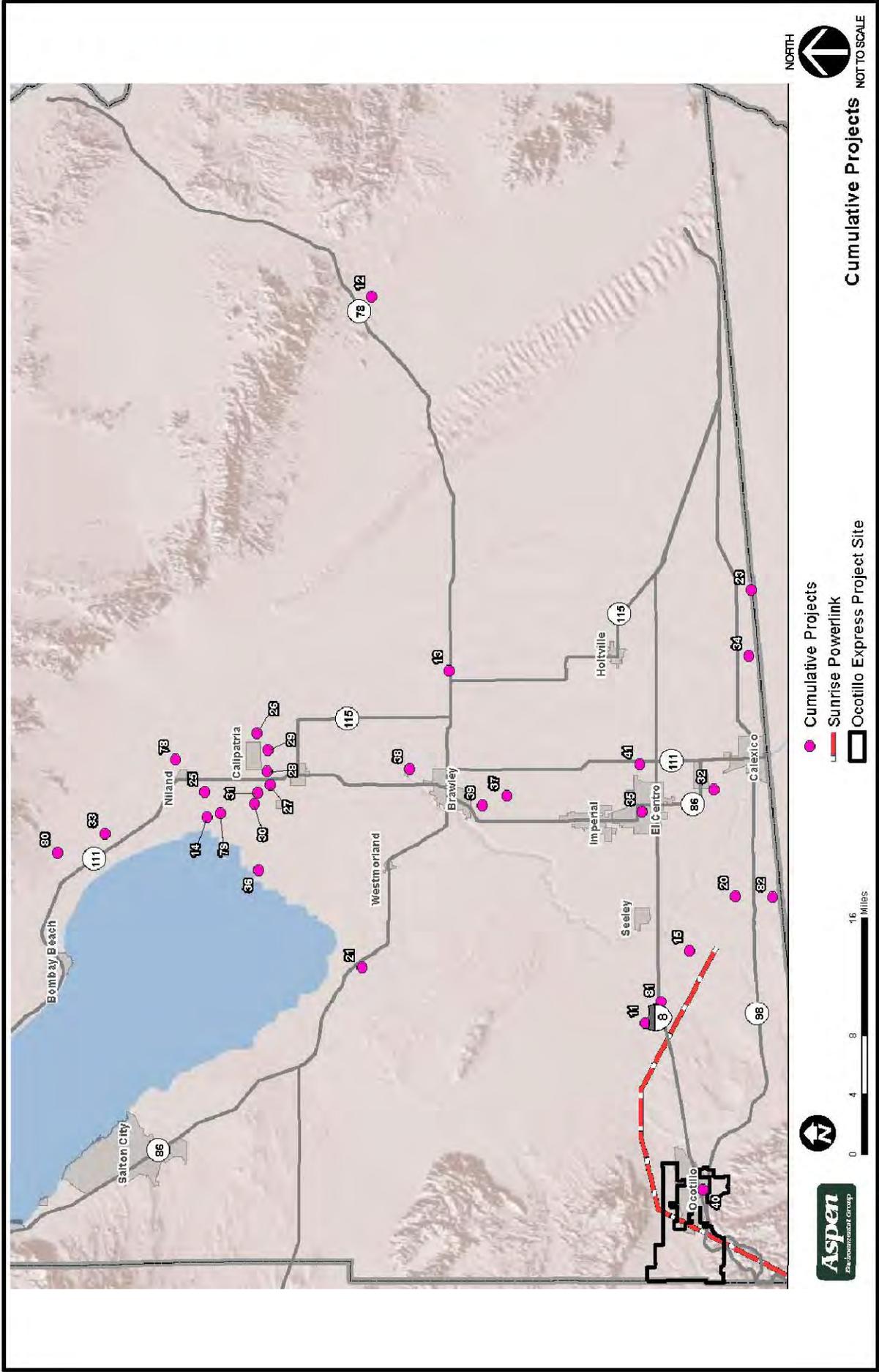
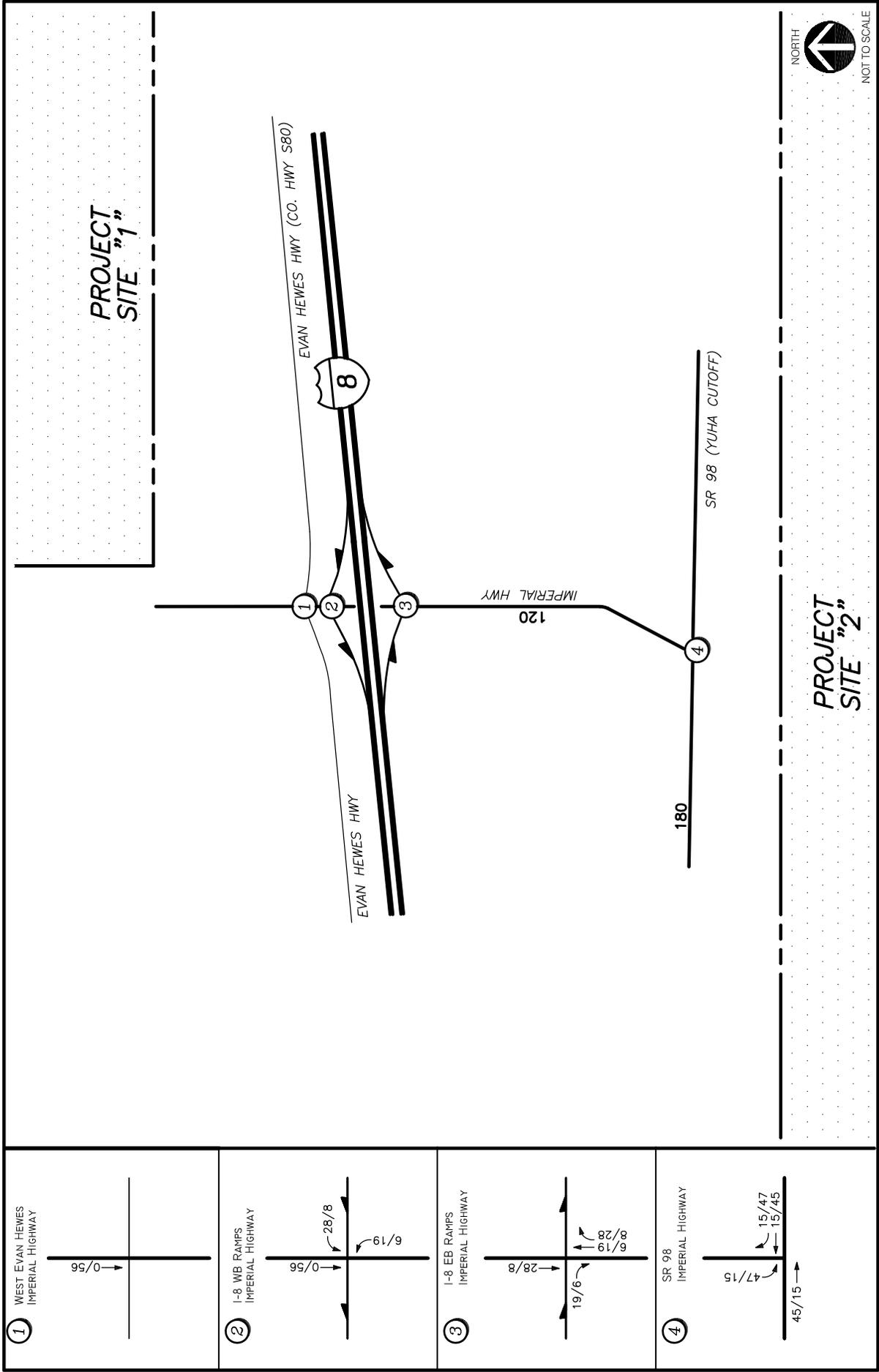


Figure 8-2
Cumulative Project Locations - Imperial County

REV. 5/24/2011
N:\1956\Figures\LLG1956 FIG. 8-2.dwg



REV: 5/24/2011
 N:\1956\Figures\LLG1956 FIG 8-3.dwg

Figure 8-3
Cumulative Project Traffic Volumes
AM/PM Peak Hours & ADT

- NOTES:
- ADT (Average Daily Traffic) shown midblock
 - AM/PM peak hour volumes are shown at the intersections

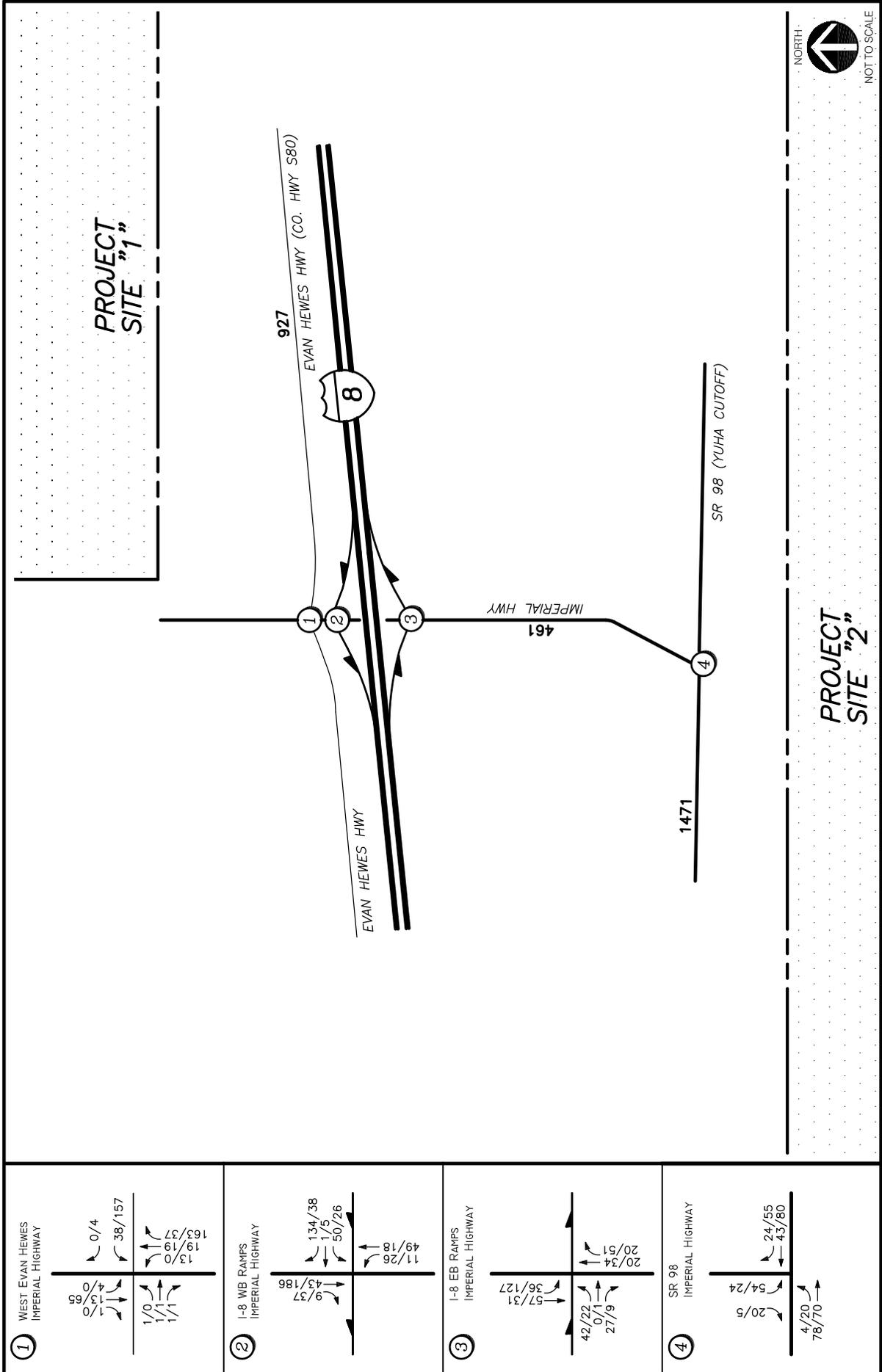


Figure 8-4
Baseline + Construction Project Traffic +
Cumulative Project Traffic Volumes
AM/PM Peak Hours & ADT
 OCOTILLO WIND ENERGY FACILITY

9.0 ANALYSIS OF CONSTRUCTION YEAR CONDITIONS

Project Phase 1 construction is assumed to commence in the Year 2012. To account for potential cumulative project traffic increases that may occur between 2010 (existing) and that time, a 5% growth factor was applied to all existing 2010 traffic volumes throughout the study area.

9.1 Baseline Without Construction Traffic Analysis

9.1.1 Intersection Operations

Table 9–1 summarizes the intersection operations throughout the project study area given the *Baseline without Construction* traffic volumes. This table shows that all of the unsignalized intersections in the study area are forecasted to operate at an acceptable LOS B or better during the AM and PM peak hours with the 5% adjustment to 2012 volumes included.

Appendix E contains the *Baseline without Construction projects* peak hour intersection analysis worksheets.

9.1.2 Segment Analysis

Table 9–2 summarizes the street segment operations throughout the project study area given the projected *Baseline without Construction* traffic volumes. This table shows all segments to continue to operate at LOS A on a daily basis.

9.2 Baseline With Construction Traffic Analysis

9.2.1 Intersection Operations

Table 9–1 summarizes the intersection operations throughout the project study area given the *Baseline with Construction* traffic volumes. This table shows that all of the unsignalized intersections in the study area are forecasted to operate at an acceptable LOS B or better during the AM and PM peak hours. Hence this project contribution is considered *not significant*.

Appendix F contains the *Baseline with Construction projects* peak hour intersection analysis worksheets.

9.2.2 Segment Analysis

Table 9–2 summarizes the street segment operations throughout the project study area given the projected *Baseline with Construction* traffic volumes. This table shows all segments to continue to operate at LOS A on a daily basis. Hence this project contribution is considered *not significant*.

**TABLE 9-1
NEAR-TERM INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Baseline Without (Construction) Project Traffic		Baseline + Project Traffic			Baseline + Construction Traffic + Cumulative Projects Traffic		
			Delay ^a	LOS ^b	Delay	LOS	Δ ^c Delay	Delay	LOS	Δ ^c Delay
1. West Evan Hewes Highway / Imperial Highway	MSSC ^d	AM	9.8	A	10.4	B	0.6	10.4	B	0.0
		PM	9.8	A	10.7	B	0.9	11.5	B	0.8
2. I-8 WB Ramps / Imperial Highway	MSSC	AM	9.2	A	9.8	A	0.6	9.8	A	0.0
		PM	9.1	A	9.4	A	0.3	10.1	A	0.7
3. I-8 EB Ramps / Imperial Highway	MSSC	AM	9.4	A	9.8	A	0.4	9.9	A	0.1
		PM	11.1	B	13.5	B	2.4	13.8	B	0.3
4. SR 98 (Yuha Cutoff) / Imperial Highway	MSSC	AM	8.8	A	8.8	A	0.0	9.5	A	0.7
		PM	9.0	A	9.1	A	0.1	10.0	A	0.9

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. Δ denotes an increase in delay due to Project / Cumulative projects
- d. MSSC – Minor Street Stop Controlled intersection. Minor street left turn delay is reported.

UNSIGNALIZED	
Delay	LOS
0.0 < 10.0	A
10.1 to 15.0	B
15.1 to 25.0	C
25.1 to 35.0	D
35.1 to 50.0	E
> 50.1	F

TABLE 9-2
CONSTRUCTION YEAR STREET SEGMENT OPERATIONS

Street Segment	Roadway Classification ^a	Existing Capacity (LOS E) ^b	Baseline Without (Construction) Project Traffic			Baseline + (Construction) Project Traffic				Baseline + (Construction) Project Traffic + Cumulative Projects Traffic			
			ADT ^c	V/C ^d	LOS ^e	ADT	V/C	LOS	Δ ^f	ADT	V/C	LOS	Δ ^f
W. Evan Hewes Highway East of Imperial Highway	2-Lane Collector	16,200	260	0.016	A	1,240	0.077	A	0.061	1,240	0.077	A	0.000
Imperial Highway I-8 EB Ramps to SR-98 Yuha Cutoff	2-Lane Collector	16,200	250	0.015	A	360	0.022	A	0.007	480	0.030	A	0.008
SR-98 Yuha Cutoff West of Imperial Highway	2-Lane Collector	16,200	1,200	0.074	A	1,310	0.081	A	0.007	1,490	0.092	A	0.011

Footnotes:

- a. County of Imperial Valley roadway classification
- b. Roadway capacity corresponding to Level of Service E from Imperial County Standard Street Classification, Average Daily Vehicle Trips table.
- c. Average Daily Traffic volumes
- d. Volume / Capacity ratio.
- e. Level of Service
- f. Increase in V/C ratio due to project traffic

9.3 Baseline With Construction and Cumulative Projects Analysis

9.3.1 Intersection Analysis

Table 9–1 summarizes the intersection operations throughout the project study area given the *Baseline with Construction* traffic volumes. This table shows that all of the unsignalized intersections in the study area are calculated to operate at an acceptable LOS B or better during the AM and PM peak hours. Hence this contribution is considered *not significant*.

Appendix G contains the *Baseline with Construction and Cumulative projects* peak hour intersection analysis worksheets.

9.3.2 Segment Analysis

Table 9–2 summarizes the street segment operations throughout the project study area given the projected *Baseline with Construction* traffic volumes. This table shows all segments to continue to operate at LOS A on a daily basis. This contribution is considered *not significant*.

10.0 PROJECT ALTERNATIVES 2 AND 3

Three alternatives are proposed for the project, each of them with fewer turbines than the Proposed project. The Proposed project consists of 158 wind turbine generators (WTG). Alternative 2 consists of the installation of 137 WTG, while 105 WTG are proposed to be installed in Alternative 3.

As seen in Section 2.0 Project Description, Alternatives 2 and 3 will utilize the same materials and equipment as the Proposed project but will be constructed a single Phase lasting 12 to 15 months. Therefore, the intensity of traffic per day will likely be the same as in the Proposed project. In the Proposed Alternative 3, no turbines will be built in Site 2 and hence, there will be no construction related traffic at the following facilities:

- SR 98 / Imperial Highway intersection
- Segment of Imperial Highway between I-8 EB ramps and SR 98
- Segment of SR 98 west of Imperial Highway

As concluded in Section 9.0, Construction Year Analysis of the proposed project, no impacts were determined. Therefore, it may be concluded that no impacts will occur during the construction of Alternatives 2 or 3, which are all forecasted to generate equal or lesser traffic for a shorter duration than the proposed project.

11.0 POST-CONSTRUCTION OPERATIONS

The project is estimated to generate 77 ADT during full operations, approximately 7% of the 1,091 ADT generated by the construction traffic. As seen in Section 9.0, during construction, the project is determined to have no significant impacts at any of the study area intersections or segments. It is therefore concluded that no significant impacts will occur due to the traffic generated by the traffic during the operations and maintenance phase of the project.

12.0 PROJECT DECOMMISSIONING

At the end of the life of the project, the wind turbines will be dismantled and removed from the site and the site will be returned to its original condition. Assuming the traffic generated during the Decommissioning is the same as that during construction, the traffic generated during the decommissioning is 1,091 ADT. As seen in Section 9.0, during construction, the project is determined to have no significant impacts at any of the study area intersections or segments. It is therefore concluded that no significant impacts will occur due to the traffic generated by the traffic during the decommissioning phase of the project.

13.0 PROJECT ACCESS

13.1 Regional Access

Regional east / west access to the project Site 1 (north of I-8) and Site 2 (south of I-8) is via I-8 and access to the north is via I-8 / SR 111. Access to the south is via Imperial Highway and SR 98 (Yuha Cutoff).

13.2 Local Access

Local access for Site 1 is from the I-8 / Imperial Highway interchange, via Imperial Highway and Evan Hewes Highway. Local access for Site 2 is from the I-8 / Imperial Highway interchange, via SR 98 and Imperial Highway. All surface streets in the study area are undivided two-lane roadways, generally with dirt shoulders. The section of Imperial Highway between the eastbound ramps and Evan Hewes Highway has paved shoulders. Curb, gutter and sidewalks are not provided. Project sites 1 and 2 are served by an adequate network of roadways in this sparsely travelled area.

13.3 Site Access

Several site access driveways are proposed. Approximately 5 access driveways are located along Imperial Highway (County Highway S2), a paved two-lane road with dirt shoulders. Another 6 access driveways are proposed on other paved two-lane public roadways. The project should ensure adequate sight distance at these access driveways for trucks to exit the project site without obstructing traffic on public streets.

14.0 SIGNIFICANCE OF IMPACTS AND MITIGATION MEASURES

The capacity analyses performed for the key roadway segments and unsignalized intersections indicate that no significant impacts would occur during the construction phase of the proposed project, which is shown to generate more traffic than the preceding decommissioning and subsequent maintenance and operations phases. No significant impacts would be associated with the decommissioning and O&M phases, either. Therefore, no mitigation measures are required. However, adequate sight distance should be ensured at all project access driveways on public streets to ensure efficient operations on the public roads.

TECHNICAL APPENDICES
OCOTILLO WIND ENERGY FACILITY
County of Imperial, California
February 7, 2012

LLG Ref. 3-10-1956

**Linscott, Law &
Greenspan, Engineers**

4542 Ruffner Street
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San Diego, CA 92111

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APPENDIX A

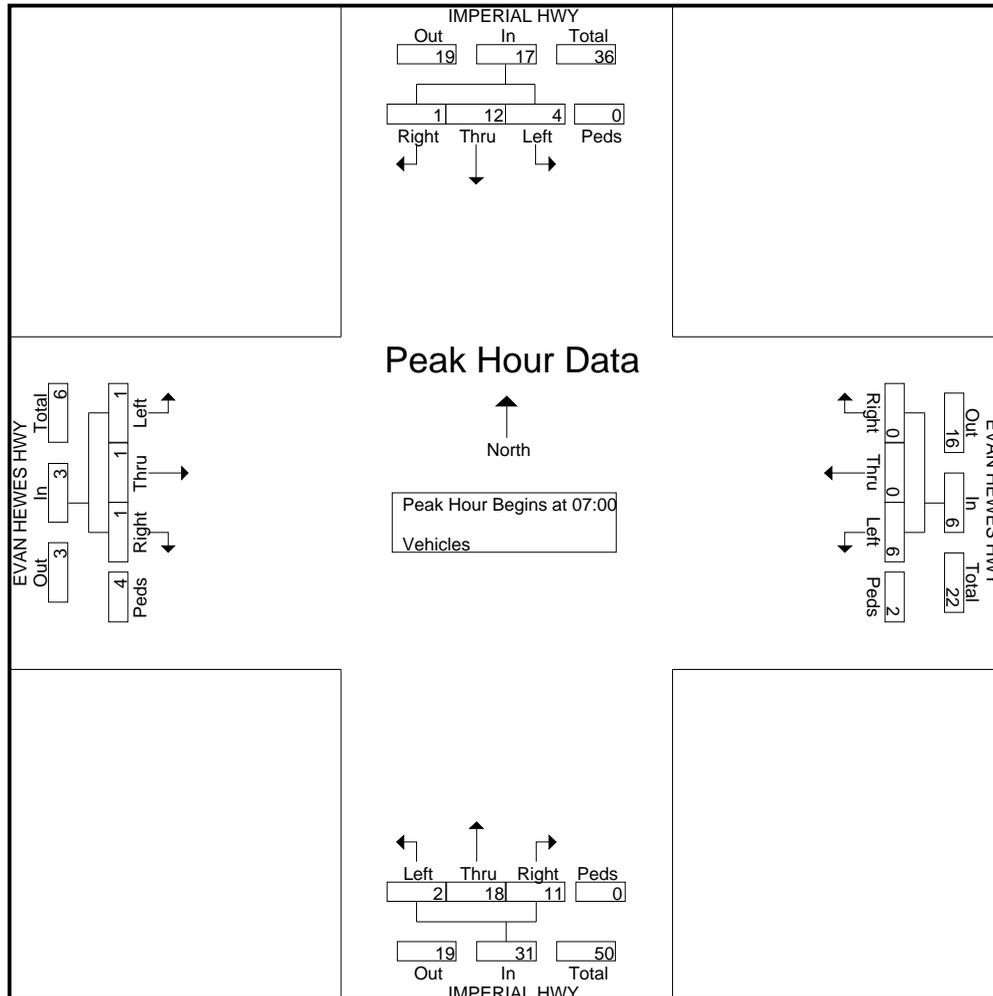
INTERSECTION AND SEGMENT MANUAL COUNT SHEETS AND VOLUMES ON I-8

True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 1099.01.IMPERIAL HWY.EVAN HEWES HWY
 Site Code : 00000000
 Start Date : 12/7/2010
 Page No : 2

Start Time	IMPERIAL HWY Southbound					EVAN HEWES HWY Westbound					IMPERIAL HWY Northbound					EVAN HEWES HWY Eastbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 07:00																						
07:00	2	2	0	0	4	0	0	0	0	0	1	12	4	0	17	0	0	0	0	0	0	21
07:15	0	6	0	0	6	3	0	0	2	5	1	2	3	0	6	0	0	0	0	0	0	17
07:30	1	4	1	0	6	3	0	0	0	3	0	2	2	0	4	0	1	1	3	5	7	18
07:45	1	0	0	0	1	0	0	0	0	0	0	2	2	0	4	1	0	0	1	2	7	7
Total Volume	4	12	1	0	17	6	0	0	2	8	2	18	11	0	31	1	1	1	4	7	7	63
% App. Total	23.5	70.6	5.9	0		75	0	0	25		6.5	58.1	35.5	0		14.3	14.3	14.3	57.1			
PHF	.500	.500	.250	.000	.708	.500	.000	.000	.250	.400	.500	.375	.688	.000	.456	.250	.250	.250	.333	.350		.750

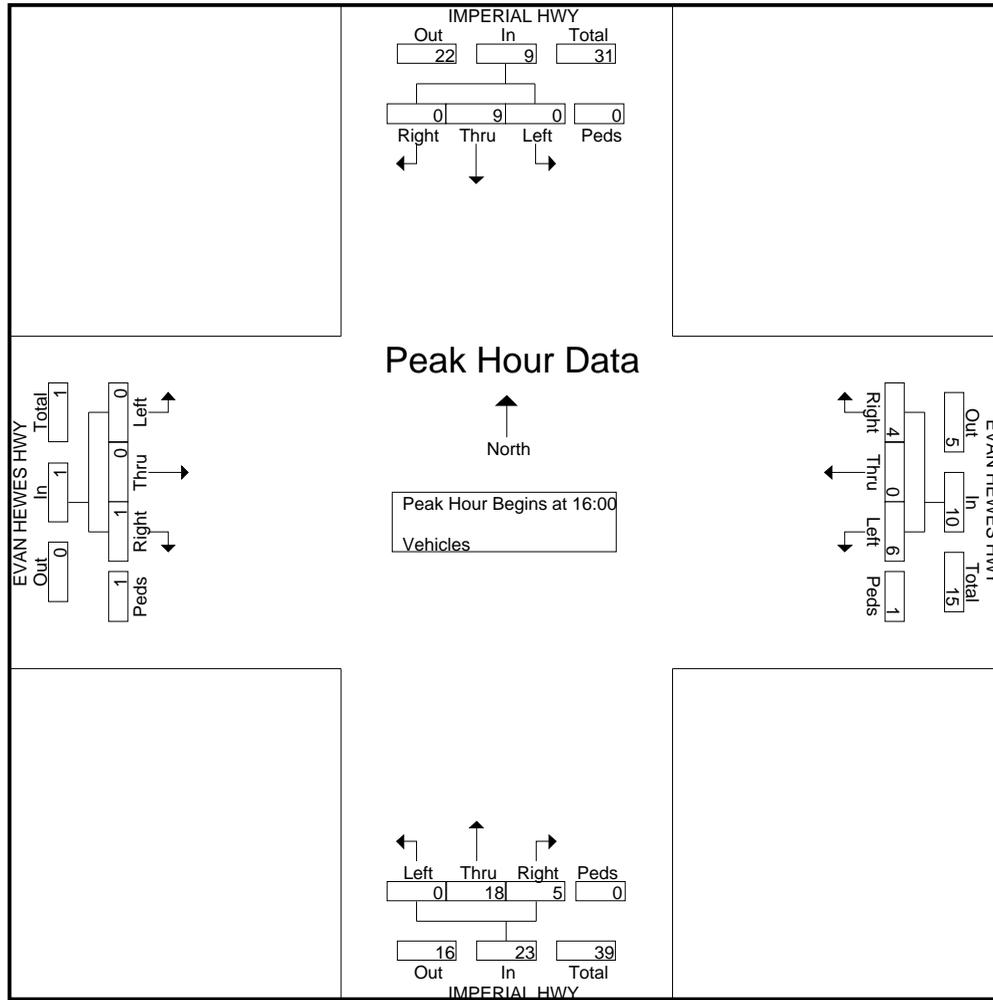


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 1099.01.IMPERIAL HWY.EVAN HEWES HWY
Site Code : 00000000
Start Date : 12/7/2010
Page No : 3

Start Time	IMPERIAL HWY Southbound					EVAN HEWES HWY Westbound					IMPERIAL HWY Northbound					EVAN HEWES HWY Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	0	1	0	0	1	3	0	0	0	3	0	3	2	0	5	0	0	0	1	1	10
16:15	0	4	0	0	4	1	0	2	0	3	0	4	1	0	5	0	0	1	0	1	13
16:30	0	2	0	0	2	1	0	1	0	2	0	8	0	0	8	0	0	0	0	0	12
16:45	0	2	0	0	2	1	0	1	1	3	0	3	2	0	5	0	0	0	0	0	10
Total Volume	0	9	0	0	9	6	0	4	1	11	0	18	5	0	23	0	0	1	1	2	45
% App. Total	0	100	0	0		54.5	0	36.4	9.1		0	78.3	21.7	0		0	0	50	50		
PHF	.000	.563	.000	.000	.563	.500	.000	.500	.250	.917	.000	.563	.625	.000	.719	.000	.000	.250	.250	.500	.865

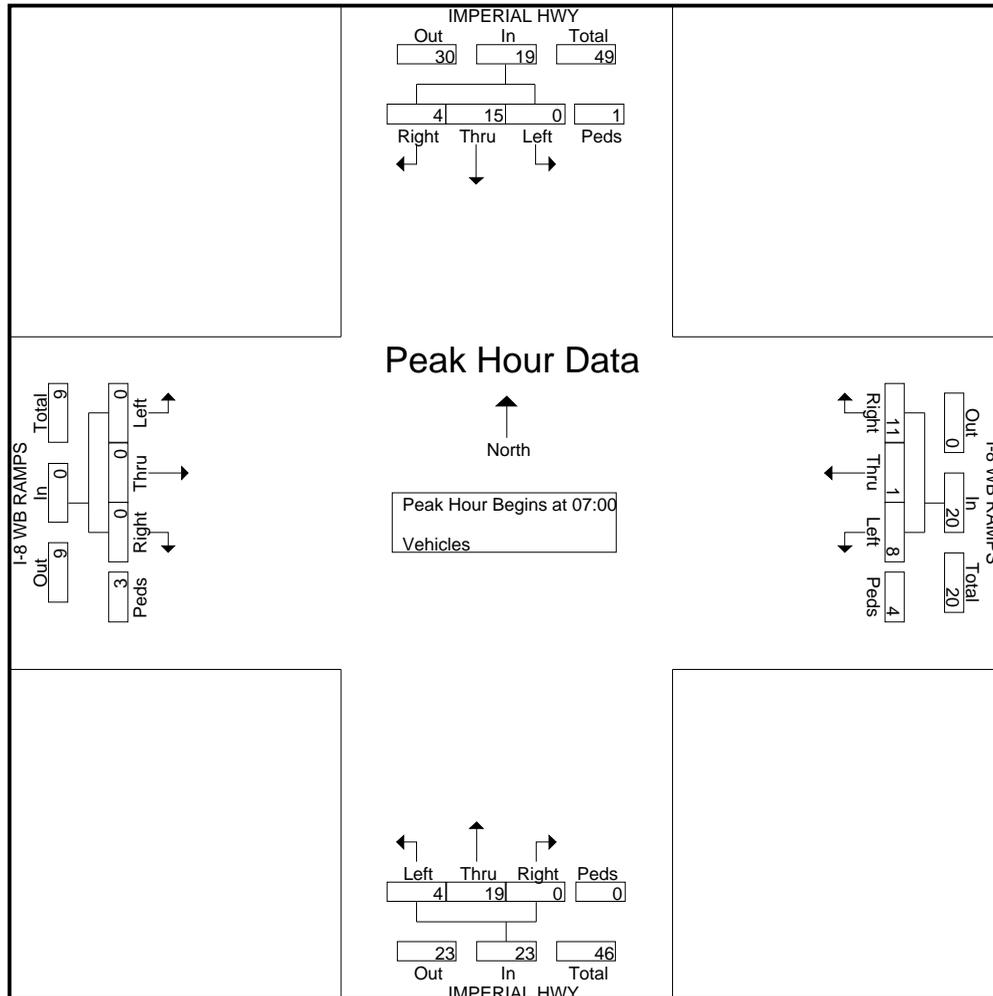


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 1099.02.IMPERIAL HWY.I-8 WB RAMPS
 Site Code : 00000000
 Start Date : 12/7/2010
 Page No : 2

Start Time	IMPERIAL HWY Southbound					I-8 WB RAMPS Westbound					IMPERIAL HWY Northbound					I-8 WB RAMPS Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	2	0	1	3	3	0	5	1	9	0	10	0	0	10	0	0	0	0	0	22
07:15	0	8	1	0	9	3	1	3	2	9	2	5	0	0	7	0	0	0	0	0	25
07:30	0	5	3	0	8	1	0	1	0	2	0	3	0	0	3	0	0	0	2	2	15
07:45	0	0	0	0	0	1	0	2	1	4	2	1	0	0	3	0	0	0	1	1	8
Total Volume	0	15	4	1	20	8	1	11	4	24	4	19	0	0	23	0	0	0	3	3	70
% App. Total	0	75	20	5		33.3	4.2	45.8	16.7		17.4	82.6	0	0		0	0	0	100		
PHF	.000	.469	.333	.250	.556	.667	.250	.550	.500	.667	.500	.475	.000	.000	.575	.000	.000	.000	.375	.375	.700

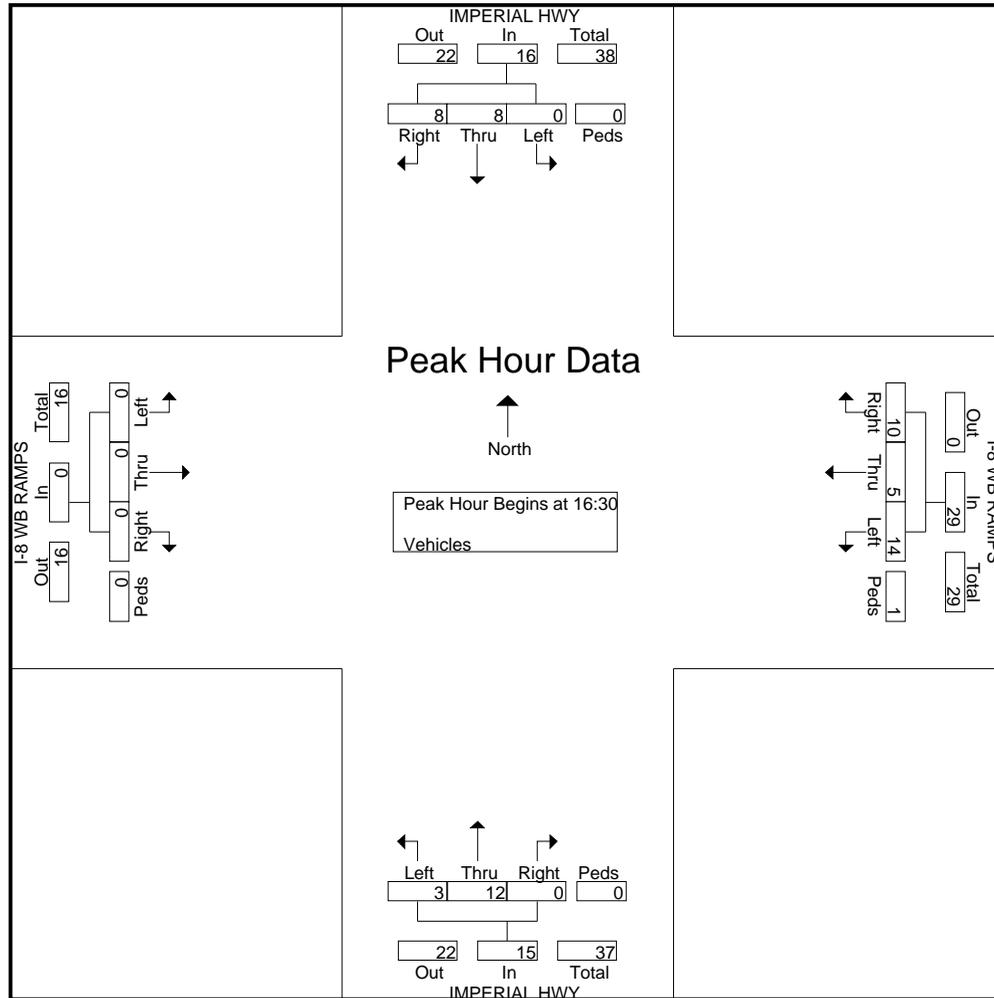


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 1099.02.IMPERIAL HWY.I-8 WB RAMPS
 Site Code : 00000000
 Start Date : 12/7/2010
 Page No : 3

Start Time	IMPERIAL HWY Southbound					I-8 WB RAMPS Westbound					IMPERIAL HWY Northbound					I-8 WB RAMPS Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	0	2	1	0	3	2	0	4	0	6	0	3	0	0	3	0	0	0	0	0	12
16:45	0	3	0	0	3	3	4	1	1	9	0	5	0	0	5	0	0	0	0	0	17
17:00	0	1	5	0	6	6	0	2	0	8	3	1	0	0	4	0	0	0	0	0	18
17:15	0	2	2	0	4	3	1	3	0	7	0	3	0	0	3	0	0	0	0	0	14
Total Volume	0	8	8	0	16	14	5	10	1	30	3	12	0	0	15	0	0	0	0	0	61
% App. Total	0	50	50	0		46.7	16.7	33.3	3.3		20	80	0	0		0	0	0	0		
PHF	.000	.667	.400	.000	.667	.583	.313	.625	.250	.833	.250	.600	.000	.000	.750	.000	.000	.000	.000	.000	.847

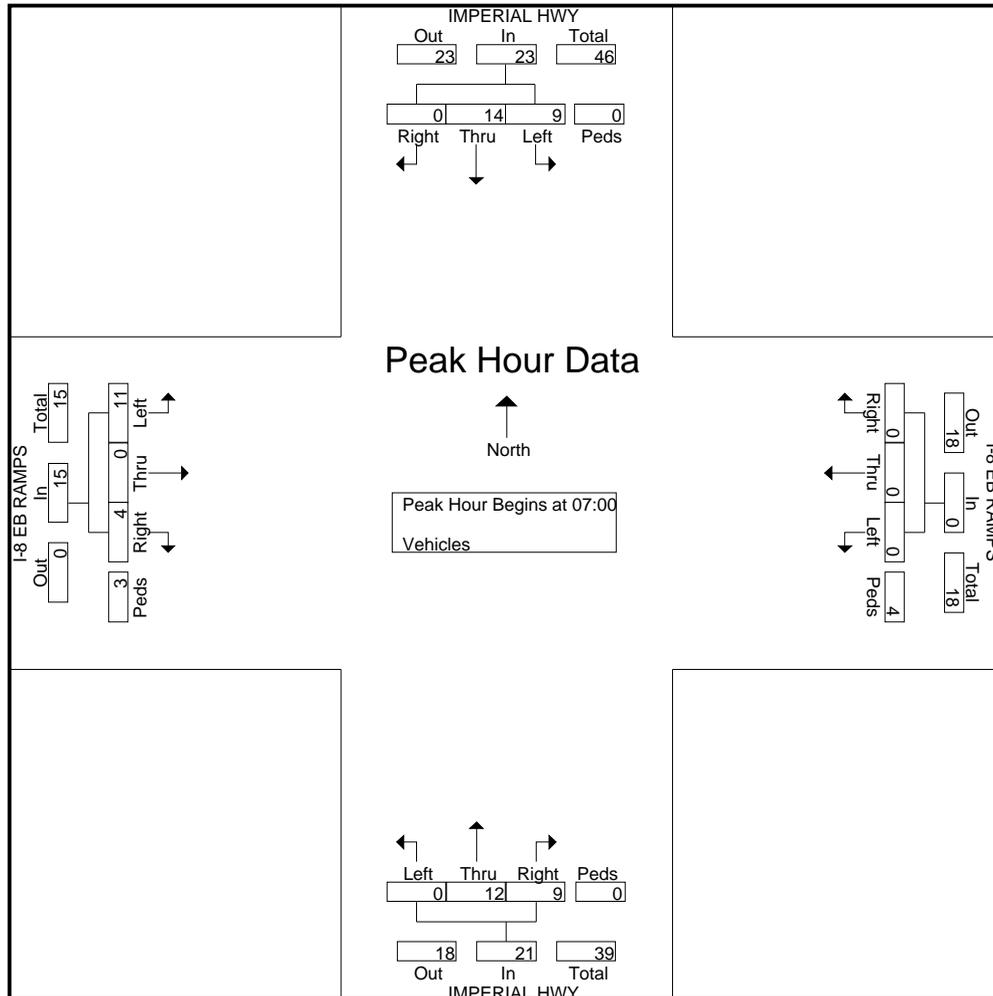


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 1099.03.IMPERIAL HWY.I-8 EB RAMPS
Site Code : 00000000
Start Date : 12/7/2010
Page No : 2

Start Time	IMPERIAL HWY Southbound					I-8 EB RAMPS Westbound					IMPERIAL HWY Northbound					I-8 EB RAMPS Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	1	4	0	0	5	0	0	0	1	1	0	4	2	0	6	6	0	0	1	7	19
07:15	5	6	0	0	11	0	0	0	2	2	0	2	2	0	4	3	0	2	0	5	22
07:30	3	3	0	0	6	0	0	0	0	0	0	3	2	0	5	2	0	2	2	6	17
07:45	0	1	0	0	1	0	0	0	1	1	0	3	3	0	6	0	0	0	0	0	8
Total Volume	9	14	0	0	23	0	0	0	4	4	0	12	9	0	21	11	0	4	3	18	66
% App. Total	39.1	60.9	0	0		0	0	0	100		0	57.1	42.9	0		61.1	0	22.2	16.7		
PHF	.450	.583	.000	.000	.523	.000	.000	.000	.500	.500	.000	.750	.750	.000	.875	.458	.000	.500	.375	.643	.750

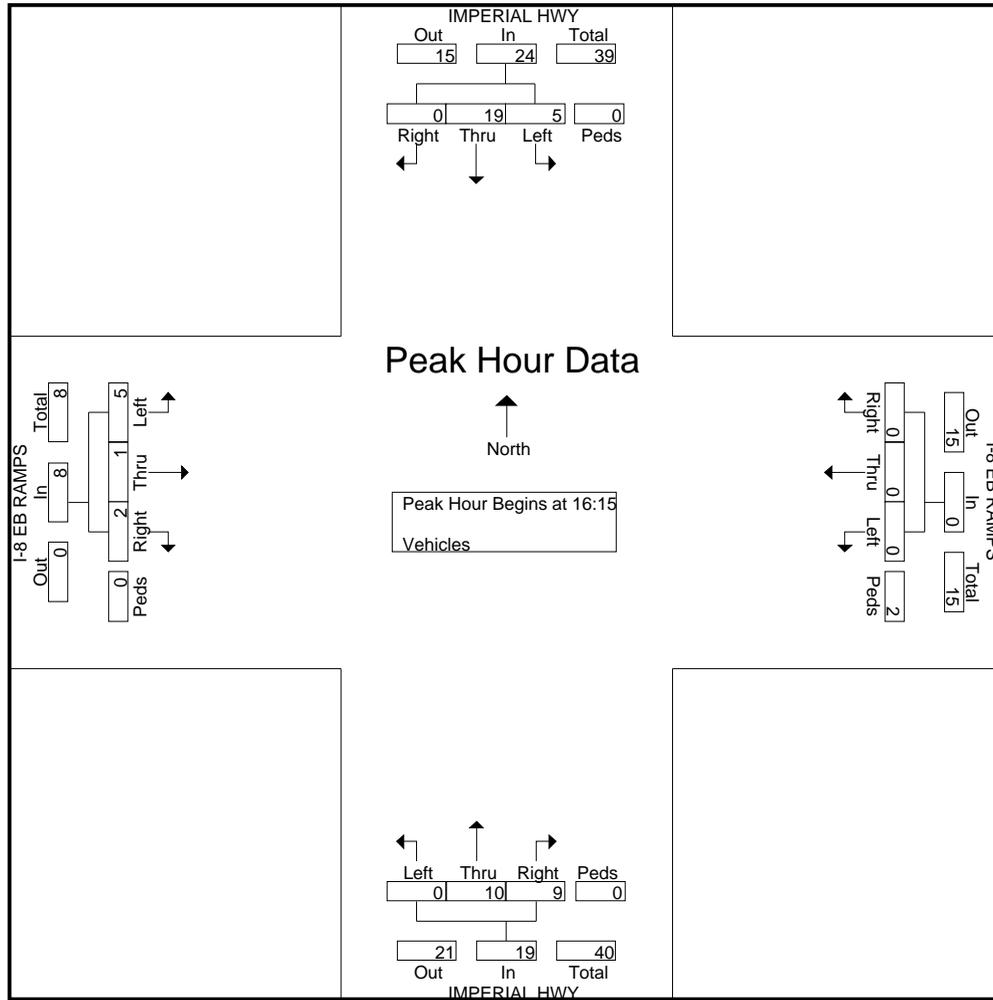


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 1099.03.IMPERIAL HWY.I-8 EB RAMPS
Site Code : 00000000
Start Date : 12/7/2010
Page No : 3

Start Time	IMPERIAL HWY Southbound					I-8 EB RAMPS Westbound					IMPERIAL HWY Northbound					I-8 EB RAMPS Eastbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 16:15																						
16:15	2	4	0	0	6	0	0	0	1	1	0	1	3	0	4	3	0	1	0	0	4	15
16:30	0	4	0	0	4	0	0	0	1	1	0	3	4	0	7	0	1	0	0	0	1	13
16:45	1	5	0	0	6	0	0	0	0	0	0	3	1	0	4	1	0	0	0	0	1	11
17:00	2	6	0	0	8	0	0	0	0	0	0	3	1	0	4	1	0	1	0	0	2	14
Total Volume	5	19	0	0	24	0	0	0	2	2	0	10	9	0	19	5	1	2	0	8	53	
% App. Total	20.8	79.2	0	0		0	0	0	100		0	52.6	47.4	0		62.5	12.5	25	0			
PHF	.625	.792	.000	.000	.750	.000	.000	.000	.500	.500	.000	.833	.563	.000	.679	.417	.250	.500	.000	.500	.883	

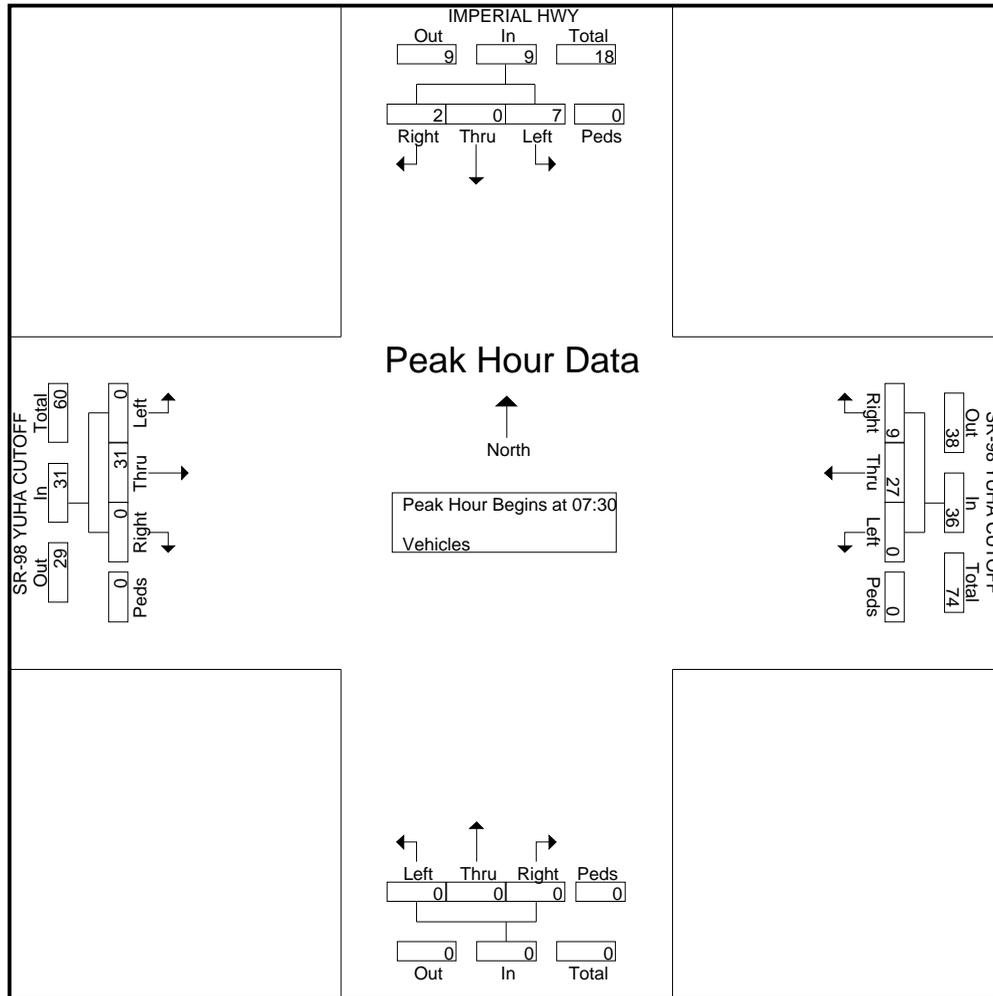


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 1099.04.IMPERIAL HWY.SR-98 YUHA CUTOFF
 Site Code : 00000000
 Start Date : 12/7/2010
 Page No : 2

Start Time	IMPERIAL HWY Southbound					SR-98 YUHA CUTOFF Westbound					Northbound					SR-98 YUHA CUTOFF Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30																					
07:30	2	0	2	0	4	0	11	0	0	11	0	0	0	0	0	0	8	0	0	8	23
07:45	0	0	0	0	0	0	2	3	0	5	0	0	0	0	0	0	4	0	0	4	9
08:00	3	0	0	0	3	0	3	3	0	6	0	0	0	0	0	0	8	0	0	8	17
08:15	2	0	0	0	2	0	11	3	0	14	0	0	0	0	0	0	11	0	0	11	27
Total Volume	7	0	2	0	9	0	27	9	0	36	0	0	0	0	0	0	31	0	0	31	76
% App. Total	77.8	0	22.2	0		0	75	25	0		0	0	0	0		0	100	0	0		
PHF	.583	.000	.250	.000	.563	.000	.614	.750	.000	.643	.000	.000	.000	.000	.000	.000	.705	.000	.000	.705	.704

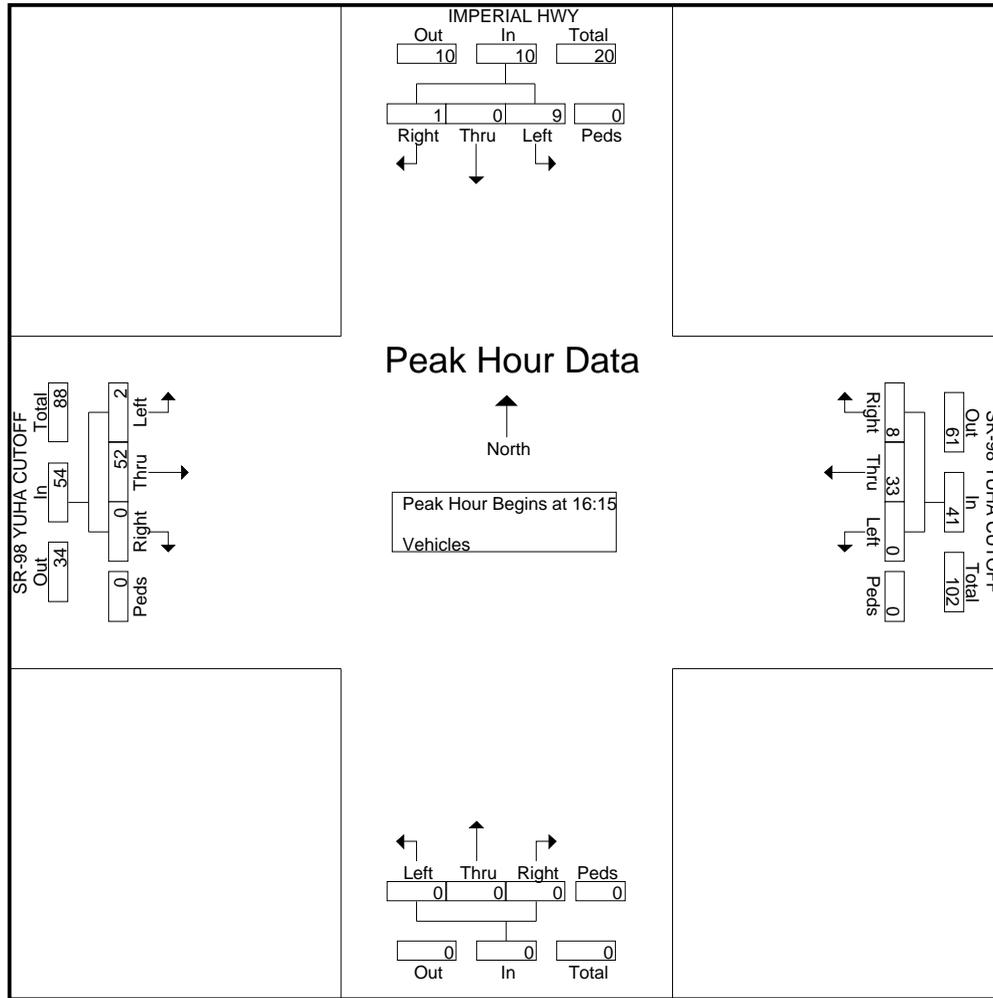


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 1099.04.IMPERIAL HWY.SR-98 YUHA CUTOFF
 Site Code : 00000000
 Start Date : 12/7/2010
 Page No : 3

Start Time	IMPERIAL HWY Southbound					SR-98 YUHA CUTOFF Westbound					Northbound					SR-98 YUHA CUTOFF Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:15																					
16:15	1	0	0	0	1	0	8	3	0	11	0	0	0	0	0	1	12	0	0	13	25
16:30	3	0	0	0	3	0	12	3	0	15	0	0	0	0	0	1	18	0	0	19	37
16:45	2	0	1	0	3	0	10	2	0	12	0	0	0	0	0	0	9	0	0	9	24
17:00	3	0	0	0	3	0	3	0	0	3	0	0	0	0	0	0	13	0	0	13	19
Total Volume	9	0	1	0	10	0	33	8	0	41	0	0	0	0	0	2	52	0	0	54	105
% App. Total	90	0	10	0		0	80.5	19.5	0		0	0	0	0		3.7	96.3	0	0		
PHF	.750	.000	.250	.000	.833	.000	.688	.667	.000	.683	.000	.000	.000	.000	.000	.500	.722	.000	.000	.711	.709



MetroCount Traffic Executive Vehicle Counts

342 -- English (ENU)

Datasets:

Site: [1099.01] WEST EVAN HEWES HWY (EAST OF IMPERIAL HWY) EASTBOUND
Direction: 6 - West bound A>B, East bound B>A. Lane: 0
Survey Duration: 15:14 Monday, December 06, 2010 => 14:15 Wednesday, December 08, 2010
File: 1099.0108Dec2010.EC0 (Regular)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, December 07, 2010 => 0:00 Wednesday, December 08, 2010
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Direction: East (bound)
In profile: Vehicles = 123 / 426 (28.87%)

* Tuesday, December 07, 2010 - Total=123, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
0	1	1	0	0	6	9	15	7	11	8	14	8	12	11	6	6	4	2	0	0	0	1	1
0	0	0	0	0	1	3	6	0	3	1	2	1	4	6	3	3	1	0	0	0	0	1	1
0	0	0	0	0	0	1	3	3	2	5	5	0	3	1	0	1	1	0	0	0	0	0	0
0	1	1	0	0	3	2	4	0	1	1	3	4	2	3	2	0	1	1	0	0	0	0	0
0	0	0	0	0	2	3	2	4	5	1	4	3	3	1	0	3	1	0	0	0	0	0	0

AM Peak 0645 - 0745 (16), AM PHF=0.67

MetroCount Traffic Executive Vehicle Counts

343 -- English (ENU)

Datasets:

Site: [1099.01] WEST EVAN HEWES HWY (EAST OF IMPERIAL HWY) WESTBOUND
Direction: 6 - West bound A>B, East bound B>A. Lane: 0
Survey Duration: 15:14 Monday, December 06, 2010 => 14:15 Wednesday, December 08, 2010
File: 1099.0108Dec2010.EC0 (Regular)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, December 07, 2010 => 0:00 Wednesday, December 08, 2010
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Direction: West (bound)
In profile: Vehicles = 129 / 426 (30.28%)

* Tuesday, December 07, 2010 - Total=129, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
2	1	1	0	0	2	1	6	4	4	8	13	11	12	14	10	12	6	5	9	0	1	5	2	-
1	0	0	0	0	1	1	0	1	0	1	5	2	3	6	2	6	1	1	3	0	1	1	1	-
0	0	0	0	0	1	0	3	1	1	2	4	3	2	3	4	2	1	1	3	0	0	1	0	-
0	0	1	0	0	0	0	3	0	2	0	4	3	3	2	3	3	2	0	3	0	0	1	0	-
1	1	0	0	0	0	0	0	2	1	5	0	3	4	3	1	1	2	3	0	0	0	2	1	-

AM Peak 1045 - 1145 (18), AM PHF=0.90

MetroCount Traffic Executive Vehicle Counts

344 -- English (ENU)

Datasets:

Site: [1099.02] IMPERIAL HWY (I-8 EB RAMPS- SR-98 YUHA CUTOFF) NORTHBOUND
Direction: 7 - North bound A>B, South bound B>A. Lane: 0
Survey Duration: 15:46 Monday, December 06, 2010 => 14:16 Wednesday, December 08, 2010
File: 1099.0208Dec2010.EC0 (Base)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, December 07, 2010 => 0:00 Wednesday, December 08, 2010
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Direction: North (bound)
In profile: Vehicles = 118 / 450 (26.22%)

* Tuesday, December 07, 2010 - Total=118, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
2	2	0	0	0	3	7	10	9	12	7	6	13	7	9	6	11	4	1	2	3	0	3	1	-
2	1	0	0	0	0	1	3	3	4	3	3	5	3	4	1	1	0	1	1	0	0	1	0	-
0	0	0	0	0	3	2	3	3	4	2	0	2	2	1	1	3	1	0	1	1	0	0	1	-
0	0	0	0	0	0	2	1	1	2	1	3	4	2	2	3	5	2	0	0	1	0	2	0	-
0	1	0	0	0	0	2	3	2	2	1	0	2	0	2	1	2	1	0	0	1	0	0	0	-

AM Peak 0845 - 0945 (12), AM PHF=0.75

MetroCount Traffic Executive Vehicle Counts

345 -- English (ENU)

Datasets:

Site: [1099.02] IMPERIAL HWY (I-8 EB RAMPS- SR-98 YUHA CUTOFF) SOUTHBOUND
Direction: 7 - North bound A>B, South bound B>A. Lane: 0
Survey Duration: 15:46 Monday, December 06, 2010 => 14:16 Wednesday, December 08, 2010
File: 1099.0208Dec2010.EC0 (Base)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, December 07, 2010 => 0:00 Wednesday, December 08, 2010
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Direction: South (bound)
In profile: Vehicles = 121 / 450 (26.89%)

* Tuesday, December 07, 2010 - Total=121, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	3	1	0	0	0	7	4	7	5	8	5	6	13	8	12	10	7	11	3	5	0	4	2	-
0	0	1	0	0	0	2	0	3	2	2	1	3	2	2	4	2	3	4	1	1	0	0	0	-
0	2	0	0	0	0	1	1	2	0	1	1	1	5	3	4	2	1	2	2	0	0	2	0	-
0	1	0	0	0	0	0	3	1	2	4	2	0	5	1	1	3	1	1	0	2	0	1	1	-
0	0	0	0	0	0	4	0	1	1	1	1	2	1	2	3	3	2	4	0	2	0	1	1	-

AM Peak 0645 - 0745 (8), AM PHF=0.50

MetroCount Traffic Executive Vehicle Counts

346 -- English (ENU)

Datasets:

Site: [1099.03] SR-98 YUHA CUTOFF (WEST OF IMPERIAL HWY) EASTBOUND
Direction: 6 - West bound A>B, East bound B>A. Lane: 0
Survey Duration: 16:14 Monday, December 06, 2010 => 14:15 Wednesday, December 08, 2010
File: 1099.0308Dec2010.EC0 (Regular)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, December 07, 2010 => 0:00 Wednesday, December 08, 2010
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Direction: East (bound)
In profile: Vehicles = 617 / 1985 (31.08%)

* Tuesday, December 07, 2010 - Total=617, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
10	8	3	5	2	7	10	22	30	43	29	46	34	25	43	34	54	33	38	37	25	32	28	19	
4	2	0	3	0	1	4	8	5	9	6	7	8	7	8	11	10	13	6	7	7	10	11	10	-
0	2	1	2	0	2	3	4	14	12	6	16	7	6	11	6	15	5	9	9	6	9	2	4	-
3	3	1	0	2	2	0	7	2	8	12	15	10	6	13	8	19	6	11	9	7	5	10	3	-
3	1	1	0	0	2	3	3	9	14	5	8	9	6	11	9	10	9	12	12	5	8	5	2	-

AM Peak 1115 - 1215 (47), AM PHF=0.73

MetroCount Traffic Executive Vehicle Counts

347 -- English (ENU)

Datasets:

Site: [1099.03] SR-98 YUHA CUTOFF (WEST OF IMPERIAL HWY) WESTBOUND
Direction: 6 - West bound A>B, East bound B>A. Lane: 0
Survey Duration: 16:14 Monday, December 06, 2010 => 14:15 Wednesday, December 08, 2010
File: 1099.0308Dec2010.EC0 (Regular)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, December 07, 2010 => 0:00 Wednesday, December 08, 2010
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Direction: West (bound)
In profile: Vehicles = 524 / 1985 (26.40%)

* Tuesday, December 07, 2010 - Total=524, 15 minute drops

	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
	4	3	6	11	19	22	34	32	34	44	30	36	24	25	35	29	34	24	14	17	15	15	7	10	
1	1	2	1	5	5	8	14	4	13	7	11	8	5	14	8	5	3	5	3	4	4	4	2	1	-
1	1	2	4	6	7	11	4	13	9	6	7	5	8	7	6	7	7	3	5	3	3	3	1	5	-
2	0	2	3	5	4	8	11	9	13	10	12	6	9	8	4	11	7	4	6	4	5	2	2	2	-
0	1	0	3	3	6	7	3	8	9	7	6	5	3	6	11	11	7	2	3	4	3	2	2	2	-

AM Peak 0900 - 1000 (44), AM PHF=0.85

Year 2009 Freeway Volumes

Interstate 8

Postmile	Description	Back Peak Hour	Back AADT	Ahead Peak Hour	Ahead AADT
10.01	Jct. Rte. 98	1,850	13,800	1,850	12,000
11.918	Ocotillo, Imperial Hwy Interchange	1,850	12,000	1,800	12,200
23.48	Dunaway Rd	1,800	12,200	1,800	12,200

APPENDIX B

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS - EXISTING

HCM Unsignalized Intersection Capacity Analysis
1: W. Evan Hewes Highway & Imperial Highway

Existing AM
3/10/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	1	1	1	6	0	0	12	18	11	4	12	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	1	7	0	0	13	20	12	4	13	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	74	80	14	76	74	26	14			32		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74	80	14	76	74	26	14			32		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	100	99			100		
cM capacity (veh/h)	909	802	1066	905	807	1050	1604			1581		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	3	7	45	18								
Volume Left	1	7	13	4								
Volume Right	1	0	12	1								
cSH	913	905	1604	1581								
Volume to Capacity	0.00	0.01	0.01	0.00								
Queue Length 95th (ft)	0	1	1	0								
Control Delay (s)	9.0	9.0	2.2	1.7								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.0	9.0	2.2	1.7								
Approach LOS	A	A										
Intersection Summary												
Average Delay				3.0								
Intersection Capacity Utilization				13.3%			ICU Level of Service			A		
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
2: I-8 WB Ramps & Imperial Highway

Existing AM
3/10/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔			↔	
Volume (veh/h)	0	0	0	8	1	11	4	19	0	0	15	4
Sign Control				Stop			Free			Free		
Grade				0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	9	1	12	4	21	0	0	16	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)							2					
Median type							None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	54	48	18	48	50	21	21			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	54	48	18	48	50	21	21			21		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	99	100			100		
cM capacity (veh/h)	930	841	1060	951	839	1057	1595			1595		
Direction, Lane #			WB 1	NB 1	SB 1							
Volume Total			22	25	21							
Volume Left			9	4	0							
Volume Right			12	0	4							
cSH			1922	1595	1700							
Volume to Capacity			0.01	0.00	0.01							
Queue Length 95th (ft)			1	0	0							
Control Delay (s)			8.6	1.3	0.0							
Lane LOS			A	A								
Approach Delay (s)			8.6	1.3	0.0							
Approach LOS			A									
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			14.4%			ICU Level of Service			A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
3: I-8 EB Ramps & Imperial Highway

Existing AM
3/10/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕					↕			↕	
Volume (veh/h)	11	0	4	0	0	0	0	12	9	9	14	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	4	0	0	0	0	13	10	10	15	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			2									
Median type							None				None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	53	58	15	55	53	18	15			23		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	53	58	15	55	53	18	15			23		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			99		
cM capacity (veh/h)	942	828	1064	935	833	1061	1603			1592		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	23	25
Volume Left	12	0	10
Volume Right	4	10	0
cSH	1284	1700	1592
Volume to Capacity	0.01	0.01	0.01
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.7	0.0	2.9
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	2.9
Approach LOS	A		A

Intersection Summary			
Average Delay		3.3	
Intersection Capacity Utilization	17.9%		ICU Level of Service A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Yuha Cut Off & Imperial Highway

Existing AM
3/10/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Volume (veh/h)	0	31	27	9	7	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	29	10	8	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	39				68	34
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	39				68	34
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1571				937	1039

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	34	39	10
Volume Left	0	0	8
Volume Right	0	10	2
cSH	1571	1700	958
Volume to Capacity	0.00	0.02	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization	13.3%		ICU Level of Service A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: W. Evan Hewes Highway & Imperial Highway

Existing PM
3/10/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	0	1	1	6	0	4	0	18	5	0	9	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	7	0	4	0	20	5	0	10	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	36	35	10	34	32	22	10			25		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	36	35	10	34	32	22	10			25		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	100	100			100		
cM capacity (veh/h)	965	858	1072	971	861	1055	1610			1589		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	11	25	10								
Volume Left	0	7	0	0								
Volume Right	1	4	5	0								
cSH	953	1003	1610	1589								
Volume to Capacity	0.00	0.01	0.00	0.00								
Queue Length 95th (ft)	0	1	0	0								
Control Delay (s)	8.8	8.6	0.0	0.0								
Lane LOS	A	A										
Approach Delay (s)	8.8	8.6	0.0	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				2.4								
Intersection Capacity Utilization				15.9%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
2: I-8 WB Ramps & Imperial Highway

Existing PM
3/10/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔			↔		
Volume (veh/h)	0	0	0	14	5	10	3	12	0	0	8	8	
Sign Control					Stop	Stop		Free			Free		
Grade					0%	0%		0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	0	0	15	5	11	3	13	0	0	9	9	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)						2							
Median type							None				None		
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	41	33	13	33	37	13	17			13			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	41	33	13	33	37	13	17			13			
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	100	100	100	98	99	99	100			100			
cM capacity (veh/h)	947	858	1067	973	854	1067	1600			1605			
Direction, Lane #	WB 1		NB 1		SB 1								
Volume Total	32		16		17								
Volume Left	15		3		0								
Volume Right	11		0		9								
cSH	1437		1600		1700								
Volume to Capacity	0.02		0.00		0.01								
Queue Length 95th (ft)	2		0		0								
Control Delay (s)	8.7		1.5		0.0								
Lane LOS	A		A										
Approach Delay (s)	8.7		1.5		0.0								
Approach LOS	A												
Intersection Summary													
Average Delay							4.6						
Intersection Capacity Utilization							13.3%	ICU Level of Service	A				
Analysis Period (min)							15						

HCM Unsignalized Intersection Capacity Analysis
3: I-8 EB Ramps & Imperial Highway

Existing PM
3/10/2011



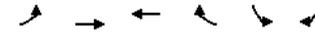
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕					↕			↕	
Volume (veh/h)	15	1	2	0	0	0	0	10	9	5	19	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	1	2	0	0	0	0	11	10	5	21	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			2									
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	47	52	21	49	47	16	21			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	47	52	21	49	47	16	21			21		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	100	100			100		
cM capacity (veh/h)	951	836	1057	946	841	1064	1595			1595		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	20	21	26
Volume Left	16	0	5
Volume Right	2	10	0
cSH	1062	1700	1595
Volume to Capacity	0.02	0.01	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.8	0.0	1.5
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	1.5
Approach LOS	A		

Intersection Summary			
Average Delay		3.2	
Intersection Capacity Utilization	15.3%		ICU Level of Service A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Yuha Cut Off & Imperial Highway

Existing PM
3/10/2011



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Volume (veh/h)	2	52	33	8	9	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	57	36	9	10	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	45				101	40
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	45				101	40
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1564				896	1031

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	59	45	11
Volume Left	2	0	10
Volume Right	0	9	1
cSH	1564	1700	996
Volume to Capacity	0.00	0.03	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.3	0.0	9.0
Lane LOS	A		A
Approach Delay (s)	0.3	0.0	9.0
Approach LOS			A

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization	14.4%		ICU Level of Service A
Analysis Period (min)	15		

APPENDIX C

CONSTRUCTION TRUCK / EMPLOYEE MATRIX & EXHIBIT 20-9, PASSENGER-CAR EQUIVALENTS ON TWO WAY AND DIRECTIONAL SEGMENTS IN THE HIGHWAY CAPACITY MANUAL, 2000

Summary of Traffic

Weeks	Employees
1 to 48	26
1 to 40	120
14 to 40	36
22 to 48	78
25 to 40	22
1 to 3	7
4 to 12	10
13 to 28	15
29 to 44	13
Maximum	297

Weeks	Trucks
1 to 48	6
2 to 40	51
14 to 21	8
22 to 37	36
25 to 40	22
10	12
25	7
1 to 3	7
4 to 12	10
5 to 28	15
29 to 44	13
Maximum	130

Passenger-car equivalents for extended two-way segments are determined from Exhibit 20-9 for estimating speeds and from Exhibit 20-10 for estimating percent time-spent-following. The terrain of extended two-way segments should be categorized as level or rolling.

EXHIBIT 20-9. PASSENGER-CAR EQUIVALENTS FOR TRUCKS AND RVs TO DETERMINE SPEEDS ON TWO-WAY AND DIRECTIONAL SEGMENTS

Vehicle Type	Range of Two-Way Flow Rates (pc/h)	Range of Directional Flow Rates (pc/h)	Type of Terrain	
			Level	Rolling
Trucks, E_T	0-600	0-300	1.7	2.5
	> 600-1,200	> 300-600	1.2	1.9
	> 1,200	> 600	1.1	1.5
RVs, E_R	0-600	0-300	1.0	1.1
	> 600-1,200	> 300-600	1.0	1.1
	> 1,200	> 600	1.0	1.1

EXHIBIT 20-10. PASSENGER-CAR EQUIVALENTS FOR TRUCKS AND RVs TO DETERMINE PERCENT TIME-SPENT-FOLLOWING ON TWO-WAY AND DIRECTIONAL SEGMENTS

Vehicle Type	Range of Two-Way Flow Rates (pc/h)	Range of Directional Flow Rates (pc/h)	Type of Terrain	
			Level	Rolling
Trucks, E_T	0-600	0-300	1.1	1.8
	> 600-1,200	> 300-600	1.1	1.5
	> 1,200	> 600	1.0	1.0
RVs, E_R	0-600	0-300	1.0	1.0
	> 600-1,200	> 300-600	1.0	1.0
	> 1,200	> 600	1.0	1.0

Level Terrain

Level terrain is any combination of horizontal and vertical alignment permitting heavy vehicles to maintain approximately the same speed as passenger cars; this generally includes short grades of no more than 1 or 2 percent.

Rolling Terrain

Rolling terrain is any combination of horizontal and vertical alignment causing heavy vehicles to reduce their speeds substantially below those of passenger cars, but not to operate at crawl speeds for any significant length of time or at frequent intervals; generally, this includes short- and medium-length grades of no more than 4 percent. Segments with substantial lengths of more than a 4 percent grade should be analyzed with the specific grade procedure for directional segments.

Heavy-Vehicle Adjustment Factor

Once values for E_T and E_R have been determined, the adjustment factor for heavy vehicles is computed using Equation 20-4.

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} \tag{20-4}$$

where

- P_T = proportion of trucks in the traffic stream, expressed as a decimal;
- P_R = proportion of RVs in the traffic stream, expressed as a decimal;

APPENDIX D
CUMULATIVE PROJECTS INFORMATION

4.13 TRANSPORTATION AND CIRCULATION

Coyote Wells Specific Plan Trip Generation	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
		Weekday Trip Generation					
Coyote Wells Specific Plan Phase I	538	102	32	134	32	102	134
Coyote Wells Specific Plan Phase II	2,648	243	106	349	122	251	373
Coyote Wells Specific Plan Phase III	4,391	555	199	754	217	565	782
Weekend Trip Generation							
Coyote Wells Specific Plan Phase I	750	137	50	188	50	138	188
Coyote Wells Specific Plan Phase II	3,073	314	141	455	157	322	479
Coyote Wells Specific Plan Phase III	5,266	689	283	973	301	699	1,001

Notes:

- 1 Trip rate shown for Law Enforcement Training Facility is based on SANDAG "Military" with a more conservative estimate of PM peak hour travel to reflect the limited off-site trips due to the wide range of amenities provided on-site
 - 2 Law Enforcement Training Participants and Full Time Employee (FTE) from Coyote Wells Specific Plan
 - 3 Similar to the Law Enforcement Training Facility, trip generation rates for the Motorsports Facility is based on SANDAG "Military" with more conservative estimate of daily trips and modified estimate of peak hour movements to reflect the greater likelihood of Motorsports Facility Users to visit off-site facilities than Law Enforcement Training Facility Participants
 - 4 Motorsports Facility Users and FTE (including Resort Hotel) from Coyote Wells Specific Plan
 - 5 Trip rate per SANDAG "Gasoline with Food Mart"
 - 6 Trip rate per SANDAG "Fast Food (without drive-through)"
 - 7 Trip rate per SANDAG "Storage"
 - 8 Trip rate per SANDAG "Estate, Urban or Rural (average 1-2 DU/acre)"
- Source: PMC, 2009

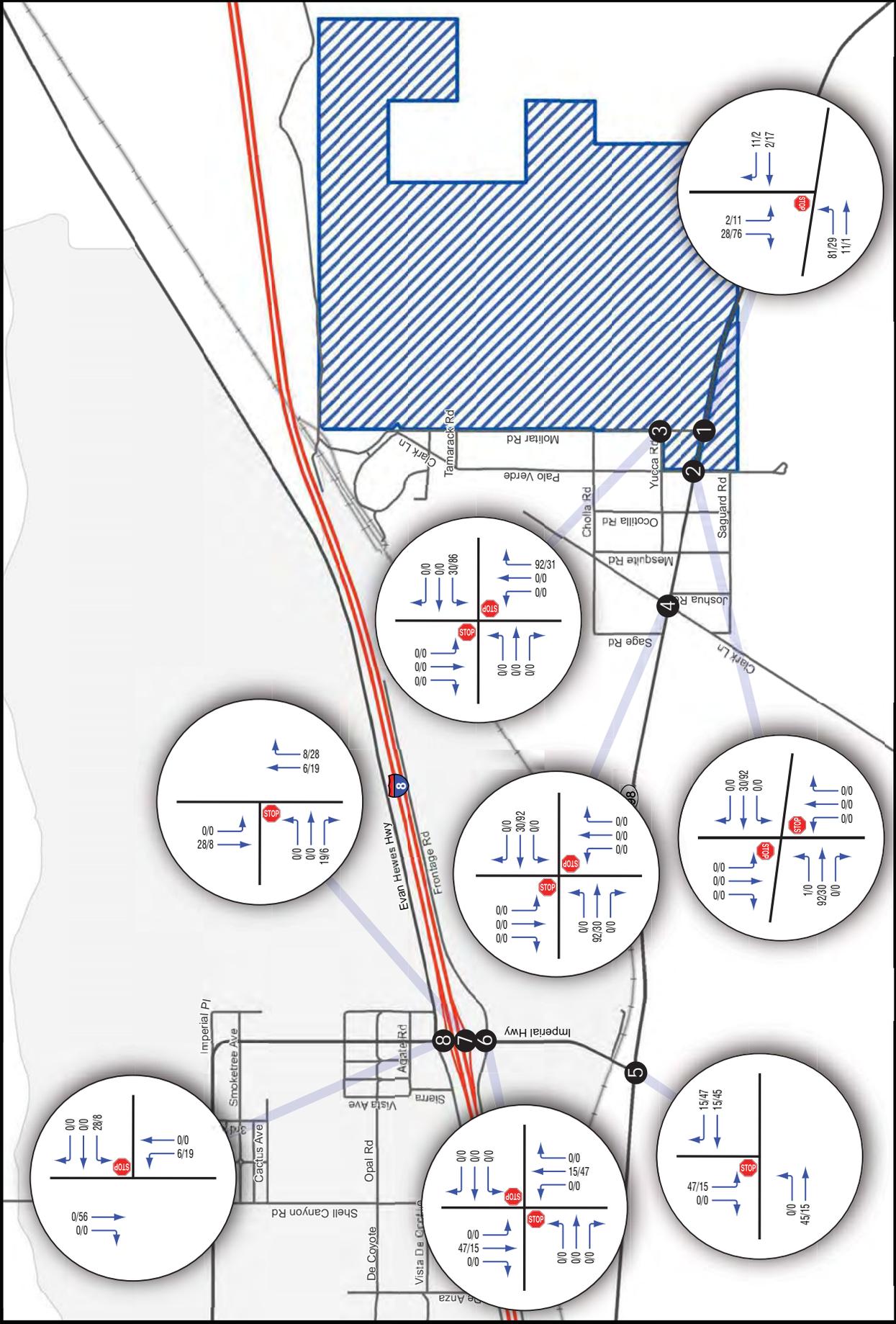


Figure 4.13-5

Phase I Project Weekday Traffic Volumes AM/PM Peak Hours



T:\CS\Work\Imperial, County of Coyote\Wells 28-0206\EIR 28-0206 002 Traffic Figures

APPENDIX E

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS – BASELINE WITHOUT CONSTRUCTION TRAFFIC

HCM Unsignalized Intersection Capacity Analysis
1: W. Evan Hewes Highway & Imperial Highway

Baseline No Project AM
11/29/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Volume (veh/h)	1	1	1	6	0	0	13	19	12	4	13	1	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	1	1	1	7	0	0	14	21	13	4	14	1	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	79	85	15	80	79	27	15						34
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	79	85	15	80	79	27	15						34
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	100	100	99	100	100	99						100
cM capacity (veh/h)	902	796	1065	898	802	1048	1603						1578
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	3	7	48	20									
Volume Left	1	7	14	4									
Volume Right	1	0	13	1									
cSH	908	898	1603	1578									
Volume to Capacity	0.00	0.01	0.01	0.00									
Queue Length 95th (ft)	0	1	1	0									
Control Delay (s)	9.0	9.0	2.2	1.6									
Lane LOS	A	A	A	A									
Approach Delay (s)	9.0	9.0	2.2	1.6									
Approach LOS	A	A											
Intersection Summary													
Average Delay	2.9												
Intersection Capacity Utilization	13.7%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
2: I-8 WB Ramps & Imperial Highway

Baseline No Project AM
11/29/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔			↔	↔	
Volume (veh/h)	0	0	0	8	1	12	4	20	0	0	16	4	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	0	0	9	1	13	4	22	0	0	17	4	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)							2						
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	57	50	20	50	52	22	22						22
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	57	50	20	50	52	22	22						22
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	100	100	99	100	99	100						100
cM capacity (veh/h)	925	839	1058	948	837	1055	1594						1594
Direction, Lane #			WB 1	NB 1	SB 1								
Volume Total			23	26	22								
Volume Left			9	4	0								
Volume Right			13	0	4								
cSH			1847	1594	1700								
Volume to Capacity			0.01	0.00	0.01								
Queue Length 95th (ft)			1	0	0								
Control Delay (s)			8.6	1.2	0.0								
Lane LOS			A	A									
Approach Delay (s)			8.6	1.2	0.0								
Approach LOS			A										
Intersection Summary													
Average Delay	3.2												
Intersection Capacity Utilization	14.5%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
3: I-8 EB Ramps & Imperial Highway

Baseline No Project AM
11/29/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔					↔			↔	
Volume (veh/h)	12	0	4	0	0	0	0	13	9	9	15	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	0	4	0	0	0	0	14	10	10	16	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)	2											
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	55	60	16	57	55	19	16			24		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55	60	16	57	55	19	16			24		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			99		
cM capacity (veh/h)	938	826	1063	932	831	1059	1601			1591		
Direction, Lane #	EB 1	NB 1	SB 1									
Volume Total	17	24	26									
Volume Left	13	0	10									
Volume Right	4	10	0									
cSH	1251	1700	1591									
Volume to Capacity	0.01	0.01	0.01									
Queue Length 95th (ft)	1	0	0									
Control Delay (s)	8.8	0.0	2.8									
Lane LOS	A		A									
Approach Delay (s)	8.8	0.0	2.8									
Approach LOS	A											
Intersection Summary												
Average Delay	3.3											
Intersection Capacity Utilization	18.0%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
4: Yuha Cut Off & Imperial Highway

Baseline No Project AM
11/29/2011

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Volume (veh/h)	0	33	28	9	7	2
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	36	30	10	8	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	40				71	35
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	40				71	35
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1569				933	1037
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	36	40	10			
Volume Left	0	0	8			
Volume Right	0	10	2			
cSH	1569	1700	954			
Volume to Capacity	0.00	0.02	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.0	8.8			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay	1.0					
Intersection Capacity Utilization	13.3%			ICU Level of Service		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
1: W. Evan Hewes Highway & Imperial Highway

11/29/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Volume (veh/h)	0	1	1	6	0	4	0	19	5	0	9	0	
Sign Control	Stop		Stop		Free		Free		Free		Free		
Grade	0%		0%		0%		0%		0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	1	1	7	0	4	0	21	5	0	10	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	38	36	10	35	33	23	10						26
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	38	36	10	35	33	23	10						26
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	100	100	99	100	100	100						100
cM capacity (veh/h)	964	857	1072	970	859	1053	1610						1588
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	2	11	26	10									
Volume Left	0	7	0	0									
Volume Right	1	4	5	0									
cSH	952	1001	1610	1588									
Volume to Capacity	0.00	0.01	0.00	0.00									
Queue Length 95th (ft)	0	1	0	0									
Control Delay (s)	8.8	8.6	0.0	0.0									
Lane LOS	A	A											
Approach Delay (s)	8.8	8.6	0.0	0.0									
Approach LOS	A	A											
Intersection Summary													
Average Delay	2.3												
Intersection Capacity Utilization	15.9%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
2: I-8 WB Ramps & Imperial Highway

11/29/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔				↔	
Volume (veh/h)	0	0	0	15	5	11	3	13	0	0	8	8	
Sign Control	Stop		Stop		Free		Free		Free		Free		
Grade	0%		0%		0%		0%		0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	0	0	16	5	12	3	14	0	0	9	9	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)	2												
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	42	34	13	34	38	14	17						14
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	42	34	13	34	38	14	17						14
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	100	100	98	99	99	100						100
cM capacity (veh/h)	944	857	1067	972	852	1066	1600						1604
Direction, Lane #			WB 1	NB 1	SB 1								
Volume Total			34	17	17								
Volume Left			16	3	0								
Volume Right			12	0	9								
cSH			1460	1600	1700								
Volume to Capacity			0.02	0.00	0.01								
Queue Length 95th (ft)			2	0	0								
Control Delay (s)			8.7	1.4	0.0								
Lane LOS			A	A									
Approach Delay (s)			8.7	1.4	0.0								
Approach LOS			A										
Intersection Summary													
Average Delay				4.6									
Intersection Capacity Utilization				13.3%			ICU Level of Service			A			
Analysis Period (min)				15									

HCM Unsignalized Intersection Capacity Analysis
3: I-8 EB Ramps & Imperial Highway

11/29/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	1	2	0	0	0	0	11	9	5	20	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	1	2	0	0	0	0	12	10	5	22	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			2									
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	49	54	22	51	49	17	22			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	49	54	22	51	49	17	22			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	100	100			100		
cM capacity (veh/h)	948	834	1055	943	839	1062	1594			1594		
Direction, Lane #	EB 1	NB 1	SB 1									
Volume Total	21	22	27									
Volume Left	17	0	5									
Volume Right	2	10	0									
cSH	1052	1700	1594									
Volume to Capacity	0.02	0.01	0.00									
Queue Length 95th (ft)	2	0	0									
Control Delay (s)	8.8	0.0	1.5									
Lane LOS	A		A									
Approach Delay (s)	8.8	0.0	1.5									
Approach LOS	A											
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			15.4%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
4: Yuha Cut Off & Imperial Highway

11/29/2011

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	55	35	8	9	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	60	38	9	10	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	47				107	42
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	47				107	42
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1561				890	1028
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	62	47	11			
Volume Left	2	0	10			
Volume Right	0	9	1			
cSH	1561	1700	989			
Volume to Capacity	0.00	0.03	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.3	0.0	9.0			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			14.5%		ICU Level of Service	A
Analysis Period (min)			15			

APPENDIX F

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS – BASELINE + CONSTRUCTION TRAFFIC

HCM Unsignalized Intersection Capacity Analysis
1: W. Evan Hewes Highway & Imperial Highway

Baseline + Construction AM
12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔				↔
Volume (veh/h)	1	1	1	52	0	4	13	19	266	8	13	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	1	57	0	4	14	21	289	9	14	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	230	370	15	227	226	165	15			310		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	230	370	15	227	226	165	15			310		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	92	100	100	99			99		
cM capacity (veh/h)	713	551	1065	718	663	879	1603			1251		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	3	61	324	24								
Volume Left	1	57	14	9								
Volume Right	1	4	289	1								
cSH	722	727	1603	1251								
Volume to Capacity	0.00	0.08	0.01	0.01								
Queue Length 95th (ft)	0	7	1	1								
Control Delay (s)	10.0	10.4	0.4	2.9								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.0	10.4	0.4	2.9								
Approach LOS	B	B										
Intersection Summary												
Average Delay	2.1											
Intersection Capacity Utilization	32.5%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
2: I-8 WB Ramps & Imperial Highway

Baseline + Construction AM
12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔				↔
Volume (veh/h)	0	0	0	30	1	212	6	74	0	0	50	16
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	33	1	230	7	80	0	0	54	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)							2					
Median type							None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	272	157	63	157	165	80	72			80		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	272	157	63	157	165	80	72			80		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	96	100	76	100			100		
cM capacity (veh/h)	518	732	1002	807	724	980	1528			1517		
Direction, Lane #			WB 1	NB 1	SB 1							
Volume Total			264	87	72							
Volume Left			33	7	0							
Volume Right			230	0	17							
cSH			1123	1528	1700							
Volume to Capacity			0.24	0.00	0.04							
Queue Length 95th (ft)			23	0	0							
Control Delay (s)			9.8	0.6	0.0							
Lane LOS			A	A								
Approach Delay (s)			9.8	0.6	0.0							
Approach LOS			A									
Intersection Summary												
Average Delay	6.2											
Intersection Capacity Utilization	24.0%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
3: I-8 EB Ramps & Imperial Highway

Baseline + Construction AM
12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↕					↕			↕		
Volume (veh/h)	66	0	10	0	0	0	0	15	12	43	37	0	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	72	0	11	0	0	0	0	16	13	47	40	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)	2												
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	157	163	40	162	157	23	40						29
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	157	163	40	162	157	23	40						29
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	91	100	99	100	100	100	100						97
cM capacity (veh/h)	792	708	1031	777	714	1054	1569						1584
Direction, Lane #	EB 1	NB 1	SB 1										
Volume Total	83	29	87										
Volume Left	72	0	47										
Volume Right	11	13	0										
cSH	911	1700	1584										
Volume to Capacity	0.09	0.02	0.03										
Queue Length 95th (ft)	7	0	2										
Control Delay (s)	9.8	0.0	4.0										
Lane LOS	A		A										
Approach Delay (s)	9.8	0.0	4.0										
Approach LOS	A												
Intersection Summary													
Average Delay	5.8												
Intersection Capacity Utilization	21.3%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
4: Yuha Cut Off & Imperial Highway

Baseline + Construction AM
12/1/2011

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Volume (veh/h)	5	33	28	9	7	30
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	36	30	10	8	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	40				82	35
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	40				82	35
tC, single (s)	4.1				*10.0	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	97
cM capacity (veh/h)	1569				845	1037
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	41	40	40			
Volume Left	5	0	8			
Volume Right	0	10	33			
cSH	1569	1700	995			
Volume to Capacity	0.00	0.02	0.04			
Queue Length 95th (ft)	0	0	3			
Control Delay (s)	1.0	0.0	8.8			
Lane LOS	A		A			
Approach Delay (s)	1.0	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay	3.2					
Intersection Capacity Utilization	16.0%			ICU Level of Service		
Analysis Period (min)	15			A		

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis
1: W. Evan Hewes Highway & Imperial Highway

Baseline + Construction PM
12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	0	1	1	260	0	8	0	19	51	4	9	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	283	0	9	0	21	55	4	10	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	76	95	10	68	67	48	10			76		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	76	95	10	68	67	48	10			76		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	69	100	99	100			100		
cM capacity (veh/h)	904	793	1072	920	821	1020	1610			1523		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	291	76	14								
Volume Left	0	283	0	4								
Volume Right	1	9	55	0								
cSH	912	923	1610	1523								
Volume to Capacity	0.00	0.32	0.00	0.00								
Queue Length 95th (ft)	0	34	0	0								
Control Delay (s)	9.0	10.7	0.0	2.3								
Lane LOS	A	B		A								
Approach Delay (s)	9.0	10.7	0.0	2.3								
Approach LOS	A	B										
Intersection Summary												
Average Delay				8.3								
Intersection Capacity Utilization				32.4%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
2: I-8 WB Ramps & Imperial Highway

Baseline + Construction PM
12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔				↔
Volume (veh/h)	0	0	0	19	5	45	9	25	0	0	208	62
Sign Control					Stop	Stop		Free			Free	
Grade					0%	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	21	5	49	10	27	0	0	226	67
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	334	307	260	307	340	27	293			27		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	334	307	260	307	340	27	293			27		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	97	99	95	99			100		
cM capacity (veh/h)	583	603	779	642	577	1048	1268			1587		
Direction, Lane #			WB 1	NB 1	SB 1							
Volume Total			75	37	293							
Volume Left			21	10	0							
Volume Right			49	0	67							
cSH			1607	1268	1700							
Volume to Capacity			0.05	0.01	0.17							
Queue Length 95th (ft)			4	1	0							
Control Delay (s)			9.4	2.1	0.0							
Lane LOS			A	A								
Approach Delay (s)			9.4	2.1	0.0							
Approach LOS			A									
Intersection Summary												
Average Delay						1.9						
Intersection Capacity Utilization						24.7%	ICU Level of Service	A				
Analysis Period (min)						15						

HCM Unsignalized Intersection Capacity Analysis
3: I-8 EB Ramps & Imperial Highway

Baseline + Construction PM
12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔	↔					↔			↔		
Volume (veh/h)	28	1	4	0	0	0	0	17	31	205	24	0	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	30	1	4	0	0	0	0	18	34	223	26	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)	2												
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	507	524	26	510	507	35	26						52
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	507	524	26	510	507	35	26						52
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	93	100	100	100	100	100	100						86
cM capacity (veh/h)	424	392	1050	419	401	1037	1588						1554
Direction, Lane #	EB 1	NB 1	SB 1										
Volume Total	36	52	249										
Volume Left	30	0	223										
Volume Right	4	34	0										
cSH	481	1700	1554										
Volume to Capacity	0.07	0.03	0.14										
Queue Length 95th (ft)	6	0	13										
Control Delay (s)	13.5	0.0	7.0										
Lane LOS	B		A										
Approach Delay (s)	13.5	0.0	7.0										
Approach LOS	B												
Intersection Summary													
Average Delay	6.6												
Intersection Capacity Utilization	29.3%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
4: Yuha Cut Off & Imperial Highway

Baseline + Construction PM
12/1/2011

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Volume (veh/h)	30	55	35	8	9	7
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	60	38	9	10	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	47				167	42
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	47				167	42
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	99
cM capacity (veh/h)	1561				806	1028
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	92	47	17			
Volume Left	33	0	10			
Volume Right	0	9	8			
cSH	1561	1700	890			
Volume to Capacity	0.02	0.03	0.02			
Queue Length 95th (ft)	2	0	1			
Control Delay (s)	2.7	0.0	9.1			
Lane LOS	A		A			
Approach Delay (s)	2.7	0.0	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay	2.6					
Intersection Capacity Utilization	21.2%			ICU Level of Service		
Analysis Period (min)	15			A		

APPENDIX G

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS – BASELINE + CONSTRUCTION TRAFFIC + CUMULATIVE PROJECTS TRAFFIC

HCM Unsignalized Intersection Capacity Analysis Baseline + Construction + Cumulative AM
 1: W. Evan Hewes Highway & Imperial Highway 12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Volume (veh/h)	1	1	1	52	0	4	13	19	266	8	13	1	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	1	1	1	57	0	4	14	21	289	9	14	1	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	230	370	15	227	226	165	15						310
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	230	370	15	227	226	165	15						310
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	100	100	92	100	100	99						99
cM capacity (veh/h)	713	551	1065	718	663	879	1603						1251
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	3	61	324	24									
Volume Left	1	57	14	9									
Volume Right	1	4	289	1									
cSH	722	727	1603	1251									
Volume to Capacity	0.00	0.08	0.01	0.01									
Queue Length 95th (ft)	0	7	1	1									
Control Delay (s)	10.0	10.4	0.4	2.9									
Lane LOS	B	B	A	A									
Approach Delay (s)	10.0	10.4	0.4	2.9									
Approach LOS	B	B											
Intersection Summary													
Average Delay				2.1									
Intersection Capacity Utilization				32.5%		ICU Level of Service		A					
Analysis Period (min)				15									

HCM Unsignalized Intersection Capacity Analysis Baseline + Construction + Cumulative AM
 2: I-8 WB Ramps & Imperial Highway 12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					↔	↔		↔				↔	
Volume (veh/h)	0	0	0	58	1	212	12	74	0	0	50	16	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	0	0	63	1	230	13	80	0	0	54	17	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)							2						
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	285	170	63	170	178	80	72						80
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	285	170	63	170	178	80	72						80
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	100	100	92	100	76	99						100
cM capacity (veh/h)	506	717	1002	789	709	980	1528						1517
Direction, Lane #			WB 1	NB 1	SB 1								
Volume Total			295	93	72								
Volume Left			63	13	0								
Volume Right			230	0	17								
cSH			1252	1528	1700								
Volume to Capacity			0.24	0.01	0.04								
Queue Length 95th (ft)			23	1	0								
Control Delay (s)			9.8	1.1	0.0								
Lane LOS			A	A									
Approach Delay (s)			9.8	1.1	0.0								
Approach LOS			A										
Intersection Summary													
Average Delay			6.5										
Intersection Capacity Utilization			24.4%		ICU Level of Service		A						
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis Baseline + Construction + Cumulative AM
 3: I-8 EB Ramps & Imperial Highway 12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↕					↕			↕		
Volume (veh/h)	66	0	29	0	0	0	0	21	20	43	65	0	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	72	0	32	0	0	0	0	23	22	47	71	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)	2												
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	198	209	71	214	198	34	71						45
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	198	209	71	214	198	34	71						45
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	90	100	97	100	100	100	100						97
cM capacity (veh/h)	744	668	992	703	677	1040	1530						1564
Direction, Lane #	EB 1	NB 1	SB 1										
Volume Total	103	45	117										
Volume Left	72	0	47										
Volume Right	32	22	0										
cSH	1070	1700	1564										
Volume to Capacity	0.10	0.03	0.03										
Queue Length 95th (ft)	8	0	2										
Control Delay (s)	9.9	0.0	3.1										
Lane LOS	A		A										
Approach Delay (s)	9.9	0.0	3.1										
Approach LOS	A												
Intersection Summary													
Average Delay	5.2												
Intersection Capacity Utilization	22.8%			ICU Level of Service			A						
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis Baseline + Construction + Cumulative AM
 4: Yuha Cut Off & Imperial Highway 12/1/2011

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Volume (veh/h)	5	78	43	24	54	30
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	85	47	26	59	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	73				155	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	73				155	60
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				93	97
cM capacity (veh/h)	1527				833	1006
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	90	73	91			
Volume Left	5	0	59			
Volume Right	0	26	33			
cSH	1527	1700	887			
Volume to Capacity	0.00	0.04	0.10			
Queue Length 95th (ft)	0	0	9			
Control Delay (s)	0.5	0.0	9.5			
Lane LOS	A		A			
Approach Delay (s)	0.5	0.0	9.5			
Approach LOS			A			
Intersection Summary						
Average Delay	3.6					
Intersection Capacity Utilization	19.7%			ICU Level of Service		
Analysis Period (min)	15			A		

HCM Unsignalized Intersection Capacity Analysis Baseline + Construction + Cumulative PM
 1: W. Evan Hewes Highway & Imperial Highway 12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	0	1	1	260	0	8	0	19	51	4	65	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	1	283	0	9	0	21	55	4	71	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	136	155	71	129	128	48	71			76		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	136	155	71	129	128	48	71			76		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	66	100	99	100			100		
cM capacity (veh/h)	826	734	992	840	761	1020	1530			1523		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	291	76	75								
Volume Left	0	283	0	4								
Volume Right	1	9	55	0								
cSH	844	844	1530	1523								
Volume to Capacity	0.00	0.35	0.00	0.00								
Queue Length 95th (ft)	0	39	0	0								
Control Delay (s)	9.3	11.5	0.0	0.4								
Lane LOS	A	B		A								
Approach Delay (s)	9.3	11.5	0.0	0.4								
Approach LOS	A	B										
Intersection Summary												
Average Delay	7.7											
Intersection Capacity Utilization	34.9%			ICU Level of Service	A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis Baseline + Construction + Cumulative PM
 2: I-8 WB Ramps & Imperial Highway 12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔				↔
Volume (veh/h)	0	0	0	27	5	45	28	25	0	0	264	62
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	29	5	49	30	27	0	0	287	67
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	436	409	321	409	442	27	354			27		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	436	409	321	409	442	27	354			27		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	95	99	95	97			100		
cM capacity (veh/h)	492	519	720	542	497	1048	1204			1587		
Direction, Lane #	WB 1		NB 1		SB 1							
Volume Total	84		58		354							
Volume Left	29		30		0							
Volume Right	49		0		67							
cSH	1288		1204		1700							
Volume to Capacity	0.06		0.03		0.21							
Queue Length 95th (ft)	5		2		0							
Control Delay (s)	10.1		4.4		0.0							
Lane LOS	B		A									
Approach Delay (s)	10.1		4.4		0.0							
Approach LOS	B											
Intersection Summary												
Average Delay	2.2											
Intersection Capacity Utilization	34.3%			ICU Level of Service	A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis Baseline + Construction + Cumulative PM
 3: I-8 EB Ramps & Imperial Highway 12/1/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕					↕			↕	
Volume (veh/h)	28	1	10	0	0	0	0	36	59	205	32	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	1	11	0	0	0	0	39	64	223	35	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			2									
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	552	584	35	558	552	71	35			103		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	552	584	35	558	552	71	35			103		
tC, single (s)	7.5	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	100	99	100	100	100	100			85		
cM capacity (veh/h)	371	360	1038	385	376	991	1577			1489		
Direction, Lane #	EB 1	NB 1	SB 1									
Volume Total	42	103	258									
Volume Left	30	0	223									
Volume Right	11	64	0									
cSH	499	1700	1489									
Volume to Capacity	0.08	0.06	0.15									
Queue Length 95th (ft)	7	0	13									
Control Delay (s)	13.8	0.0	6.9									
Lane LOS	B		A									
Approach Delay (s)	13.8	0.0	6.9									
Approach LOS	B											
Intersection Summary												
Average Delay			5.9									
Intersection Capacity Utilization			29.7%	ICU Level of Service	A							
Analysis Period (min)			15									

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis Baseline + Construction + Cumulative PM
 4: Yuha Cut Off & Imperial Highway 12/1/2011

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Volume (veh/h)	30	70	80	55	24	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	76	87	60	26	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	147				258	117
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	147				258	117
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				96	99
cM capacity (veh/h)	1435				714	935
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	109	147	34			
Volume Left	33	0	26			
Volume Right	0	60	8			
cSH	1435	1700	754			
Volume to Capacity	0.02	0.09	0.04			
Queue Length 95th (ft)	2	0	4			
Control Delay (s)	2.4	0.0	10.0			
Lane LOS	A		A			
Approach Delay (s)	2.4	0.0	10.0			
Approach LOS			A			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			26.2%	ICU Level of Service	A	
Analysis Period (min)			15			